Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems

Submitted by ATCO Gas Australia Pty Ltd

30 June 2015

As amended on 10 September 2015

Economic Regulation Authority
WESTERN AUSTRALIA

This document is available from the Economic Regulation Authority's website at www.erawa.com.au. For further information, contact:

Economic Regulation Authority
Perth, Western Australia
Phone: (08) 6557 7900

Contents

Tables

Figures

Final Decision

Background

1. On 17 March 2014, ATCO Gas Australia Pty Ltd (**ATCO**) submitted its proposed revised access arrangement, access arrangement information and other supporting information for the Mid-West and South-West Gas Distribution System (**GDS**) to the Economic Regulation Authority (**Authority**). The proposed revised access arrangement, access arrangement information and supporting information are available on the Authority's website.[1]

2. The role of the Authority is to determine whether the proposed revisions comply with the requirements of the National Gas Law (**NGL**) and National Gas Rules (**NGR**)[2], as implemented in Western Australia by the *National Gas Access (WA) Act 2009* (**NGL**(**WA**)).

3. The Authority notes that the current access arrangement had a review submission date of 1 July 2013.[3] However as a result of the amendment to rule 87 of the NGR by the Australian Energy Market Commission (**AEMC**) in November 2012, the Authority was required to exercise its power under rule 52(3) to extend the period for ATCO to submit its access arrangement proposal.

4. Furthermore, clause 35 of schedule 1 to the NGR extended the period for ATCO to submit its access arrangement proposal to three months after the date that the Authority's first Rate of Return Guidelines were published. On 16 December 2013, the Authority published a notice to this effect concurrently with the Authority's Rate of Return Guidelines.[4] The Authority notes that as 16 March 2014 was a Sunday, clause 28(3) to schedule 2 of the NGL(WA), operates to extend the review submission date to 17 March 2014.

5. ATCO's proposed revised access arrangement covers the period 1 July 2014 to 31 December 2019 (herein referred to as **AA4** or fourth access arrangement period). ATCO's current access arrangement (**AA3**) applies until a new proposed access arrangement is approved by the Authority.

6. The purpose of an access arrangement is to provide details about the terms and conditions, including price, upon which an independent third party (a user) can gain access to covered pipelines for the transport of gas.

7. The Authority invited submissions from interested parties on the revised access arrangement by publishing an initiating notice on 4 April 2014. On 2 May 2014, the Authority published an Issues Paper[5] in order to assist interested parties in

---

1 https://www.erawa.com.au/gas/gas-access/mid-west-and-south-west-gas-distribution-systems/access-arrangements/proposed-access-arrangement-for-period-2014-2019

2 Unless otherwise specified, the relevant version of the National Gas Rules being referred to and relied on in this Final Decision is Version 27.

3 Access Arrangement for the Mid-West and South-West Gas Distribution, 25 June 2012.

4 Economic Regulation Authority, *Notice, Final Guidelines, Rate of Return Guidelines for Gas Transmission and Distribution Networks*, 16 December, 2013.

5 https://www.erawa.com.au/gas/gas-access/mid-west-and-south-west-gas-distribution-systems/access-arrangements/proposed-access-arrangement-for-period-2014-2019

understanding some of the significant issues that the Authority intended to address in determining whether or not to approve the proposed revised access arrangement. Interested parties were invited to make submissions on the GDS Access Arrangement Proposal by 21 May 2014.

8. The following parties provided submissions on ATCO's proposed revised GDS access arrangement by the closing date:

- Alinta Energy
- Wesfarmers Kleenheat Gas Pty Ltd

9. No other submissions were received in response to the Issues Paper. The submissions from Alinta and Kleenheat are available on the Authority's website.[6]

10. As per rule 59(1) of the NGR [and section 65(a) of the NGL(WA)], in arriving at its draft decision, the Authority considered the public submissions that were received within the timeframe specified in its initiating notice (21 May 2014). The details of the public submissions that were received and considered by the Authority are set out in its draft decision on the proposed revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System, published on 14 October 2014 (the **Draft Decision**).

11. Under rule 59 of the NGR, the Authority is mandated to make a draft decision that indicates whether it is prepared to approve the access arrangement revision proposal as submitted. If the Authority is not prepared to accept the revised proposal, the draft decision must set out the nature of any amendments that are required in order to make the proposal acceptable to the Authority. An access arrangement draft decision must also include a statement of the reasons for the decision.[7]

12. The Authority Draft Decision, which did not approve the proposed revised access arrangement, was made with consideration of submissions received from interested parties and advice from technical advisors. The Authority's reasons for not approving the access arrangement revision proposal are set out in its Draft Decision, which is available on the Authority's website.[8]

13. The Draft Decision set out 45 amendments that the Authority required ATCO to implement in its revisions to the proposed revised access arrangement (herein referred to as the **revised proposal**).

14. Under rule 59(3) of the NGR, the Authority is required to fix a period of at least 15 business days for revision of the revised proposal (the **revision period**). The Authority fixed the revision period at six weeks from the date of the publication of the Draft Decision, expiring at 4:00 pm WST on 25 November 2014. Pursuant to rule 60(1) of the NGR, ATCO may, within the revision period, submit additions or other amendments to the access arrangement revisions proposal to address matters raised in the Draft Decision.

---

6 http://www.erawa.com.au/gas/gas-access/mid-west-and-south-west-gas-distribution-system/access-arrangements/proposed-access-arrangement-for-period-2014-2019/public-submissions

7 Rule 59(4) of the NGR.

8 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014.

15. The Authority subsequently extended the revision period following a written request from ATCO for an extension of two business days to 27 November 2014. The Authority published this extension in a notice on 24 November 2014. The Authority received ATCO's revised proposal and response to the Authority's Draft Decision by the close of the extended revision period on 27 November 2014. The Authority published a notice to this effect on its website on 1 December 2014.

16. On 23 December 2014, ATCO submitted a corrected version of its response to the Authority's Draft Decision on required amendments to the Access Arrangement for the GDS (**ATCO Response to the Authority's Draft Decision**) as a result of corrections it made to the document, subsequent to its initial submission date for the revised proposal on 27 November 2014. The Authority published the corrected version on its website on 7 January 2015 along with a list of amendments made by ATCO to the initial version.[9] All references to ATCO's response to the Draft Decision are dated 27 November 2014, as ATCO did not change the date on the front of its corrected documents.

17. Consistent with the requirements of rule 59(5)(c)(iii) of the NGR, the Authority also invited submissions on its Draft Decision for a period of 20 business days following the revision period allowed to ATCO. The closing date for submissions was 23 December 2014. As a result of the two business day extension to the revision period, the Authority also extended the public consultation period for its Draft Decision to provide interested parties with sufficient time to provide a submission. A new closing date was set at 12 January 2015.

18. The following parties provided submissions on the Authority's Draft Decision (including late submissions accepted):

- Alcock Brown-Neaves Group
- Alinta Energy
- ATCO Gas Australia
- The Chamber of Minerals and Energy of Western Australia
- Chamber of Commerce and Industry WA
- Cossill & Webley Consulting Engineers
- DBNGP (WA) Transmission Pty Ltd
- Danmar Homes
- Energy Networks Association
- EnergySafety
- Energy Supply Association of Australia
- Highbury Homes
- Housing Industry Association
- Masters Builders Association of WA
- Master Plumbers and Gasfitters Australia of WA

[9] ATCO Gas Australia, *Access Arrangement for the Mid-West and South-West Gas Distribution System*, 17 March 2014.

- Optimal Group Australia
- Peet Limited
- Property Council of Australia
- Rheem Australia
- Rinnai Australia
- SolCogen
- Urban Development Institute of Australia
- Western Australian Local Government Association
- Wesfarmers Kleenheat Gas

19. Copies of the public submissions received are available on the Authority's website.[10]

20. Under rule 62 of the NGR, the Authority must consider any submissions received on the Draft Decision within the consultation period and make a Final Decision to approve, or to refuse to approve, the proposed revised access arrangement (or proposed revised access arrangement revisions as submitted by ATCO).

21. After considering submissions received from ATCO and interested parties, the Final Decision of the Authority is to not approve the revised access arrangement proposal. The Authority's reasons for refusing to approve the revised proposal are set out in this Final Decision.

22. Under rule 64(1) of the NGR, when the Authority refuses to approve an access arrangement revision proposal, the Authority is required to itself propose revisions to the access arrangement. The Authority must make a decision giving effect to its proposal within two months of the date of this Final Decision.[11] The Authority will in due course publish its proposed revisions to the access arrangement and its decision to give effect to these revisions.

23. In accordance with rule 64(2) of the NGR, the Authority will formulate its proposed revisions having regard to the requirements of the NGL, ATCO's revised proposal and the Authority's reasons for refusing to approve the revised access arrangement.

24. Amendments to the proposed revised access arrangement that the Authority intends to include in its proposed revisions are set out in this Final Decision in Appendix 1 and also at the point in which each relevant element of the proposed revised access arrangement is considered.

25. On 21 August 2015, the Authority issued a public notice inviting interested parties to make submissions on proposed amendments to the Final Decision. Subsequent to the publication of the Final Decision, the Authority was made aware by ATCO and other parties of issues that required corrections and points of clarification. Additionally the Authority proposed amendments for issues it identified in the course of making the required corrections.

---

10 http://www.erawa.com.au/gas/gas-access/mid-west-and-south-west-gas-distribution-system/access-arrangements/proposed-access-arrangement-for-period-2014-2019/public-submissions

11 Rule 64(4) of the NGR.

26. The following parties provided submissions to the Authority's proposed amendments to the Final Decision (including late submissions accepted):

- Alinta Energy
- ATCO Gas Australia
- DBNGP (WA) Transmission Pty Ltd
- Energy Networks Association

27. Copies of the public submissions received are available on the Authority's website.[12]

28. The Authority has considered each of the submissions to its proposed amendments to the Final Decision. Where applicable, the submissions are addressed in the relevant sections below.

29. The Authority has made amendments to this Final Decision, pursuant to clause 20 of schedule 2 to the NGL (WA). The Final Decision, as so amended (Final Decision as amended on 10 September 2015), is the Authority's final decision on the access arrangement for the GDS, for the purposes of rule 62 of the NGR and for all other purposes.

Overview

30. The GDS has been a regulated pipeline for third party access since 18 July 2000. The first access arrangement for the GDS was approved under the *National Third Party Access Code for Natural Gas Pipeline Systems* (**the Code**) by the Authority's predecessor, the Office of Gas Access Regulation. The second access arrangement period for the GDS was approved by the Authority under the Code, and the third access arrangement period was approved by the Authority under the NGL(WA) and NGR.

31. The GDS consists of gas reticulation networks serving Geraldton, Eneabba, Bunbury, Busselton, Harvey, Pinjarra, Kemerton, Brunswick Junction, Capel and the Perth Greater Metropolitan Area including Mandurah. These combined networks constitute approximately 13,500km of gas mains and associated infrastructure.

32. ATCO was formed on 29 July 2011, when ATCO Ltd through its 100 per cent owned entities, acquired 100 per cent of the shares in WA Gas Networks Pty Ltd (**WAGN**) from Brookfield Infrastructure Group and DUET Group.[13]

33. ATCO Ltd controls ATCO Group, which is a Canadian based international group of companies that is engaged in the areas of structures and logistics, utilities, energy and technologies.[14]

---

12 http://www.erawa.com.au/gas/gas-access/mid-west-and-south-west-gas-distribution-system/access-arrangements/proposed-access-arrangement-for-period-2014-2019/public-submissions

13 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 26.

14 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 23.

34. ATCO is a privately owned subsidiary of Canadian Utilities Limited that is principally controlled by ATCO Ltd. Prior to the acquisition of the GDS, the access arrangement proposal for the third access arrangement period was submitted by WAGN.[15]

Summary of Key Points

Final Decision Key Points

35. The Authority has reviewed ATCO's proposed revised access arrangement for the fourth access arrangement period in accordance with the NGR and NGL, including the National Gas Objective (**NGO**).[16] In undertaking its assessment for the Draft Decision the Authority appointed a technical advisor, Energy Market Consulting associates (**EMCa**), to assist its review of ATCO's initial proposed capital and operating expenditure and related governance arrangements.[17] The Authority also appointed a finance expert, Dr Martin Lally of Capital Finance Consultants Ltd, to assist with its review of ATCO's cost of debt.[18]

36. In undertaking its consideration for this Final Decision, the Authority re-appointed EMCa to provide advice regarding some elements of ATCO's revised proposal for capital and operating expenditure.[19] The Authority also appointed Deloitte Access Economics (**Deloitte**) to undertake a review of ATCO's demand forecast and based on the findings of this review, prepare a revised demand forecast.[20] The Authority also appointed Chairmont to review the reasonableness of the Authority's debt hedging cost allowance in the cost of debt.[21] To ensure procedural fairness, the Authority provided the reports prepared by EMCa, Deloitte and Chairmont to ATCO prior to this Final Decision. The Authority considered ATCO's response in preparing this Final Decision.

37. The Authority's key amendments to ATCO's proposed revised access arrangement for the fourth access arrangement period required by this Final Decision are as follows:

- ATCO to identify and report on an asset health key performance indicator during the fourth access arrangement period for use as a new indicator for the fifth access arrangement period.
- Forecast operating expenditure for the fourth access arrangement period capped at $369.94 million,[22] with main adjustments addressing ATCO's proposed network, corporate support and business development and marketing expenditure.

---

15 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 17.

16 See section 23 of the NGL

17 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement*, June 2014.

18 M. Lally, *The Cost of Debt*, 10 October 2014.

19 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement – Addendum Report*, April 2015.

20 Deloitte Access Economics, *Review of ATCO Gas Australia's gas demand forecasts*, April 2015.

21 Chairmont Consulting, *ERA Hedging Costs in the Cost of Debt*.

22 Real $ million at 30 June 2014.

- Forecast capital expenditure for the fourth access arrangement period capped at $446.51 million,[23] with main adjustments addressing ATCO's proposed growth and sustaining capital expenditure.
- Rate of return revised to 6.02 per cent for 2015 which will be updated annually commencing each year on 1 January.
- Adopt the current cost accounting (**CCA**) approach to depreciation, based on the indexed value of the regulatory asset base rather than a transition to an historic cost accounting (**HCA**) approach to depreciation.
- Estimated cost of corporate income tax calculated by excluding capital contributions and commercial meters from the tax asset base and updating asset lives in the fourth access arrangement period.
- ATCO to maintain the current tariff variation mechanism for B2 and B3 customers for the fourth access arrangement period as in the current approved current access arrangement, and exclude cost pass-throughs for regulatory costs.
- Incorporation of a new cost pass through mechanism for the Authority to assess costs related to sustaining capital expenditure forecasts which have not been allowed as part of the Final Decision, but which have been assessed by the Authority as being an '*intermediate*' risk which requires appropriate treatment under Australian Standard (AS 4645). ATCO has not proposed its expenditure in accordance with this risk rating.
- B3 standing charge to be recalculated, and ATCO is to implement an increase gradually from 2015 to 2019 to ensure this standing charge at least meets the avoidable costs of connecting a new B3 customer by 2019.
- Tariffs for all other tariff classes are to decrease in line with the decreased revenues as per this Final Decision on an annual basis. Given the increase to the fixed charge, B3 volume charges will decrease by more than the volume charges for the other tariff classes to ensure that a typical 15 GJ per year B3 customer receives the same decrease to charges.

38. A comparison of key figures in ATCO's initial proposal with the Draft Decision and ATCO's revised proposal with the Final Decision are shown in Table 1 to 4.

[23] Real $ million at 30 June 2014.

Table 1 Comparison of ATCO's Proposals and Authority's Decisions – Total Revenue

Component	ATCO Initial Proposal	Authority Draft Decision	ATCO Revised Proposal	Authority Final Decision
Total Revenue (nominal $ millions)	1,208.50	836.10	1,124.52	915.22
Forecast Operating Expenditure (real $ millions in June 2014)	421.33	347.48	407.08	369.94
Forecast Capital Expenditure (real $ millions in June 2014)	606.92	286.44	592.22	446.51
WACC nominal post-tax (per cent)	8.53	5.94	7.64	6.02
Gamma	0.25	0.50	0.25	0.40
Regulatory Depreciation (nominal $ millions)[24]	127.34	94.91	127.68	124.28
Estimated Cost of Corporate Income Tax (nominal $ millions)	40.47	4.02	38.38	12.57
Return on Working Capital (nominal $ millions)	1.26	0.55	1.24	0.77

Source: ATCO Gas Australia, Tariff Model, September 2014. ATCO Gas Australia, Tariff Model, December 2014. ERA, GDS Tariff Model, October 2014. ERA, GDS Tariff Model, September 2015.

[24] In the Draft Decision the Authority removed the inflationary gain of $136.11 million as a separate line item in the building blocks. In the Final Decision the Authority has adopted ATCO's method and removes the inflationary gain from depreciation.

Table 2 Comparison of Tariffs in ATCO's Initial Proposal and Authority's Draft Decision – Tariffs (Nominal)

Percentage Change from previous period	1 Jan 2015	1 Jan 2016	1 Jan 2017	1 Jan 2018	1 Jan 2019
ATCO Initial Proposal					
A1, A2 and B1 Tariffs	5.1%	5.1%	5.1%	5.1%	5.1%
B2 Standing charge	7.1%	5.1%	5.1%	5.1%	5.1%
B2 Usage Charge 100 GJ	4.2%	5.1%	5.1%	5.1%	5.1%
B2 Usage Charge > 100 GJ	4.2%	5.1%	5.1%	5.1%	5.1%
B3 Standing Charge	90.0%	5.1%	5.1%	5.1%	5.1%
B3 Usage Charge >2<10 GJ	(28.6%)	5.1%	5.1%	5.1%	5.1%
B3 Usage Charge >10 GJ	(28.6%)	5.1%	5.1%	5.1%	5.1%
Draft Decision					
A1, A2 and B1 Tariffs	(30.0%)	2.2%	2.2%	2.2%	2.2%
B2 Standing charge	(30.0%)	2.2%	2.2%	2.2%	2.2%
B2 Usage Charge 100 GJ	(30.0%)	2.2%	2.2%	2.2%	2.2%
B2 Usage Charge > 100 GJ	(30.0%)	2.2%	2.2%	2.2%	2.2%
B3 Standing Charge	10.8%	10.2%	9.6%	9.1%	8.7%
B3 Usage Charge >2<10 GJ	(28.3%)	(4.1%)	(4.5%)	(5.0%)	(5.5%)
B3 Usage Charge >10 GJ	(38.5%)	(4.1%)	(4.5%)	(5.0%)	(5.5%)

Source: ATCO Gas Australia, Tariff Model, September 2014. ATCO Gas Australia, Tariff Model, December 2014.

Table 3 ATCO's Revised Proposal – Tariffs (Nominal) Percentage Change from Previous Period

Percentage Change from previous period	1 Jul 2015	1 Jan 2016	1 Jan 2017	1 Jan 2018	1 Jan 2019
ATCO Revised Proposal					
A1, A2 and B1 Tariffs	0.6%	0.6%	0.6%	0.6%	0.6%
B2 Standing charge	3.3%	3.2%	3.1%	3.0%	2.9%
B2 Usage Charge first 100 GJ	0.3%	0.3%	0.3%	0.3%	0.3%
B2 Usage Charge > 100 GJ	0.3%	0.3%	0.3%	0.3%	0.3%
B3 Standing Charge	21.4%	17.6%	15.0%	13.0%	11.5%
B3 Usage Charge First 2 GJ	(100.0%)	-	-	-	-
B3 Usage Charge >2<10 GJ	9.9%	(7.5%)	(8.6%)	(10.0%)	(11.7%)
B3 Usage Charge >10 GJ	9.9%	(7.5%)	(8.6%)	(10.0%)	(11.7%)

Source: ATCO Gas Australia, Tariff Model, December 2014.

Table 4 Authority's Final Decision – Tariffs (Nominal) Percentage Change from Previous Period

Percentage Change from previous period	1 Oct 2015	1 Jan 2016	1 Jan 2017	1 Jan 2018	1 Jan 2019
Final Decision					
A1, A2 and B1 Tariffs	(2.5%)	(8.2%)	(8.2%)	(8.2%)	(8.2%)
B2 Standing charge	(2.5%)	(8.2%)	(8.2%)	(8.2%)	(8.2%)
B2 Usage Charge 100 GJ	(2.5%)	(8.2%)	(8.2%)	(8.2%)	(8.2%)
B2 Usage Charge > 100 GJ	(2.5%)	(8.2%)	(8.2%)	(8.2%)	(8.2%)
B3 Standing Charge	9.9%	5.0%	13.8%	12.5%	11.5%
B3 Usage Charge First 2 GJ	(100.0%)	-	-	-	-
B3 Usage Charge >2<10 GJ	10.5%	(14.8%)	(21.8%)	(26.8%)	(35.4%)
B3 Usage Charge >10 GJ	10.5%	(14.8%)	(21.8%)	(26.8%)	(35.4%)

Source: ERA, GDS Tariff Model, September 2015.

Decision Making Framework

Regulatory Framework

39. The purpose of an access arrangement for a gas pipeline is to provide the details of the terms and conditions, including price, upon which an independent third party (the user) can gain access to the covered pipeline.

40. The requirements for an access arrangement are established by the NGL and NGR as enacted by the *National Gas (South Australia) Act 2008* and as implemented in Western Australia by the NGL(WA).

41. Pursuant to rule 100 of the NGR, all provisions of an access arrangement are required to be consistent with the National Gas Objective (**NGO**).

42. The National Gas Objective is defined in section 23 of the NGL(WA) as:

> The objective of this Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.

43. Sections 28(1) and (2) of the NGL(WA) specify the manner in which the Authority must perform or exercise its economic regulatory functions or powers.

> 28. Manner in which [Authority] must perform or exercise [Authority] economic regulatory functions or powers
>
> 1) The [Authority] must, in performing or exercising an [Authority] economic regulatory function or power, perform or exercise that function or power in a manner that will or is likely to contribute to the achievement of the National Gas Objective.
>
> 2) In addition, the [Authority] –
>
> a) must take into account the revenue and pricing principles –
>
> i) when exercising a discretion in approving or making those parts of an access arrangement relating to a reference tariff; or

ii) when making an access determination relating to a rate or charge for a pipeline service; and

b) may take into account the revenue and pricing principles when performing or exercising any other [Authority] economic regulatory function or power, if the [Authority] considers it appropriate to do so.

44. During the course of the third access arrangement, the AEMC made numerous changes to the NGR. In particular, rule 87 of the NGR has been updated extensively. The Authority addressed some of these changes, including the changes to rule 87, in its Rate of Return Guidelines published on 16 December 2013.

45. At the time when the proposed revisions for the third access arrangement period were submitted by WAGN, rule 87(1) of the NGR stated the following:[25]

> 87. Rate of return
>
> 1) The rate of return on capital is to be commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services.
>
> 2) In determining a rate of return on capital:
>
> a) it will be assumed that the service provider:
>
> i) meets benchmark levels of efficiency; and
>
> ii) uses a financing structure that meets benchmark standards as to gearing and other financial parameters for a going concern and reflects in other respects best practice; and
>
> b) a well accepted approach that incorporates the cost of equity and debt, such as the Weighted Average Cost of Capital, is to be used; and a well accepted financial model, such as the Capital Asset Pricing Model, is to be used.

46. The current rule 87 of the NGR states as follows:[26]

> 87. Rate of return
>
> 1) Subject to rule 82(3), the return on the projected capital base for each regulatory year of the access arrangement period is to be calculated by applying a rate of return that is determined in accordance with this rule 87 (the allowed rate of return).
>
> 2) The allowed rate of return is to be determined such that it achieves the allowed rate of return objective.
>
> 3) The allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services (the allowed rate of return objective).
>
> 4) Subject to subrule (2), the allowed rate of return for a regulatory year is to be:
>
> a) a weighted average of the return on equity for the access arrangement period in which that regulatory year occurs (as estimated under subrule (6)) and the return on debt for that regulatory year (as estimated under subrule (8)); and
>
> b) determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in rule 87A.
>
> 5) In determining the allowed rate of return, regard must be had to:

[25] Rule 87 of the National Gas Rules (Version 10).

[26] Rule 87 of the National Gas Rules.

a) relevant estimation methods, financial models, market data and other evidence;

b) the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and

c) any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

Return on equity

6) The return on equity for an access arrangement period is to be estimated such that it contributes to the achievement of the allowed rate of return objective.

7) In estimating the return on equity under subrule (6), regard must be had to the prevailing conditions in the market for equity funds.

Return on debt

8) The return on debt for a regulatory year is to be estimated such that it contributes to the achievement of the allowed rate of return objective.

9) The return on debt may be estimated using a methodology which results in either:

a) the return on debt for each regulatory year in the access arrangement period being the same; or

b) the return on debt (and consequently the allowed rate of return) being, or potentially being, different for different regulatory years in the access arrangement period.

10) Subject to subrule (8), the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting:

a) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the time when the [Authority's] decision on the access arrangement for that access arrangement period is made;

b) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the access arrangement period; or

c) some combination of the returns referred to in subrules (a) and (b).

11) In estimating the return on debt under subrule (8), regard must be had to the following factors:

a) the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective;

b) the interrelationship between the return on equity and the return on debt;

c) the incentives that the return on debt may provide in relation to capital expenditure over the access arrangement period, including as to the timing of any capital expenditure; and

d) any impacts (including in relation to the costs of servicing debt across access arrangement periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one access arrangement period to the next.

12) If the return on debt is to be estimated using a methodology of the type referred to in subrule (9)(b) then a resulting change to the service provider's total revenue must be effected through the automatic application of a formula that is specified in the decision on the access arrangement for that access arrangement period.

Rate of return guidelines

13) The [Authority] must, in accordance with the *rate of return consultative procedure*, make and publish guidelines (the *Rate of Return Guidelines*).

14) The Rate of Return Guidelines must set out:

    a) the methodologies that the [Authority] proposes to use in estimating the *allowed rate of return*, including how those methodologies are proposed to result in the determination of a return on equity and a return on debt in a way that is consistent with the *allowed rate of return objective*; and

    b) the estimation methods, financial models, market data and other evidence the [Authority] proposes to take into account in estimating the return on equity, the return on debt and the value of imputation credits referred to in rule 87A.

15) There must be *Rate of Return Guidelines* in force at all times after the date on which the [Authority] first publishes the *Rate of Return Guidelines* under these rules.

16) The [Authority] must, in accordance with the rate of return consultative procedure, review the Rate of Return Guidelines:

    a) at intervals not exceeding three years, with the first interval starting from the date that the first Rate of Return Guidelines are published under these rules; and

    b) at the same time as it reviews the Rate of Return Guidelines under clauses 6.5.2 and 6A.6.2 of the National Electricity Rules.[27]

17) The [Authority] may, from time to time and in accordance with the rate of return consultative procedure, amend or replace the Rate of Return Guidelines.

18) The Rate of Return Guidelines are not mandatory (and so do not bind the [Authority] or anyone else) but, if the [Authority] makes a decision in relation to the rate of return (including in an access arrangement final decision or an access arrangement final decision) that is not in accordance with them, the [Authority] must state, in its reasons for the decision, the reasons for departing from the guidelines.

19) If the Rate of Return Guidelines indicate that there may be a change of regulatory approach by the decision maker in future decisions, the guidelines should also (if practicable) indicate how transitional issues are to be dealt with.

47. In addition to the NGL(WA) and NGR, the Authority must also take into consideration the *National Gas Access (WA) (Local Provisions) Regulations 2009* (**WA Local Regulations**). Part 2 of the WA Local Regulations contain provisions which deal with the impact of reference tariffs on 'small users' (retailers) and 'small use customers'.[28]

Content of an Access Arrangement

48. Under section 2 of the NGL(WA), a "full access arrangement" means an access arrangement that:

- provides for price or revenue regulation as required by the NGR; and
- deals with all other matters for which the NGR require provisions to be made in an access arrangement.

27 The National Electricity Rules are not applicable in Western Australia.

28 This is, customers to whom less than 1 terajoule of gas is delivered at a delivery point in any year and who are not users.

49. The required content of a full access arrangement proposal is specified in rule 48 of the NGR.

> 48. Requirements for full access arrangement (and full access arrangement proposal)
>
> 1) A full access arrangement must:
>
> a) identify the pipeline to which the access arrangement relates and include a reference to a website at which a description of the pipeline can be inspected; and
>
> b) describe the pipeline services the service provider proposes to offer to provide by means of the pipeline; and
>
> c) specify the reference services; and
>
> d) specify for each reference service:
>
> i) the reference tariff; and
>
> ii) the other terms and conditions on which the reference service will be provided; and
>
> e) if the access arrangement is to contain queuing requirements – set out the queuing requirements; and
>
> f) set out the capacity trading requirements; and
>
> g) set out the extension and expansion requirements; and
>
> h) state the terms and conditions for changing receipt and delivery points; and
>
> i) if there is to be a review submission date – state the review submission date and the review commencement date; and
>
> j) if there is to be an expiry date – state the expiry date.
>
> 2) This rule extends to an access arrangement proposal consisting of a proposed full access arrangement.

50. As per rule 43 of the NGR, the service provider must submit access arrangement information when submitting a full access arrangement proposal, and that information must include the information specifically required by the NGL.[29] Access arrangement information is information that is reasonably necessary for users to understand the background to the access arrangement or the access arrangement proposal, and the basis and derivation of various elements of the access arrangement or the access arrangement proposal.[30]

51. The ATCO access arrangement is a full access arrangement, for which a proposed revised access arrangement and revised access arrangement information have been submitted by ATCO.[31]

[29] Rule 42(2) of the NGR.

[30] Rule 42(1) of the NGR.

[31] See the Authority's website for a copy of the proposed revised access arrangement and the revised access arrangement information.

Key Dates and Identification of the Pipeline

Regulatory Requirements

52. Rule 48(1)(a) of the NGR requires an access arrangement to identify the pipeline to which the access arrangement relates and to make reference to a website where a description of the pipeline can be inspected.

53. Rule 49(1)(a) of the NGR requires a full access arrangement to contain a review submission date and a revision commencement date but must not contain an expiry date.

54. Rule 50(1) of the NGR states that as a general rule, a review submission date will fall four years after the access arrangement takes effect and a revision commencement date will fall five years after the access arrangement takes effect. Under rule 50(2) of the NGR, the Authority must accept the service provider's proposed dates if it is in accordance with rule 50(1) of the NGR. If the service provider's proposed dates do not conform with rule 50(1) of the NGR, rule 50(4) of the NGR allows the Authority to approve dates that are consistent with the NGO and the revenue and pricing principles.

ATCO's Proposed Revisions

55. ATCO referred to the pipeline as the ATCO GDS at. The current access arrangement refers to the pipeline as the WAGN GDS, as that access arrangement was submitted by WAGN.

56. ATCO has also provided a website address (http://www.atcogas.com.au/About-Us/Coverage-Maps) at clause 3.[32] The website address contained in the current access arrangement is for the previous owner (WAGN).

57. At clause 2.2 of the proposed revised access arrangement, ATCO has proposed a review submission date of 1 September 2018 and a revision commencement date of 1 January 2020.[33]

58. The dates proposed by ATCO for the fourth access arrangement period result in a five and a half year access arrangement period beginning in a new financial year and ending at the end of a calendar year. ATCO states that the change in reporting period to align with the calendar year is to "simplify adjustments and comparisons between financial reporting required by the ERA".[34]

Draft Decision

59. The Authority considered that ATCO had met the requirements of rule 48(1)(a) of the NGR as it had appropriately identified the pipeline to which the access arrangement

---

32 ATCO Gas Australia, Access Arrangement for the Mid-West and South-West Gas Distribution System, 17 March 2014, clause 3, p. 6.

33 ATCO Gas Australia, Access Arrangement for the Mid-West and South-West Gas Distribution System, 17 March 2014, clauses 2.2(a) and (b), p. 5.

34 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 21.

relates and had also provided a website at which a description of the pipeline can be inspected.[35]

60. The Authority was satisfied that ATCO had met the requirements of rule 49(1)(a) of the NGR in providing both a review submission date and a revision commencement date.[36]

61. The Authority noted that both the review submission date and revision commencement date did not conform to the general requirements of rule 50(1) of the NGR. However, after considering ATCO's proposal, the Authority was satisfied that the dates were consistent with the NGO and revenue pricing principles as per rule 50(4) of the NGR.[37]

62. The Authority approved the identification of the pipeline and key dates as set out in clauses 2 and 3 of ATCO's proposed revised access arrangement.[38]

ATCO's Response to the Draft Decision

63. ATCO did not propose any new changes to clauses 2 and 3 of its proposed revised access arrangement in its revised proposal.

Submissions

64. The Authority has not received any submissions in relation to the key dates or the identification of the pipeline for ATCO's initial proposal, the Authority's Draft Decision or ATCO's revised proposal.

Considerations of the Authority

65. As ATCO did not propose any new changes to clauses 2 and 3 of the proposed revised access arrangement and given that the Authority received no submissions with respect to these two clauses, the Authority considers that ATCO has met the requirements of the NGO and NGR for the identification of the pipeline and key dates.

Final Decision

66. The Authority's Final Decision is to approve the identification of the pipeline and key dates as set out in clauses 2 and 3 of the proposed revised access arrangement.[39]

---

35 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, paragraph 51, p. 21.

36 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, paragraph 52, p. 21.

37 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, paragraph 53, p. 21.

38 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, paragraph 54, p. 21.

39 ATCO Gas Australia, *Access Arrangement for the Mid-West and South-West Gas Distribution System*, pp. 6-7.

Pipeline Services

Regulatory Requirements

67. A "pipeline service" is defined in section 2 of the NGL(WA).

> Pipeline service means –
>
> a) a service provided by means of a pipeline, including –
>
> i) a haulage service (such as firm haulage, interruptible haulage, spot haulage and backhaul); and
>
> ii) a service providing for, or facilitating, the interconnection of pipelines; and
>
> b) a service ancillary to the provision of a service referred to in paragraph (a), but does not include the production, sale or purchase of natural gas or processable gas.

68. Under rule 48(1) of the NGR, a full access arrangement proposal must, *inter alia*:

> a) identify the pipeline to which the access arrangement relates and include a reference to a website at which a description of the pipeline can be inspected; and
>
> b) describe the pipeline services the service provider proposes to offer to provide by means of the pipeline; and
>
> c) specify the reference services; and
>
> d) specify for each reference service:
>
> i) the reference tariff; and
>
> ii) the other terms and conditions on which the reference service will be provided.

69. Rule 101 of the NGR requires a full access arrangement to specify all reference services.

> 1) A full access arrangement must specify as a reference service:
>
> a) at least one pipeline service that is likely to be sought by a significant part of the market; and
>
> b) any other pipeline service that is likely to be sought by a significant part of the market and which the [Authority] considers should be specified as a reference service.

70. The Authority is required to take into account the revenue and pricing principles when deciding whether to specify a pipeline service as a reference service.[40]

ATCO's Proposed Revisions

71. Clause 4.1 of the proposed revised access arrangement defines pipeline services as reference services (haulage services) and non-reference services.[41]

72. Clause 4 of the proposed revised access arrangement does not specifically define or refer to ancillary services as reference services. However, the current access

---

40 Rule 101(2) of the NGR.

41 ATCO Gas Australia, *Access Arrangement for the Mid-West and South-West Gas Distribution System*, 17 March 2014, clause 4, p. 7.

arrangement defines ancillary services as reference services at clause 4.1(b). The five ancillary services included in clause 4 of the current access arrangement are still present in the proposed revised access arrangement at clauses 4.7 to 4.11.

73. The descriptions of the five reference services (haulage services) under the proposed revised access arrangement are set out in clauses 4.2 (Service A1), 4.3 (Service A2), 4.4 (Service B1), 4.5 (Services B2) and 4.6 (Service B3).

74. ATCO has made minor updates to clauses 4.2 (Service A1) and 4.3 (Service A2) to reflect the change in ownership from WAGN to ATCO. No other changes have been made to these clauses.

75. ATCO has updated clause 4.4 (Service B1) to include an option of allowing prospective users to take delivery of gas at a delivery point on the medium pressure/low pressure system using standard delivery facilities, which include a standard 18m^3/h meter or a standard meter with a badged capacity of more than 18m^3/h. Alternatively, prospective users can request user specific delivery facilities as per the current access arrangement. Clause 4.4 (Service B1) has also been updated to reflect the change in ownership from WAGN to ATCO.

76. Clauses 4.5 (Service B2) and 4.6 (Service B3) have been updated to include additional meter options. ATCO is proposing to offer users on Service B2 a standard meter with a badged capacity of less than 18m^3/h or the original standard 12m^3/h meter as per the current access arrangement. For Service B3, ATCO is proposing to offer users three meter options, being the original standard 8m^3/h meter as per the current access arrangement, a standard 10m^3/h meter or a standard meter with a badged capacity of less than 12m^3/h.

77. In summary, the proposed reference services (haulage services) are pipeline services applicable in the following circumstances:

- Service A1: at the time of application the user reasonably anticipates taking delivery of gas at a delivery point on the GDS of 35 terajoules (**TJ**) or more of gas per year and requests a contracted peak rate of 10 gigajoules (**GJ**) or more of gas per hour. Also the user requests specific delivery facilities be installed.
- Service A2: at the time of application the user reasonably anticipates taking delivery of gas at a delivery point on the GDS of between 10 and 35 TJ/year; or requests a contracted peak rate of less than 10 GJ/hour; or an above 10 TJ determination has been, or is likely to be made under the Retail Market Rules. Also, the user requests specific delivery facilities be installed.
- Service B1: at the time of application the user reasonably anticipates taking delivery of gas at a delivery point on the GDS of less than 10 TJ/year or requests a contracted peak rate of less than 10 GJ/hour. Prospective users can request user specific delivery facilities or can take delivery of gas at a delivery point on the medium pressure/low pressure system using standard delivery facilities, which include a standard 18m^3/h meter or a standard meter with a badged capacity of more than 18m^3/h.
- Service B2: the user requests a delivery of gas at a delivery point on the medium pressure/low pressure system using standard delivery facilities, which include a standard 12m^3/h meter or a standard meter with a badged capacity of less than 18m^3/h.
- Service B3: the user requests a delivery of gas at a delivery point on the medium pressure/low pressure system using standard delivery facilities, which include a

standard 8m^3/h meter, a standard 10m^3/h meter, or a standard meter with a badged capacity of less than 12m^3/h.

78. The reference tariffs are Tariff A1, A2, B1, B2 and B3, which correspond to Services A1, A2, B1, B2 and B3 respectively. ATCO's reference tariffs are specified in Annexure A to the proposed revised access arrangement.

79. Other pipeline services that ATCO is proposing to offer include:[42]

a) Deregistering a delivery point (clause 4.7): a delivery point is permanently deregistered by removing the standard delivery facilities to the extent ATCO considers necessary; removing the delivery point in accordance with the Retail Market Rules; and removing the delivery point from the Delivery Point Register. This service is available for A1, A2, B1, B2 and B3 customers.

b) Applying a meter lock (clause 4.8): a lock is applied to the valve that comprises part of the standard delivery facilities to prevent gas from being received at the relevant delivery point. This service is available for B2 and B3 customers.

c) Removing a meter lock (clause 4.9): a lock that was applied to a valve comprising part of the standard delivery facilities to prevent gas from being received at the relevant delivery point is removed. This service is available for B2 and B3 customers.

d) Disconnecting a delivery point (clause 4.10): physically disconnecting a delivery point to prevent gas from being delivered to the delivery point. This service is available for B2 and B3 customers.

e) Reconnecting a delivery point (clause 4.11): reconnecting a delivery point to allow gas to be delivered to the delivery point. This service is available for B2 and B3 customers.

80. Clause 4.7 has been updated to reflect the change in ownership from WAGN to ATCO.

81. Annexure C specifies the reference tariffs and tariff variation mechanism for the pipeline services listed in clauses 4.7 to 4.11.

82. The other terms and conditions on which the pipeline services are to be supplied are set out in the Template Haulage Contract (Annexure F to the proposed revised access arrangement). The Template Haulage Contract contains schedules setting out terms and conditions specific to each reference service (Schedules 1, 2, 3, 4 and 5 correspond to Services A1, A2, B1, B2 and B3 respectively) and the other applicable pipeline services as per paragraph 79.

83. For non-reference services, clause 4.12 has been updated to reflect the change in ownership from WAGN to ATCO. No other changes have been made to this clause.

Draft Decision

84. The Authority considered that the changes in wording to ATCO from WAGN in clauses 4.2, 4.3, 4.4 and 4.7 were necessary to reflect the change in ownership from WAGN to ATCO.

---

[42] ATCO Gas Australia, *Access Arrangement for the Mid-West and South-West Gas Distribution System*, 17 March 2014, clause 4, p. 9.

85. The Authority considered ATCO's amendments to include standard delivery facilities (Service B1) and different metering options (Services B2 and B3) and had no reason to believe that the changes would have a negative impact for current users or prospective users of these services. ATCO believes that users will be able to increase their consumption of gas without having to change over to a new service and incur an additional connection cost to cover the cost of the larger connection, meter box and meter.[43] In addition, the Authority received no submissions from interested parties regarding this amendment in ATCO's initial proposal.

86. The Authority approved the definitions of the pipeline services as set out in clauses 4.2 to 4.11 of the proposed revised access arrangement.

87. The Authority received no submissions and had no other information available to it to suggest that negotiated services referred to in clause 4.12 would likely be sought by a significant part of the market. Therefore, the Authority considered negotiated services to be non-reference services and approved clause 4.12 of the proposed revised access arrangement.

88. As discussed in the paragraph 72, there was no definition or reference to ancillary services throughout clause 4 of the proposed revised access arrangement. However, ATCO does refer to these pipeline services as ancillary reference services in chapter 4 of its access arrangement information, in addition to providing a definition of ancillary services in the glossary to the access arrangement information.[44] Clause 4.1(b) of the current access arrangement for the GDS specifically refers to ancillary services as reference services to be offered.

89. The Authority sought clarification from ATCO as to whether ancillary services are reference services due to the inconsistency between the access arrangement and access arrangement information. ATCO did not provide the Authority with sufficient reasoning behind its decision to remove the definition of ancillary services from clause 4.1 of the proposed revised access arrangement whilst maintaining the reference to it in the access arrangement information. The Authority noted ATCO's response that ancillary services are reference services, but this would not have been clear to readers of the proposed revised access arrangement unless they also referred to the access arrangement information and glossary to the access arrangement information and the NGL(WA).

90. The Authority did not approve clause 4.1 of the proposed revised access arrangement. The Authority considered that it was necessary to define "ancillary services" and requested that ATCO amend its proposed revised access arrangement to specify ancillary services as a reference service, under pipeline services.

ATCO's Response to the Draft Decision

91. In its response to the Draft Decision, ATCO states that it has implemented Required Amendment 1 from the Authority's Draft Decision to clarify that Ancillary Services are

---

43 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 39.

44 ATCO Gas Australia, *Glossary: Access Arrangement Information*, 17 March 2014, p. 1.

reference services. ATCO's revised proposal indicates that Required Amendment 1 of the Authority's Draft Decision has been implemented in full.[45] [46]

Submissions

92. The Authority has not received any submissions in relation to pipeline services for ATCO's initial proposal, the Authority's Draft Decision or ATCO's revised proposal.

Considerations of the Authority

93. The Authority considers that ATCO has implemented Required Amendment 1 of the Draft Decision in full. Furthermore, as the Authority received no submissions with respect to pipeline services on ATCO's proposed revised access arrangement, the Draft Decision or ATCO's revised proposal, the Authority considers that clause 4 of the proposed revised access arrangement satisfies the requirements of the NGR and NGL(WA).

Final Decision

94. The Authority's Final Decision is to approve pipeline services, reference services and reference tariffs as set out in clause 4 of the proposed revised access arrangement.[47]

Total Revenue

Revenue Building Blocks

Regulatory Requirements

95. Rule 76 of the NGR provides that total revenue is to be determined for each regulatory year of the access arrangement period using a building block approach:

> 76. Total revenue
>
> Total revenue is to be determined for each regulatory year of the access arrangement period using the building block approach in which the building blocks are:
>
> a) a return on the projected capital base for the year; and
>
> b) depreciation on the projected capital base for the year; and
>
> c) the estimated cost of corporate income tax for the year; and
>
> d) increments of decrements for the year resulting from the operation of incentive mechanism to encourage gains in efficiency; and
>
> e) a forecast of operating expenditure for the year.

---

45 ATCO Gas Australia, *Access Arrangement for the Mid-West and South-West Gas Distribution System*, 26 November 2014, clause 4, p. 8.

46 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 17.

47 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, pp. 8-11.

96. ATCO has applied the building block methodology, including an estimate of the tax liability, to determine the total revenue for the fourth access arrangement period.

ATCO's Proposed Revisions

97. ATCO has calculated total revenue in accordance with the building block approach, as the sum of the following:

- forecast operating expenditure;
- return on the projected capital base;
- depreciation of the projected capital base;
- estimated cost of corporate income tax (net of imputation credits); and
- estimated return on working capital.

98. ATCO implemented a number of changes to the assumptions in the revenue modelling for the fourth access arrangement period as a result of changes to the NGR. ATCO:

- Adopted a transition approach for depreciation. ATCO applied straight line depreciation to the CCA treatment of the opening capital base at 1 July 2014 and straight line depreciation to the HCA treatment for capital additions during the fourth access arrangement period.
- Included equity raising costs in revenue modelling for the fourth access arrangement period, reflecting the reality that a benchmark firm may wish to raise equity to fund its investment program.
- Included an estimate of the tax liability consistent with new rule 87 of the NGR.

99. ATCO did not include revenues from non-reference services in total revenue. The terms and conditions of non-reference services are negotiated outside the access arrangement.

100. Table 5 shows ATCO's initial proposal for total revenue of $1,208.50 million.[48]

[48] Nominal Dollars. ATCO Gas Australia, *Tariff Model*, September 2014.

Table 5 ATCO's Initial Proposal of Total Revenue (Nominal) Building Blocks (AA4)

Nominal $ Million	July to Dec 2014	2015	2016	2017	2018	2019	Total
Operating Expenditure	36.88	77.03	79.83	83.60	87.98	91.89	457.21
Return on Capital Base	42.96	90.55	98.48	106.96	115.50	123.91	578.36
Depreciation	4.83	15.52	20.45	24.86	28.91	32.74	127.33
Corporate Income Tax	2.64	7.44	8.26	11.11	14.16	15.53	59.13
Imputation Credits	(0.66)	(1.86)	(2.07)	(2.78)	(3.54)	(3.88)	(14.78)
Return on Working Capital	0.10	0.20	0.19	0.22	0.26	0.30	1.26
Total Revenue	**86.74**	**188.88**	**205.15**	**223.97**	**243.27**	**260.49**	**1,208.50**

Source: ATCO Gas Australia, Tariff Model, September 2014.

Draft Decision

101. The Authority assessed ATCO's proposed total revenue in the following chapters:

- Demand Forecast;
- Key Performance Indicators;
- Operating Expenditure;
- Opening Capital Base;
- Projected Capital Base;
- Rate of Return;
- Gamma;
- Depreciation;
- Taxation; and
- Return on Working Capital.

102. The Authority noted that the introduction of rule 87(4) of the NGR, which requires the allowed rate of return to be determined on a nominal basis, meant that an inflationary gain arose when a nominal rate is used to compute the return on the nominal capital base. ATCO proposed to remove this inflationary gain from its depreciation allowance. The Authority required ATCO to adopt the current cost accounting approach for its depreciation schedule for the regulatory asset base. The Authority did not consider that the inflationary gain should be offset from the nominal depreciation and treated the inflationary gain as a separate item in the revenue building block as shown in Table 6.

103. The Authority did not accept ATCO's proposed total revenue for the fourth access arrangement period under rule 76 of the NGR. The Authority's approved total revenue in nominal dollars is set out in Table 6.

Table 6 Authority Draft Decision Approved Total Revenue (Nominal) Building Blocks (AA4)

Nominal $ Million	Jun to Dec 2014	2015	2016	2017	2018	2019	Total
Forecast Operating Expenditure	32.26	64.46	66.16	67.77	70.48	72.43	373.56
Return on Projected Capital Base	29.52	61.36	64.76	67.14	69.17	71.07	363.02
Depreciation of Projected Capital Base	15.06	36.23	39.98	43.22	46.80	50.58	231.87
Estimated Cost of Corporate Income Tax	8.13	-	-	-	-	-	8.13
Imputation Credits	(4.07)	-	-	-	-	-	(4.07)
Estimated Return on Working Capital	0.14	0.10	0.14	0.16	0.17	0.19	0.90
Inflationary Gain							
Return on Projected Capital Base	(11.23)	(23.14)	(24.42)	(25.31)	(26.08)	(26.79)	(136.96)
Return on Working Capital	(0.05)	(0.04)	(0.06)	(0.06)	(0.07)	(0.07)	(0.35)
Authority Approved Total Revenue (Nominal) Building Blocks	**69.76**	**138.98**	**146.56**	**152.92**	**160.47**	**167.40**	**836.10**

Source: ERA, GDS Tariff Model, October 2014.

ATCO's Response to the Draft Decision

104. In its response to the Authority's Draft Decision ATCO did not accept the Authority's required amendment for total revenue. ATCO considered that the values in Table 6 of the Draft Decision do not result in an access arrangement that complies with the NGR or the NGL.[49]

105. ATCO engaged HoustonKemp Economists to evaluate the Draft Decision against the NGO. HoustonKemp concluded that the Draft Decision if repeated in the Final Decision will not satisfy or be likely to contribute to the achievement of the NGO.[50]

106. ATCO has not incorporated the inflationary gain building block into its revised proposal because it considers that:

---

49 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014.

50 ATCO Gas Australia, Appendix 1.1, *Evaluation of Economic Regulation Authority's Draft Decision against the National Gas Objective*, Greg Houston, HoustonKemp, 26 November 2014.

- the ERA is incorrect in its view about the reasons for the inflationary gain;
- the inflationary gain does not relate to the return on assets rather it results wholly from the indexation of the capital base for inflation;
- working capital is not subject to indexation, so to remove an amount for inflationary gain would result in less total revenue than that properly calculated under rule 76 of the NGR and required by the RPP; and
- Rule 76 of the NGR sets out a complete listing of the building blocks and does not provide for a new separate building block to be added.

107. ATCO's revised calculation of total revenue is shown in Table 7.

Table 7 ATCO's Revised Proposed Total Revenue (Nominal) Building Blocks (AA4)

Nominal $ Million	Jun to Dec 2014	2015	2016	2017	2018	2019	Total
Operating Expenditure	32.61	74.82	77.71	81.21	85.47	90.20	442.02
Return on Capital Base	38.06	80.00	87.14	94.88	102.62	109.82	512.53
Depreciation	4.84	15.35	20.54	24.94	29.00	33.01	127.68
Corporate Income Tax	6.91	8.71	7.57	7.01	6.40	4.45	41.05
Return on Working Capital	0.15	0.21	0.20	0.21	0.23	0.25	1.24
Total Revenue	**82.58**	**179.09**	**193.16**	**208.25**	**223.72**	**237.72**	**1124.52**

Source: ATCO Gas Australia, Tariff model, November 2014.

Submissions

108. The Authority did not receive any submissions that addressed the calculation of total revenue. Public submissions in relation to the total revenue building blocks are discussed under the appropriate chapters identified in paragraph 109.

Considerations of the Authority

109. The Authority assessed ATCO's proposed revised total revenue in the following chapters:

- Demand Forecast;
- Key Performance Indicators;
- Operating Expenditure;
- Opening Capital Base;
- Projected Capital Base;
- Rate of Return;
- Gamma;
- Depreciation;
- Taxation; and
- Return on Working Capital.

110. The Authority has considered ATCO's revised proposal to remove the inflationary gain from its depreciation allowance.

Inflationary Gain

111. ATCO maintains its initial position that the double count of inflation only arises as a result of applying indexation to the capital base and the best way to avoid this problem is to not index the capital base. However, ATCO recognises that a change from an approach where the capital base is indexed to one where it is no longer indexed can result in higher short-term prices for customers. Therefore, ATCO has resubmitted its transitional approach to depreciation to reduce the price impact on customers.

112. ATCO's transitional approach to depreciation will apply HCA to all capital additions that occur from 1 July 2014 and progressively apply HCA to the past capital base over the next two regulatory periods.

113. ATCO's depreciation schedule for the fourth access arrangement period will be determined by applying:

- straight-line depreciation to the HCA value of all capital additions to occur during the fourth access arrangement period (from 1 July 2014); and
- straight-line depreciation to the CCA value of the opening capital base in any year of the period and subtracting an amount to remove the double counting of inflation.

114. ATCO's transitional approach uses the AER's PTRM method (which removes the double count associated with indexation from the depreciation building block) during the fourth access arrangement period to the indexed opening capital base and all new capital during the fourth access arrangement period is not indexed.

115. ATCO considers the only way to remove the double count of inflation that occurs with the CCA approach is to remove it in the calculation of the depreciation building block.

116. ATCO considers that the ERA's required amendment to remove the inflationary gain as a separate item in the revenue building block does not comply with the rules of the NGR as:

- the ERA is incorrect in its view about the reasons for the inflationary gain;
- the NGR requires a nominal rate of return to be applied: this means the double count cannot be removed from the return on capital because if it were the return would be real.
- rule 76 of the NGR sets out a complete listing of the building blocks and does not provide for a new separate building block to be added;

117. ATCO considers that removing the double count from the depreciation calculation is allowed as long as the depreciation schedule is compliant with rule 89 of the NGR, which outlines the criteria for the depreciation schedule and the circumstances where deferral of depreciation may occur.

118. Finally, ATCO states that if transparency is desired, the removal of inflation from the depreciation building block can be expressly acknowledged and shown.

119. The Authority does not accept ATCO's proposed transitional approach for depreciation in paragraphs 2074 to 2076. The Authority requires ATCO to adopt the

CCA approach to depreciation which is consistent with rule 89 of the NGR. The Authority's required CCA approach to depreciation necessitates a removal of the inflationary gain.

120. The Authority has further considered ATCO's revised proposal to remove the inflationary gain from its depreciation allowance in paragraphs 2077 to 2081. The Authority accepts ATCO's proposal to remove the inflationary gain from depreciation. The Authority has decided to remove the inflationary gain using the AER's PTRM method (which removes the double count associated with indexation from the depreciation building block). The Authority notes that the removal of the inflationary gain does not constitute a deferral of depreciation under rule 89(2) of the NGR.

121. The Authority agrees with ATCO that rule 76 of the NGR sets out a complete listing of the building blocks and does not provide for a new separate building block to be included. In the Draft Decision the Authority required ATCO to treat the inflationary gain as a separate line item in the building block for the benefit of clearly identifying the inflationary gain. The Authority considers that transparency is desired and requires the removal of inflation from the depreciation building block to be expressly acknowledged and shown as a separate line item.

Working capital

122. ATCO has not adopted the Authority's inflationary adjustment in its calculation of return on working capital. ATCO states that its proposal does not index the working capital and there is no double compensation for inflation.

123. The Authority notes that it will not remove an inflationary adjustment as the working capital method chosen by ATCO treats working capital as annual cashflow and not an asset.

124. The return on working capital will be treated as part of ATCO's operating expenditure.

Final Decision

125. The Authority has considered ATCO's response to the Draft Decision. The Authority does not approve ATCO's revised proposed total revenue for the fourth access arrangement period. The Authority's reasoning for each building block is set out in the chapters identified in paragraph 109.

126. The Authority does not accept ATCO's proposed transitional approach for depreciation. The Authority requires ATCO to adopt the CCA approach to depreciation. The Authority accepts ATCO's proposal to remove the inflationary gain that arises from the CCA approach to depreciation from the depreciation building block. However, the Authority requires the removal of inflation from the depreciation building block to be expressly acknowledged and shown as a separate line item.

127. The Authority's approved total revenue in nominal dollars is set out in Table 8.

Table 8 Authority Approved Total Revenue (Nominal) Building Blocks (AA4)

Nominal $ Million	Jun to Dec 2014	2015	2016	2017	2018	2019	Total
Regulatory Operating Expenditure	31.26	69.39	70.31	72.12	74.61	76.66	394.35
Operating Expenditure	31.13	69.22	70.16	71.99	74.51	76.58	393.59
Return on Working Capital	0.13	0.18	0.15	0.13	0.11	0.07	0.77
Return on Capital Base	29.83	62.42	67.30	71.40	74.90	78.17	384.03
Regulatory Depreciation	7.02	17.66	21.00	23.47	26.04	29.09	124.28
Depreciation	16.61	37.37	42.26	46.02	49.70	53.78	245.74
Inflationary Gain	(9.58)	(19.71)	(21.26)	(22.55)	(23.66)	(24.69)	(121.46)
Regulatory Corporate Income Tax	5.48	5.61	1.48	-	-	-	12.57
Corporate Income Tax	9.13	9.35	2.46	-	-	-	20.95
Imputation Credits	(3.65)	(3.74)	(0.98)	-	-	-	(8.38)
Authority Approved Total Revenue	**73.59**	**155.08**	**160.08**	**167.00**	**175.56**	**183.92**	**915.22**

Source: ERA, GDS Tariff Model, September 2015.

Required Amendment 1

The proposed revised access arrangement values for total revenue (nominal) must reflect the values in Table 8.

Demand Forecast

Regulatory Requirements

128. Rule 72 of the NGR contains requirements for the provision of information in an access arrangement in relation to demand.

> 72. Specific requirements for access arrangement information relevant to price and revenue regulation
>
> (1) The access arrangement information for a full access arrangement proposal (other than an access arrangement variation proposal) must include the following:
>
> (a) if the access arrangement period commences at the end of an earlier access arrangement period:
>
> ...
>
> (iii) usage of the pipeline over the earlier access arrangement period showing:
>
> (A) for a distribution pipeline, minimum, maximum and average demand…
>
> (B) for a distribution pipeline, customer numbers in total and by tariff class …
>
> …
>
> (d) to the extent it is practicable to forecast pipeline capacity and utilisation of pipeline capacity over the access arrangement period, a forecast of pipeline capacity and utilisation of pipeline capacity over that period and the basis on which the forecast has been derived; …

129. In addition, rule 74 contains specific requirements for the provision of forecasts and estimates.

> 74. Forecasts and estimates
>
> (1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.
>
> (2) A forecast or estimate:
>
> (a) must be arrived at on a reasonable basis; and
>
> (b) must represent the best forecast or estimate possible in the circumstances.

ATCO's Proposed Revisions

130. ATCO's demand forecast for the fourth access arrangement period was developed on the basis of historical data and recommendations from external consultants.[51] It included a forecast overall increase of 2.1 per cent in the number of connections and in the consumption of gas by tariff class (A1, A2, B1, B2, B3) over the fourth access arrangement period.[52]

---

51 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 42.

52 ATCO's proposed business development and marketing campaign is discussed in detail in the Operating Expenditure chapter of this Draft Decision.

131. ATCO modified its demand forecast methodology by:

- Using Effective Degree Day (**EDD**) weather normalisation rather than Heating Degree Day (**HDD**) weather normalisation in order to minimise demand forecast bias from extreme one-off weather events.[53]
- Adopting a long-term price elasticity factor, which was based on the identification and validation of long-term sensitivity factors.[54]

132. ATCO's initial forecast customer numbers by tariff class over the fourth access arrangement period are shown in Table 9.

Table 9 ATCO Initial Proposal Forecast Customer Numbers (AA4)

Tariff Class	2014	2015	2016	2017	2018	2019
A1	70	70	70	70	70	69
A2	112	120	126	132	138	145
B1	1,410	1,468	1,528	1,589	1,652	1,717
B2	9,932	10,346	10,792	11,270	11,781	12,326
B3	664,763	679,549	694,284	708,948	723,542	738,065

Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Table 9, p. 57.

133. ATCO's initial forecast customer usage (GJ) by tariff class over the fourth access arrangement period is shown in Table 10. Based on Table 10, ATCO forecast a decline in the annual average growth in usage for B2 customers from 2014 to 2016 and an annual increase from 2016 to 2019.

Table 10 ATCO Initial Proposal Forecast Customer Usage (AA4, GJ)

Tariff Class	2014	2015	2016	2017	2018	2019
A1	11,922,065	12,029,555	12,143,688	12,370,908	12,673,841	13,008,602
A2	2,103,786	2,208,644	2,315,018	2,445,268	2,593,941	2,752,930
B1	1,652,379	1,667,284	1,691,685	1,729,881	1,775,516	1,823,895
B2	1,194,484	1,177,612	1,169,788	1,173,334	1,183,114	1,195,512
B3	9,970,563	10,089,375	10,274,990	10,501,759	10,747,244	10,999,195

Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Table 9, p. 57.

134. As shown in Table 11, ATCO initially forecast an increase of 7,239 customers across all tariff classes over the fourth access arrangement period as a result of its proposed business development and marketing campaign. ATCO's proposed business development and marketing expenditure is explained in detail in the Operating Expenditure chapter of the Final Decision.

[53] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, pp. 47 – 49.

[54] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, pp. 49 – 50.

Table 11 ATCO's Initial Proposal Forecast New Connections and Usage from Business Development and Marketing Operating Expenditure (AA4)

Tariff Class	July to Dec 2014	2015	2016	2017	2018	2019
Customer numbers	781	1,439	1,287	1,244	1,244	1,244
Customer usage (TJ)	50.0	114.2	144.1	175.9	208.3	240.7

Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Table 16, p. 84.

Draft Decision

135. The Authority noted that the actual average amount of gas consumed by customers in all tariff classes was 6 per cent lower than forecast in the third access arrangement period.[55] This was due largely to the lower than forecast consumption by both A1 (industrial) and B3 (residential) customers.[56]

136. ATCO attributed lower A1 usage primarily to the closure of two industrial plants. ATCO attributed lower average B3 usage to warmer weather, retail gas price increases, subsidised electricity prices, the advent of solar photovoltaic cells and improved gas appliance efficiency levels.

137. The Authority commissioned its technical advisor, Energy Market Consulting associates (EMCa), to investigate the key drivers behind ATCO's demand forecast for the fourth access arrangement period.

138. EMCa noted that, out of ATCO's customer base of 676,287 customers in 2014:

- 664,763 (98.3 per cent) are B3 customers, and they account for 37 per cent of total usage;
- 70 (0.01 per cent) are A1 customers, and they account for 44 per cent of total usage; and
- 11,454 (1.69 per cent) are A2, B1 and B2 customers, and they account for 19 per cent of total usage.

139. ATCO forecast a 2.1 per cent growth in B3 customers per year over the fourth access arrangement period. This is:[57]

- less than the average growth rate over the third access arrangement period (2.3 per cent); and
- less than the B3 customer growth rate from 2006 to 2013 (2.8 per cent).

140. Figure 1 shows both the actual annual growth in B3 customers from 2006 and ATCO's initial projected annual growth in B3 customers over the fourth access arrangement period.

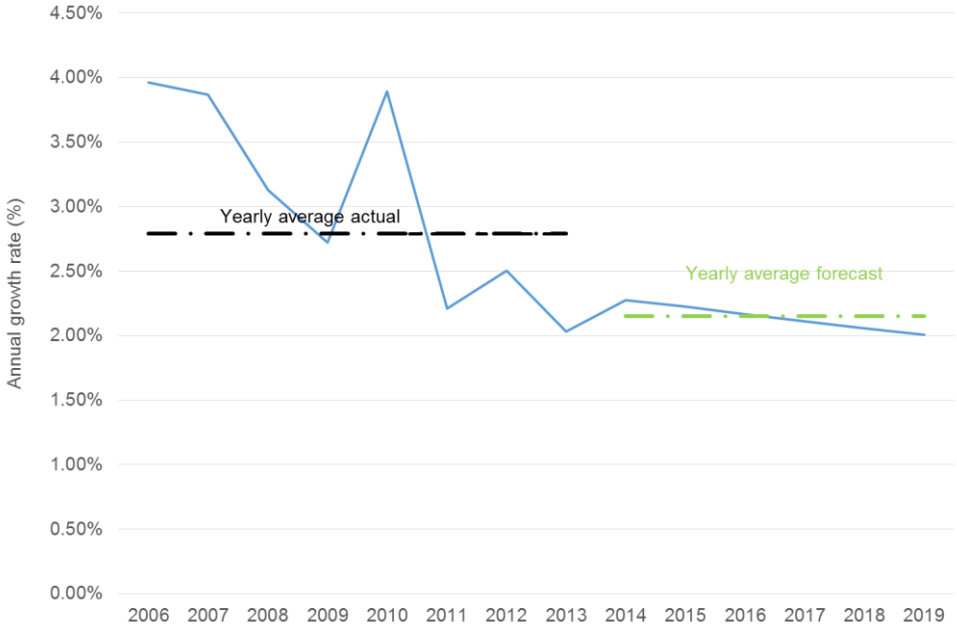
---

55 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 43.

56 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 44.

57 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Table 4, p. 50.

Figure 1 ATCO Initial Proposal Annual Growth in B3 Customers

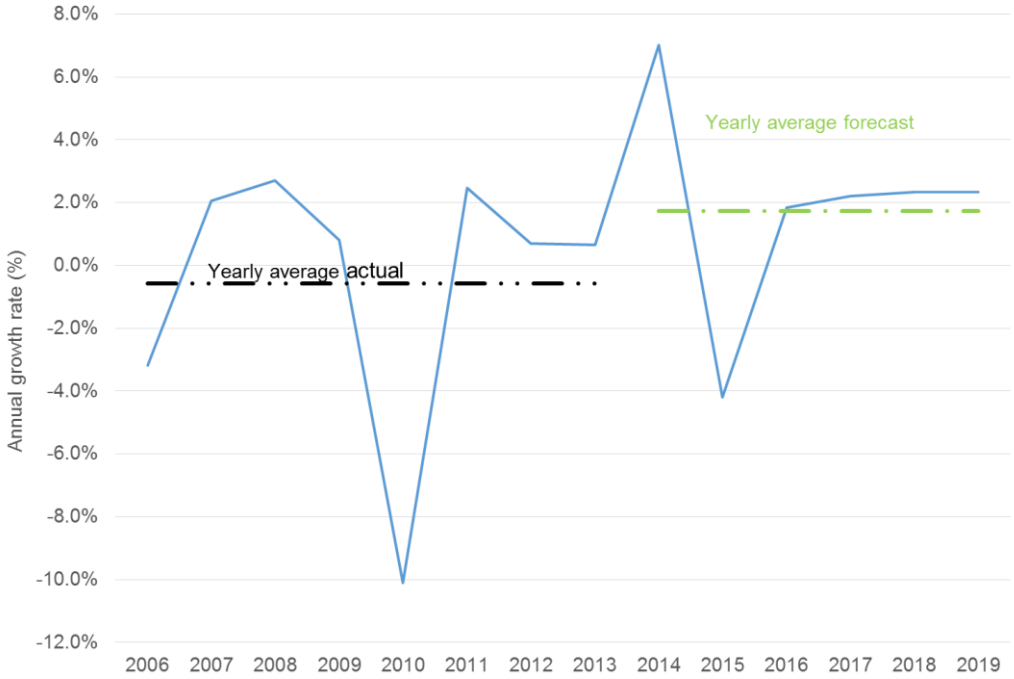


Source: EMCa, Review of Technical Aspects of the Proposed Access Arrangement, ATCO Gas Australia Proposed Access Arrangement for the Mid-West and South-West Gas Distribution Systems, June 2014. ATCO Gas Australia, Tariff Model, September 2014.

141. ATCO initially forecast a 2 per cent growth in B3 average customer usage per year over the fourth access arrangement period. Actual growth rate in B3 average customer usage from 2006-2013 was -0.57 per cent.

142. Figure 2 shows both the actual annual growth in B3 average customer usage from 2006 and ATCO's initial projected annual growth in B3 average customer usage over the fourth access arrangement period. The Authority noted that the dip in 2010 and the spike in 2014 can be partially explained by split year data due to the migration from calendar year to fiscal year data in 2010, and back to calendar year data in 2014.

Figure 2 ATCO Initial Proposal Annual Growth in B3 Customer Usage



Source: EMCa, Review of Technical Aspects of the Proposed Access Arrangement, ATCO Gas Australia Proposed Access Arrangement for the Mid-West and South-West Gas Distribution Systems, June 2014. ATCO Gas Australia, Tariff Model, September 2014.

143. ATCO's initial demand forecast for A1, A2, B1 and B2 tariff classes for the fourth access arrangement period was produced as follows:

- ATCO developed customer number forecasts in-house.
- Core Energy Group Pty Ltd (**Core**) then produced usage forecasts based on estimated usage growth.

144. ATCO developed the demand forecast for the B3 tariff class as follows:

- ATCO relied on B3 connection growth forecasts from Economics Consulting Services (**ECS**), and then excluded the Albany and Kalgoorlie connections to arrive at a forecast for new B3 connections to the regulated network of 17,490 in 2014, 17,740 in 2015 and 17,760 thereafter.
- ATCO then provided Core with these connection forecasts, in addition to the following:
  - ATCO's own forecast of additional new customers and additional usage that it expects from its proposed business development and marketing campaign.
  - ATCO's own forecast of 250 new B3 customers over the fourth access arrangement period occurring in 2014 as a result of the introduction of a new meter (AL10).
- Core produced aggregate customer number forecasts using these inputs, and deducting its forecast number of disconnections.
- To produce its volume forecasts, Core developed volume forecasts per connection, by tariff type, using regression analysis taking account of factors such as normalised weather in effective degree-days (EDD), trending and price elasticity. Core then modified the regression-based forecast for qualitative factors

which included (for example) ATCO's assessment of the impact on volumes of its proposed business development and marketing campaign.

145. EMCa noted the following concerns in relation to the development of ATCO's B3 demand forecast:

- The ECS report described a number of factors that might impact new B3 connections, including population growth, land activity and housing activity.[58] Despite discussing these factors, ECS described the B3 demand forecast for the fourth access arrangement period as being predominantly based on long term population growth.
- The ECS report assumed the highest considered population growth rate at less than two per cent as the basis of forecast new customers. The report provided three population growth assumptions, the highest of which commences at 2 per cent and declines to 1.8 per cent per year over the period from 2015 to 2019. The central population growth assumption is 0 to 0.2 per cent per year lower, and the lowest population growth assumption is around 0 to 0.2 per cent per year lower again.
- The demand forecast assumed that annual customer disconnections represent close to 20 per cent of the assumed number of new customer connections. This may indicate an overly pessimistic customer forecast.
- The Core report projected stabilisation of the average annual consumption per customer at around 14.8 GJ. This was based on the assumption that the decline in average consumption per customer that has been evident over the past seven years would level out.
- This assumption was founded on a qualitative adjustment that Core had made to the per-customer volume forecasts resulting from its regression model.
- EMCa noted that it is difficult to reconcile Core's assumption that the usage decline had now stabilised with the evidence of continuing decline each year in the average annual volumes for newly connected B3 customers.[59] EMCa noted that the annual usage of the most recently connected customers was less than 12 GJ.

146. The Authority addressed ATCO's proposed demand forecast in the Operating Expenditure and Projected Capital Base chapters of the Draft Decision. The Authority adjusted ATCO's proposed demand forecast in line with those chapters as follows:

- The Authority considered that ATCO's proposed business development and marketing campaign would not have the impact on customer usage that ATCO foresaw. In the Operating Expenditure chapter of the Draft Decision, the Authority decided to baseline ATCO's business development and marketing expenditure at the current level. This was because ATCO's proposed business development and marketing campaign yielded a negative net present value when ATCO's key assumptions, including customer usage assumptions, were adjusted. The Authority considered that the adjusted business development and marketing operating expenditure would still deliver ATCO's proposed marginal increase in the number of customers.

---

58 Economics Consulting Services, *ATCO Gas Australia Connections Forecast*, May 2013.

59 Energy Market Consulting associates, *Review of Technical Aspects of the Proposed Access Arrangement*, ATCO Gas Australia *Proposed Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, June 2014, para 241, p. 60.

- The Authority considered that ATCO's proposed customer initiated greenfield growth capital expenditure was not conforming capital expenditure. In the Projected Capital Base chapter of the Draft Decision, the Authority considered that ATCO had not provided any evidence that the large and relatively generic expansion initiative of greenfield customer initiated capital expenditure satisfied the incremental revenue test under rule 79(2)(b) of the NGR. The Authority therefore adjusted the customer numbers that ATCO included in its demand forecast as a result of customer initiated greenfield projects.

147. The Authority adjusted ATCO's demand forecast for the Draft Decision to reflect the following:

- Reduction in ATCO's forecast number of B3 customers to reflect the Authority's decision to exclude ATCO's proposed customer initiated greenfield growth capital expenditure from conforming capital expenditure.
- Average annual usage per customer for new B2 customers of 80 GJ, and average annual usage per customer for new B3 customers of 12 GJ, as per recent usage data for new customers.[60]
- Average usage per customer for existing B2 and B3 customers would be constant as of 2014.

148. The Authority decided that:

- Even with the Authority's adjustment to business development and marketing operating expenditure, the Authority's adjusted demand forecast included ATCO's forecast customer number increases that it attributed to its proposed business development and marketing campaign. The Authority considered that the portion of the expenditure that it deemed efficient would deliver the forecast customer number growth.
- Customer numbers and usage for A1, A2 and B1 customers was as per ATCO's demand forecast.

149. The Authority's adjusted Draft Decision GDS demand forecast for the fourth access arrangement period is shown in Table 12.

[60] ATCO Gas Australia, *Email response to EMCa56*, 17 April 2014.

Table 12 Authority Draft Decision Adjusted GDS Demand Forecast (AA4)[61]

Tariff class	2014 July to Dec	2015	2016	2017	2018	2019
A1						
Customers	70	70	70	70	70	69
Usage (GJ)	6,038,463	12,029,555	12,143,688	12,370,908	12,673,841	13,008,602
A2						
Customers	112	120	126	132	138	145
Usage (GJ)	1,093,677	2,208,644	2,315,018	2,445,268	2,593,941	2,752,930
B1						
Customers	1,410	1,468	1,528	1,589	1,652	1,717
Usage (GJ)	901,816	1,667,284	1,691,685	1,729,881	1,775,516	1,823,895
B2						
Customers	9,932	10,346	10,792	11,270	11,781	12,326
Usage (GJ)	638,656	1,227,604	1,263,284	1,301,524	1,342,404	1,386,004
B3						
Customers	664,763	666,936	675,346	677,378	679,340	681,231
Usage (GJ)	5,643,642	9,996,639	10,097,553	10,121,937	10,145,481	10,168,173
Total						
Customers	676,287	678,940	687,862	690,439	692,981	695,488
Usage (GJ)	14,316,253	27,129,726	27,511,228	27,969,518	28,531,183	29,139,604

Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Table 9, p. 57. ATCO Gas Australia, Email response to EMCa56, 17 April 2014. ERA, GDS Tariff Model, October 2014.

ATCO's Response to the Draft Decision

150. ATCO did not accept the Authority's Draft Decision for the demand forecast. ATCO does not consider that the Authority's adjustments to the GDS demand forecast will result in an access arrangement that complies with the NGO, NGR or the revenue and pricing principles. ATCO submits that the Authority has not adopted a robust forecast methodology for consumption, resulting in a consumption forecast that is too high and that the Authority has not accepted the proposed greenfield connections, resulting in forecast connections being too low.[62]

Marketing and business development

151. ATCO does not accept that the additional customer numbers and consumption will be achieved if marketing and business development expenditure remains at 2013 levels. ATCO states that the 2013 expenditure amounts consist mainly of internal

[61] This demand forecast includes customers receiving prudent discounts.

[62] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 23.

labour costs towards market research activities. ATCO submits that this amount of expenditure is not sufficient to cover the marketing campaigns proposed for the fourth access arrangement period.[63]

152. ECS notes in its letter to ATCO that the restricted funding to business development and marketing programs over the fourth access arrangement period will result in a reduction in B3 connections by 33 per cent to 4,650.

153. ATCO states that it has assessed the expected impact of the additional proposed marketing and business development activities on customer numbers and consumption on an incremental basis. ATCO considers that including additional consumption and customer numbers in the absence of providing the forecast expenditure for these activities would result in an overestimate of demand.

Greenfield growth expenditure

154. ATCO does not accept the Authority's amendment to remove all expenditure on greenfield development areas. ATCO considers that the net present value analysis performed by EMCa, and relied upon by the Authority was flawed. ATCO submits that preventing the connection of customers who are willing to pay for connection to the gas network is inconsistent with the efficiency principles under the NGR.

155. ATCO has revised its expenditure on greenfield development areas in line with its revised forecast of new customers. ATCO states that its revised forecast of new customers is higher than its initial proposal in March 2014, as the forecast is influenced by historical connection numbers as well as the stronger growth in customer numbers experienced in 2014[64].

Adjustments to average per customer consumption

156. ATCO considers that the Authority's adjustments to the average customer consumption forecast contain errors and result in forecasts that do not comply with rule 74 of the NGR.

157. ATCO considers that the Core forecasts represent the best forecast for the fourth access arrangement period. ATCO notes that, without including the impact of proposed marketing and business development activities, the average consumption per customer would continue to decline.

158. ATCO notes that other regulatory and government bodies take the influence of weather on gas demand into account when assessing the underlying growth in historical demand. ATCO considers that the ERA forecast ignores the impact of weather, which results in observations being influenced by unseasonal weather events.

159. ATCO states it is widely recognised across the energy sector that customers periodically swap out old appliances for newer, more energy efficient appliances. ATCO has derived new customer demand per connection by deducting the weighted

---

63 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 24.

64 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 24.

average 6 star impact of 1.098 GJ from the weighted average demand for all connections.

160. ATCO considers that the Authority adopted a flat forecast for B3 customer usage for the entirety of the fourth access arrangement period at a higher amount than Core's forecast.

161. ATCO considers that EMCa has understated the annual usage of recently connected customers by using data that only reflects the first year of consumption. ATCO submits that Core's estimated average from adjusting the forecast average demand for the impact of 6-star building standards is a better method of forecasting new customer demand, as consumption from the first two years following connection is not representative of likely continued usage.

162. ATCO cites Core's report in stating that the Authority's approach is not representative of the average mature consumption per customer. ATCO submits that if average consumption per customer were to remain static over time, this would likely result in an overestimate of average consumption per customer for new customers. Core has made the following criticisms of the Authority's forecast demand:

- Demand for 12 GJ/connection for B3 customers is not representative of the mature consumption of a new B3 connection.
- Demand for 80 GJ/connection for new B2 customers over a single year's observation of historical demand per connection results in the overestimation of the forecast demand per B2 connection.
- The assumption that average consumption per customer for existing B2 and B3 customers will be constant as of 2014 is not the optimum basis for deriving the most accurate forecast for the GDS.

163. ATCO claims that the forecast usage for B2 connections is likely to be much greater than 80 GJ over the fourth access arrangement period as a result of ATCO making the AL10 meters available for B3 connections. ATCO states that customers who were previously on the B2 tariff as a result of their consumption being greater than the capacity of the AL8 meter, will now be able to utilise the AL10 meter on the B3 tariff, meaning that approximately half of the B2 customers will now be classified as B3 customers resulting in a higher average consumption for the remaining B2 customers.

ATCO's revised demand forecast methodology

164. ATCO has updated its demand forecast to incorporate a further year since its initial proposal. It has also incorporated new connection forecasts from Economics Consulting Services (**ECS**) and Core's updated demand forecast. This takes into account actual connections and consumption data for the period to 31 October 2014, with estimates for November and December 2014 and the removal of the carbon tax.

165. The revised ECS forecast incorporates the latest housing industry forecasts from the Housing Industry Association (**HIA**) and the Western Australian Housing Industry Forecasting Group (**HIFG**), which extends to 2018. ATCO states that it has updated its connection forecast to incorporate the latest available information.

166. ATCO notes that the 2014 ECS forecast for B3 customers is higher than the 2013 ECS forecast for the years 2015, 2016 and 2017 due to the higher than expected number of dwelling starts in 2013 and 2014. ATCO cites the lag between

building properties and connecting them to the gas network to explain why the connection rate is expected to remain high until 2017, after which it expects it will revert to levels consistent with the HIA and HIFG forecast.

167. ATCO notes that the disconnection rate referred to by EMCa is not the same as that used by ATCO and Core. ATCO considers the rate it uses to be more stable over time than EMCa's, which it views as extremely volatile. The disconnection rate has been updated to include the latest 2014 data. ATCO considers that it has experienced a fairly flat historical trend for disconnections as a percentage of total B3 connections.

ATCO's revised demand forecast

168. In response to the Draft Decision, ATCO has revised the demand forecasts as follows:

- included connections associated with the proposed customer initiated greenfield growth capital expenditure;
- updated B3 connection forecast for the June 2014 ECS Report;
- applied average annual usage per customer for new B2 and B3 customers as forecast by Core;
- applied average usage per customer for existing B2 and B3 customers as per the 2014 Core forecast; and
- updated A1, A2 and B1 forecasts to reflect newly identified information.

169. Table 13 summarises ATCO's revised overall demand forecast (connection numbers and consumption) for the fourth access arrangement period. This table incorporates ATCO's revised forecast of the impact of business development and marketing initiatives.

Table 13 ATCO Revised Proposal Demand and Connection Forecasts for AA4

Tariff Class	2014 July to Dec	2015	2016	2017	2018	2019
A1						
Connections (Average)	73	73	74	74	74	74
Demand (GJ)	6,016,711	11,572,769	11,720,093	11,883,212	12,105,157	12,350,313
A2						
Connection (Average)	107	111	117	121	125	130
Demand (GJ)	995,527	1,982,745	2,092,394	2,184,157	2,288,724	2,400,155
B1						
Connection (Average)	1,402	1,438	1,489	1,541	1,595	1,650
Demand (GJ)	874,652	1,671,627	1,706,345	1,754,091	1,808,694	1,866,278
B2						
Connection (Average)	10,254	10,542	10,873	11,193	11,500	11,793
Demand (GJ)	647,044	1,249,783	1,242,812	1,242,746	1,244,572	1,245,362
B3						
Connection (Average)	671,425	682,402	698,689	715,147	730,154	743,578
Demand (GJ)	5,153,602	9,858,722	10,007,804	10,188,283	10,372,812	10,530,472
Total						
Connection (Average)	683,261	694,566	711,242	728,076	743,448	757,225
Demand (GJ)	13,687,536	26,335,646	26,769,448	27,252,489	27,819,959	28,392,580

Source: ATCO Gas Australia Pty Ltd, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 4-8, p. 33.

170. As will be discussed in the Operating Expenditure chapter of this Final Decision, ATCO has revised its expenditure on marketing and business development activities, which has impacted the forecasts on customer numbers and consumption.

171. ATCO expects that its revised marketing and business development expenditures will result in the addition of 4,048 customers and 339,761 GJ of consumption over the fourth access arrangement period.[65]

Submissions

172. The Authority has not received any submissions in relation to the demand forecast in ATCO's initial proposal. The Authority received submissions from Alinta Energy (**Alinta**) and the Energy Supply Association of Australia (**ESAA**) in response to the Authority's Draft Decision.

---

65 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 27 November 2014, p. 31.

173. In its submission in response to the Draft Decision, Alinta recommended that the Authority revise its forecast consumption for B3 customers. Alinta advised that the Authority's demand forecast may be too low, and that this may make it uneconomic for ATCO to connect new customers.[66]

174. In response to Alinta's submission, ATCO submitted that Alinta's average residential consumption is not directly comparable to ATCO's demand forecast.[67]

175. Alinta notes that the Authority's adjusted demand forecast for B3 customers has used consumption data for only the first year of usage for new customers. Alinta cautions against using only a customer's first year of consumption for forecasting purposes as it may not be representative of likely continued use.[68]

176. Alinta notes that weather also plays a role in determining a customer's demand. Alinta refers to the year 2013 during which the winter months were unseasonably warm, resulting in lower gas consumption than was forecast.[69]

177. In its submission in response to the Authority's Draft Decision, the ESAA urged the Authority to consider the effects of changes in gas and electricity prices and new technologies on gas consumption assumptions.

Considerations of the Authority

178. The Authority notes that ATCO did not accept the required amendment to update the GDS demand forecast as per the Draft Decision.

179. The Authority notes the concerns expressed by ATCO towards EMCa's assessment and the Authority's review and adjustments of the initial GDS demand forecast, specifically with respect to the consideration of weather adjusted data, the impact of additional business development and marketing initiatives and the overall forecast methodology.

180. In response to ATCO's revised proposal and the concerns it expressed towards the Authority's adjustments and EMCa's assessment of its initial GDS demand forecast, the Authority commissioned Deloitte Access Economics (**Deloitte**) as its technical advisor with respect to the revised GDS demand forecast. The Authority requested that Deloitte assess:

- ATCO's proposed methodology to forecast GDS demand, including key drivers, assumptions and trends behind customer numbers and consumption forecasts;
- ATCO's proposed methodology to forecast GDS demand in greenfield areas that ATCO has proposed to expand into, including key drivers, assumptions and trends behind customer numbers and consumption forecasts; and

---

66 Alinta Energy, Alinta Energy Submission – *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 12 January 2015, p. 5.

67 ATCO Gas Australia, Email – *Alinta Energy Forecast Residential Average Consumption*, 13 January 2015.

68 Alinta Energy, Alinta Energy Submission – *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 12 January 2015, p. 5.

69 Alinta Energy, Alinta Energy Submission – *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 12 January 2015, p. 5.

- ATCO's proposed methodology for forecasting additional GDS demand in response to the business development and marketing campaign that ATCO has proposed, including key drivers, assumptions and trends behind customer numbers and consumption forecasts.

181. Deloitte notes that the Core demand forecast lacks a consideration of the impact of economic activity, through its omission from the forecasting equations. The Authority agrees with Deloitte in its consideration that this is not a reasonable approach.[70]

182. Deloitte notes that during the historical period (2007 to 2014) used to support Core's demand forecast, WA gas consumption was subject to the considerable economic changes brought on by the mining construction boom. However, the construction boom is expected to moderate in addition to the general economic conditions. By not explicitly accounting for the effect of moderating economic conditions on gas demand, Core's trend model has likely over forecast consumption over the forthcoming access arrangement period.[71]

183. Deloitte states that economic activity has previously been found to have a statistically significant impact on gas demand and, in light of lower economic growth forecasts for Western Australia over the forthcoming access arrangement period compared with historic performance, is expected to have an impact on gas demand across the GDS. Consequently, the Authority considers the Core forecasts to be an overestimate.

184. In addition to Deloitte's comments regarding the omission of the impact of economic activity from Core's forecasting, Table 14 below presents a summary of Deloitte's review and recommendations concerning the overall Core demand forecast.[72]

Table 14 Deloitte's Review and Recommendations concerning the Core Demand Forecast

Assumption	Review and Recommendations
Weather Normalisation	The approach is consistent with industry standards and has been transparently applied.
Economic Conditions	Economic conditions have not been incorporated into the modelling of future gas demand. There is no mention of the potential for economic conditions to have an impact on demand, despite Core incorporating and/or discussing this in other gas forecasts (e.g. Core's 2012 gas demand forecast prepared for Envestra's Victorian and Albury networks). Deloitte does not consider this to be a reasonable approach. Given the strong correlation of Gross State Product (**GSP**) with A2 demand per connection, in particular, Deloitte would expect economic conditions to be statistically significantly related to gas demand in WA. With WA's GSP growth expected to decline over the forthcoming access arrangement period, this could result in an overestimate of gas demand. Deloitte recommended that the forecasts be re-done to reflect the responsiveness of gas demand to declining economic conditions over the forthcoming access arrangement period.
Prices	Deloitte considers that Core's estimate of the wholesale gas price forecast and the price elasticity factors are reasonable. It notes that Core has not adjusted the retail

70 Deloitte Access Economics, *Review of ATCO Gas Australia's gas demand forecasts*, April 2015, p. ii.

71 Deloitte Access Economics, *Revision of ATCO Gas Australia's gas demand forecasts*, May 2015, p. 5.

72 Deloitte Access Economics, *Review of ATCO Gas Australia's gas demand forecasts,* April 2015, pp. i - v.

Assumption	Review and Recommendations
	price of gas for movements in the price of distribution, which are projected to remain flat in real terms over the forthcoming access arrangement period. Deloitte notes that Core has not applied a cross-price elasticity factor to electricity in its analysis, in contrast to the work Core has performed for Jemena's NSW gas demand forecast. Depending on the movements between electricity and gas prices, this could have an impact on gas demand. However, Deloitte notes that there is currently no data on cross-price elasticity in the Australian context. Accordingly, Deloitte considers it is reasonable for Core to not include a cross-price elasticity factor and there is sufficient justification for its omission in the GDS forecast.
BD and Marketing	Deloitte considers that the overall approach to estimating the impact of marketing programs is not transparent and in some instances overly simplistic. Deloitte notes that it has insufficient evidence to conclude that the underlying assumptions are incorrect. However, it notes that the programs are expected to materially increase total consumption across affected tariffs by 2.2 per cent by 2019. In the absence of substantiating information from ATCO, Deloitte recommends removing the assumptions that the existing customer Hot Water System (**HWS**) and appliance incentives increase average consumption across all existing B3 connections. Infill: Deloitte considers that adopting a basic modification of the take-up rate of a previous infill project is simplistic and not transparent. Assuming new infill customers adopt the same consumption profile as existing customers is simplistic, but is not expected to have a material impact on forecasts. Infill HWS: As with infill, Deloitte considers that the take up rate of 15 per cent is largely unsubstantiated, and in the absence of a sensitivity analysis, not transparent. The expected annual consumption is reasonable. Existing customer HWS: The expected number of new customers each year is based on the maximum number of rebates that ATCO will provide each year. Deloitte considers that this makes it an unsubstantiated assumption that the rebates are fully subscribed. The expected annual consumption is reasonable. Appliance: Deloitte considers that the assumptions underlying the appliance program appear to be reasonable. Deloitte cautions that care needs to be taken to ensure that the appliance program does not double count greenfield customers. GPAC: The basis for the forecast additional customers is based on the maximum number of rebates on offer. Deloitte notes that no explanation has been given as to why the market is expected to take up all the rebates on offer. The expected annual consumption of new customers is reasonable. Generation: Similar to GPAC and HWS, the additional customers gained from the generation program is based on the number of rebates on offer. The generation program is expected to increase consumption in the A2 Tariff by 7.5 per cent by 2019, representing a material impact on the forecast results. Deloitte considers that further explanation is required to explain why the value of the rebate is sufficient to increase demand as predicted. Approach to incorporating business development and marketing for the B3 tariff: Deloitte notes that ATCO has assumed that the existing customer HWS and appliance programs will increase consumption per year for all B3 connections. No justification has been provided as to why ATCO expects these will increase all residential consumption and not just those who subscribe to the specific rebates.
Greenfields	Deloitte notes that the majority of new connections over the forthcoming access arrangement period will come from greenfields sites (with a small number of infill connections arising from marketing initiatives). Deloitte also notes that ATCO revised its forecasting approach for consumption per connection for B3 greenfield customers to adjust for the expected lower, on average, consumption profile of new builds (due to 6 star energy efficiency building standards).

Assumption	Review and Recommendations
	However, Deloitte notes that new B2 connections have been assumed to adopt the same consumption profile as existing connections. Deloitte considers that, as the new B2 connections are also expected to be new builds, it is to be reasonably expected that these will have, on average, a lower consumption profile than existing connections. Deloitte recommends that further explanation be provided to ascertain why new B2 connections in greenfield areas are not expected to have a lower consumption profile than existing connections. Deloitte notes that no reference has been made to the potential impact of a slowdown in economic activity on the expected growth in new commercial connections.
B3 - Consumption	Deloitte notes that the average of the annual percentage change in B3 consumption per connection between 2011 and 2014 – adjusted for the impact of price – was used as the basis of the residential B3 forecasts. Deloitte agrees that there is a structural break in the data, whereby consumption per connection between 2009 and 2011 is substantially different to consumption per connection pre 2009 and post 2011. Deloitte considers that the approach is reasonable. Deloitte also considers that the omission of statistical analysis of the potential for changing economic circumstances to impact on WA residential gas demand would not be considered to be reasonable. However, with the restriction of the analysis from 2011 to 2014, there are insufficient data points to test this relationship.
B3 Connections	Deloitte notes that the new B3 tariff connections to new houses is based on a forecast of the number of new homes completed in WA and the proportion of new homes connecting to gas. New homes completed are assumed to be the forecast dwelling starts for a year, less/plus accumulation/completion backlog. For the 2013-2014 period, the forecast dwelling starts are assumed to be the HIA forecast, after which it is assumed to be the mid-point between the HIA forecast dwelling starts and HIFG forecast dwelling completions. Deloitte considers that the forecast is reasonable. However for the new homes forecast, Deloitte recommends using an independent forecast of dwelling completions (e.g. the BIS Shrapnel report). Deloitte notes that the forecast rate of disconnections is equal to the historical average from 2008 to 2014. It is possible that factors such as changes in the economy may impact on the disconnection rate. Without undertaking significant further work, Deloitte considers that the 0.37 per cent forecast disconnection rate is not unreasonable.
B2 and B1	Deloitte notes that the key omission from the forecasting approach used for commercial consumption per connection is the potential for declining economic conditions to impact on commercial gas consumption over the forthcoming access arrangement period. Deloitte expects that this would have a statistically significant impact on gas demand in WA. Deloitte recommends that an econometric test be conducted for this relationship and, if necessary, the forecasts be redone to account for declining growth in GSP. Deloitte notes that the use of average historical growth of connection for B1 seems reasonable given that the time series is stable. Deloitte notes that the B2 growth rate is assumed to increase at a non-linear rate, which is different from the approach used for Tariffs A1, A2 and B1. Deloitte does not consider this to be unreasonable.
A2	Similar to the forecasts for commercial consumption per connection, Deloitte considers the omission of economic conditions from the forecast equation to be unreasonable.

Assumption	Review and Recommendations
	Deloitte recommends econometrically testing for the relationship between GSP and consumption and if necessary, re-doing the forecasts to account for declining growth in GSP. Deloitte notes that the connection numbers for A1 and A2 are forecast using the average growth rate from 2007 to 2014.
A1	Given the size and concentration of the A1 tariff class, Deloitte questions Core's approach to forecasting the consumption per connection for this tariff, as forecasts for this size are usually based on a survey of large customers. Deloitte notes that Core have utilised a linear trend through the historical data as the basis of its forecasts. Deloitte recommends adopting a more tailored approach to forecasting A1 consumption. Deloitte considers that a survey would provide the necessary information to better understand the planned future demand of the largest customers. Deloitte considers that this is particularly relevant given the expected slowdown in economic growth in WA over the forthcoming access arrangement period.

185. The Authority considered the review undertaken by Deloitte and subsequently requested that it make the necessary adjustments to update the Core GDS Demand Forecast to take into account its recommendations from the review report.[73]

Prices

186. The Authority notes ESAA's submission regarding the effects of changes in gas and electricity prices and new technologies on gas consumption assumptions. Deloitte noted that, depending on the movements between electricity and gas prices, this could have an impact on gas demand. However, Deloitte also noted that there is currently no data on cross-price elasticity between gas and electricity in the Australian context. As such, Deloitte considered it reasonable for Core not to include a cross-price elasticity factor. The Authority considers that Deloitte's approach to assessing the potential impact of cross-price elasticity factors to be reasonable.

Weather Normalised Data

187. Deloitte provided the Authority with an updated revised GDS demand forecast (revised demand forecast) and a report (revision report) outlining the revisions it made to the Core GDS Demand Forecast. The revised demand forecast's starting point is the Core model, meaning that weather normalised data is factored in from the onset of the review and in the revision of the Core model. The Authority considers that this should address ATCO's concerns.

Economic Conditions and Forecast Consumption

188. The Authority notes Deloitte's comments with respect to the lack of consideration by Core of economic conditions when forecasting consumption for the fourth access arrangement period. The Authority considers that Core's approach is not reasonable. However, the Authority notes that for the A1 tariff class, it is generally accepted industry practice that a survey be used to inform demand forecast for large customers as it would provide a better estimation of demand from the largest customers. Accordingly, no test was conducted for a relationship between economic conditions and the A1 tariff class consumption.

---

[73] Deloitte Access Economics, *Revision of ATCO Gas Australia's gas demand forecasts*, May 2015

189. As a result of Deloitte's recommendation for the A1 tariff class, the Authority sought further clarification from ATCO as to why a survey approach was not adopted as a basis for forecasting for large industrial consumption. ATCO states that it does not have a direct relationship with industrial customers as these customers deal directly with their chosen retailer.[74] Additionally, ATCO states that it may be potentially confusing or misleading for it to seek information directly from the end user about the potential tariff load. In the absence of this information, Deloitte did not recommend any adjustments to the A1 forecast. The Authority accepts ATCO's A1 forecast consumption.

190. Deloitte included economic conditions as an independent variable in its econometric analysis for consumption in the A2, B2 and B3 tariff classes. For the A2 and B2 tariff class, Deloitte has used the Western Australian Treasury's Gross State Product (**GSP**) data. For the B3 tariff class, Deloitte has used household disposable income. As Deloitte is not aware of any robust forecast of household disposable income, it has used the Wage Price Index (**WPI**) as a proxy due to its strong correlation with household disposable income. The mid-point between Deloitte and the WA Treasury's forecasts of WPI was chosen as it is considered to be a conservative estimate of the growth path of the WPI.

191. For these three tariff classes, Deloitte found that there was a statistically significant relationship between the economic condition variable and consumption. Accordingly, Deloitte has included economic conditions as a variable in its revised demand forecast for the A2, B2 and B3 tariff classes. The Authority agrees with Deloitte's revision and considers that it is necessary to amend the A2, B2 and B3 tariff class forecasts to reflect the statistical significance of economic conditions. The Authority rejects ATCO's A2, B2 and B3 tariff class forecast consumption.

192. Whilst Deloitte notes in its review report that B1 tariff class customers would also be expected to be affected by economic conditions, it did not find a statistically significant relationship between GSP and B1 consumption in its econometric analysis. Deloitte notes that due to the limited number of data points available, the regression analysis was not strong enough to conclude statistical significance at the 10 per cent level of confidence as the p-value of 0.12 was just outside this cut-off. Deloitte expects that the addition of more data points through the use of quarterly data would address this limitation. In the absence of the additional data, the Authority accepts ATCO's B1 forecast consumption.

Forecast Connections

193. Deloitte found Core's forecast of customer connections for the A1, A2, B1 and B2 tariff classes to be reasonable and did not recommend any changes. The Authority agrees with Deloitte's findings and accepts ATCO's forecast customer connections for the A1, A2, B1 and B2 tariff classes.

194. The Authority notes that Deloitte considers the methodology adopted in producing the B3 connection forecast to be reasonable. However, Deloitte also raises concerns as to the somewhat arbitrary manner by which dwelling starts have been converted to dwelling completions as part of the process to forecast B3 connections. Rather than using the "backlog" approach as ATCO has adopted, Deloitte notes that other jurisdictions have adopted the use of the BIS Shrapnel forecasts for dwelling completions. Deloitte recommends using the BIS Shrapnel forecast directly rather

[74] ATCO Gas Australia, *Email Response to DA30,* 15 April 2015.

than ATCO's backlog factor. The Authority agrees with Deloitte's recommendation and considers that its revised B3 customer connections forecasts represent the best forecast, consistent with rule 74(2) of the NGR. Accordingly, the Authority rejects ATCO's B3 customer connection forecast.

Business Development, Marketing and Greenfields

195. In its review of the impact of business development, marketing, and greenfield expenditure on the demand forecast for the GDS, Deloitte found that ATCO's overall approach to estimating this impact was not transparent and, in some cases, simplistic.

196. Deloitte notes that ATCO's approach to forecasting additional connections on the basis of the maximum number of rebates that ATCO is willing to provide each year is simplistic – and heavily reliant on assumptions about take up rates and the expectation that all incentives will be fully subscribed. Deloitte notes that without robust evidence contrary to ATCO's modelling assumptions, it is not in a position to contend that ATCO's forecasts are unreasonable. As such, Deloitte has not recommended any adjustments as a result of the impact of business development, marketing and greenfield expenditure on the demand forecasts, except for a change based on information provided by ATCO on the expected B3 consumption impacts from the Existing Hot Water System (**HWS**) and Building Appliance incentives.

197. In its review report, Deloitte noted that no justification had been provided by ATCO as to why it expects the existing customer HWS and appliance initiatives to increase consumption per year for all B3 connections.[75] Deloitte sought further clarification from ATCO with regard to this assumption and was provided with information on expected B3 consumption impacts from the existing HWS and appliance incentives.[76] However, in place of Core's approach of estimating the cumulative impact of these incentives on all B3 customers, Deloitte recommends directly incorporating the expected additional consumption from just the customers affected by these two incentives. The Authority agrees with Deloitte's recommendation as the Authority considers this to be the best forecast and has accordingly adjusted B3 consumption volumes for these two marketing incentives.

198. In addition to the adjustment recommended by Deloitte, the Authority has not accepted the inclusion of the HWS Infill initiative and the Infill initiative as per the Operating Expenditure and Capital Base chapters of this Final Decision. The Authority's reasons are set out in the Operating Expenditure and Capital Base chapters.

Revised Demand Forecast

199. Taking into consideration the points above, the Authority has adopted Deloitte's revised demand forecast as set out in Table 15 below with an adjustment to remove connections and associated consumption from the HWS Infill initiative and Infill initiative.

---

75 Deloitte Access Economics, *Review of ATCO Gas Australia's gas demand forecasts*, April 2015, p. iii.

76 ATCO Gas Australia, *Email Response to DA29,* 30 April 2015.

Table 15 Authority Final Decision Approved Demand and Connection Forecasts for AA4

Tariff Class	2014 July to Dec	2015	2016	2017	2018	2019
A1						
Connections (Average)	73	73	74	74	74	74
Demand (GJ)	5,860,661	11,572,769	11,720,093	11,883,212	12,105,157	12,350,313
A2						
Connection (Average)	107	111	117	121	125	130
Demand (GJ)	995,487	1,843,789	1,903,018	1,987,975	2,093,987	2,137,616
B1						
Connection (Average)	1,401	1,438	1,489	1,541	1,595	1,650
Demand (GJ)	898,739	1,669,707	1,702,977	1,749,145	1,802,173	1,858,092
B2						
Connection (Average)	10,245	10,542	10,873	11,193	11,500	11,793
Demand (GJ)	668,945	1,181,866	1,143,225	1,123,671	1,103,966	1,049,638
B3						
Connection (Average)	670,569	683,974	701,896	716,977	729,592	741,199
Demand (GJ)	5,538,726	9,538,366	9,469,679	9,472,604	9,579,771	9,724,814
Total						
Connection (Average)	682,396	696,139	714,449	729,906	742,886	754,846
Demand (GJ)	13,962,558	25,806,497	25,938,993	26,216,608	26,685,055	27,120,472

Source: ERA, GDS Tariff Model, September 2015.

Final Decision

200. The Authority's Final Decision is not to approve ATCO's demand forecast consumption for the A2, B2 and B3 tariff classes. The Authority approves ATCO's demand forecast consumption for the A1 and B1 tariff classes. The Authority approves ATCO's forecast connection numbers for the A1, A2, B1 and B2 tariff classes. The Authority does not approve ATCO's forecast connection numbers for the B3 tariff class. The Authority requires ATCO to amend its forecast as set out in Table 15.

Required Amendment 2

The GDS demand forecast for the fourth access arrangement period must reflect Table 15 of this Final Decision.

Key Performance Indicators

Regulatory Requirements

201. Rule 72 of the NGR states that the access arrangement information must include key performance indicators that support the service provider's expenditure proposal in the access arrangement period.

> 72. Specific requirements for access arrangement information relevant to price and revenue regulation
>
> (1) The access arrangement information for a full access arrangement proposal (other than an access arrangement variation proposal) must include the following:
>
> …
>
> (f) the key performance indicators to be used by the service provider to support expenditure to be incurred over the *access arrangement period*;
>
> …

ATCO's Proposed Changes

202. ATCO provided eight Key Performance Indicators (**KPIs**) under three categories, with targets for each KPI. Table 16 shows the eight KPIs and targets.

Table 16 ATCO Key Performance Indicator and Targets

Key Performance Indicator	ATCO Proposed Target
Customer Service	
Domestic customer connections within five days	>97 per cent
Attendance to broken mains and services within one hour	>97 per cent
Attendance to loss of gas supply within three hours	>97 per cent
Network Integrity	
Total public reported gas leaks per one kilometre main	<0.8
System Average Interruption Frequency Index (SAIFI)	<0.005
Unaccounted for Gas (UAFG)	<2.9 per cent
Expenditure	
Operating expenditure per kilometre of main	$ 6,068
Operating expenditure per customer connection	$116

Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Table 2, p. 30.

203. Of the eight KPI targets proposed, ATCO has confirmed that only the following three exclude the unregulated Albany and Kalgoorlie gas distribution systems:[77]

- Unaccounted for Gas (**UAFG**).
- Operating expenditure per kilometre of main.

[77] The Authority has accepted this in the Draft Decision as it understands that it is challenging for ATCO to maintain two data sets for the other key performance indicators.

- Operating expenditure per customer connection.

Draft Decision

204. The Authority requested its technical advisor, Energy Market Consulting associates (**EMCa**), to assess ATCO's KPIs from the following perspectives:

- The reason for the inclusion of the KPIs – with reference to the requirement of rule 72 of the NGR, ATCO's reporting obligations under the Gas Distribution Licence (GDL8, Version 8), the provisions in AS4645.1 2008, and the performance targets of other Australian gas distribution businesses.
- The rationale for KPI targets – with reference to past performance, proposed expenditure in the fourth access arrangement period, and performance of other Australian gas distribution businesses.

205. EMCa assessed ATCO's proposed KPI targets and proposed new targets that it considered to be more reasonable than those proposed by ATCO, based on the following:

- Proxy for customers' expectations for the six customer service and network integrity KPIs, by considering ATCO's past performance and available benchmark information from other Australian gas distribution utilities.
- Link between ATCO's proposed KPIs, KPI targets and expenditure over the fourth access arrangement period.
- Likelihood of attainment of the targets, based on information that ATCO has provided in its proposed revised access arrangement, and in response to subsequent information requests from EMCa.

206. EMCa's proposed targets were weighted to more recent performance, as it considered that it is more representative of the results of previous investments given the generally observed lag between investment and improved performance. EMCa therefore considered average service performance over the most recent three-year period (as provided by ATCO).

207. Based on the issues raised in ATCO's initial revised access arrangement proposal and its Asset Management Plan (**AMP**), and consistent with the declared business objectives of ATCO, EMCa also suggested that ATCO include an asset health performance measure within its key performance indicators for the fourth access arrangement period.

208. The Authority considered each key performance indicator proposed by ATCO as set out below.

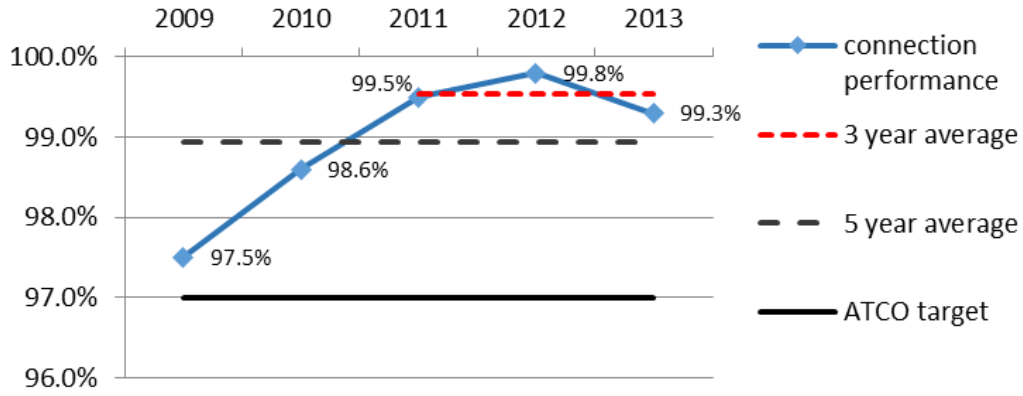
Domestic customer service connections within timeframes

209. ATCO described *domestic customer service connections within timeframes* as "the percentage of new customer connections to established domestic dwellings on the distribution network provided within any applicable regulated time limit" (within five days).

210. ATCO's proposed target for domestic customer service connections within five days was 97 per cent over the fourth access arrangement period. ATCO's three-year average performance was 99.5 per cent, and ATCO's five-year average performance was 98.9 per cent.

211. Figure 3 shows ATCO's five year performance and fourth access arrangement period target for *domestic customer service connections within timeframes*.

Figure 3 ATCO's Performance – Domestic Customer Service Connections within Timeframes (per cent)



Source: EMCa, Review of Technical Aspects of the Proposed Access Arrangement, ATCO Gas Australia Proposed Access Arrangement for the Mid-West and South-West Gas Distribution Systems, June 2014. ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Figure 7.
Note: ATCO target refers to ATCO's proposed target for the fourth access arrangement period.

212. In the Draft Decision, the Authority revised ATCO's annual growth in B3 customers over the fourth access arrangement period. The Authority did not consider that the forecast net connection growth in the other tariff classes would be sufficiently high to lead to extra pressure on ATCO's connection performance. Moreover, the Draft Decision's revised expenditure was above the levels for the third access arrangement period. Therefore, the Authority considered that ATCO's connection performance should not deteriorate materially over the fourth access arrangement period.

213. The Authority considered that it was appropriate for ATCO to include *domestic customer service connections within timeframes* in its revised access arrangement for the fourth access arrangement period under rule 72 of the NGR. The Authority also considered that ATCO should be able to achieve a rate of domestic customer service connections within five days at or above 99.5 per cent over the fourth access arrangement period, as per ATCO's three-year average performance.

Attendance to broken mains and services within one hour

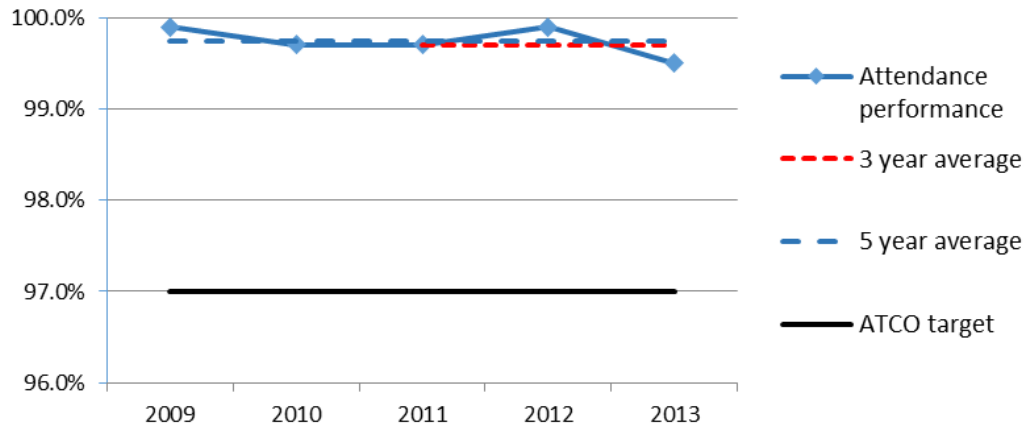
214. ATCO described *attendance to broken mains and services within one hour* as the percentage of attendance to broken mains and services within one hour of the service request being received.

215. ATCO's proposed target for this KPI was 97 per cent over the fourth access arrangement period.

216. ATCO's three-year average performance and five-year average performance were 99.7 per cent.

217. Figure 4 shows ATCO's five year performance and fourth access arrangement period target for *attendance to broken mains and services within one hour*.

Figure 4 ATCO's Performance – Attendance to Broken Mains and Services within One Hour (per cent)



Source: EMCa, Review of Technical Aspects of the Proposed Access Arrangement, ATCO Gas Australia Proposed Access Arrangement for the Mid-West and South-West Gas Distribution Systems, June 2014. ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Figure 8.
Note: ATCO target refers to ATCO's proposed target for the fourth access arrangement period.

218. The Authority considered that ATCO's proposed target of 97 per cent for this KPI did not support ATCO's increased operating and capital expenditure requirements. Furthermore, the Authority considered that ATCO would likely achieve attendance within one hour 97 per cent of the time on average without any additional expenditure over the third access arrangement period levels.

219. The Authority considered that it was appropriate for ATCO to include *attendance to broken mains and services within one hour* in its revised access arrangement for the fourth access arrangement period under rule 72 of the NGR. The Authority also considered that ATCO should be able to achieve a rate of attendance to broken mains and services within one hour at or above 99.7 per cent over the fourth access arrangement period, as per ATCO's three-year and five-year average performance.

Attendance to loss of gas supply within three hours

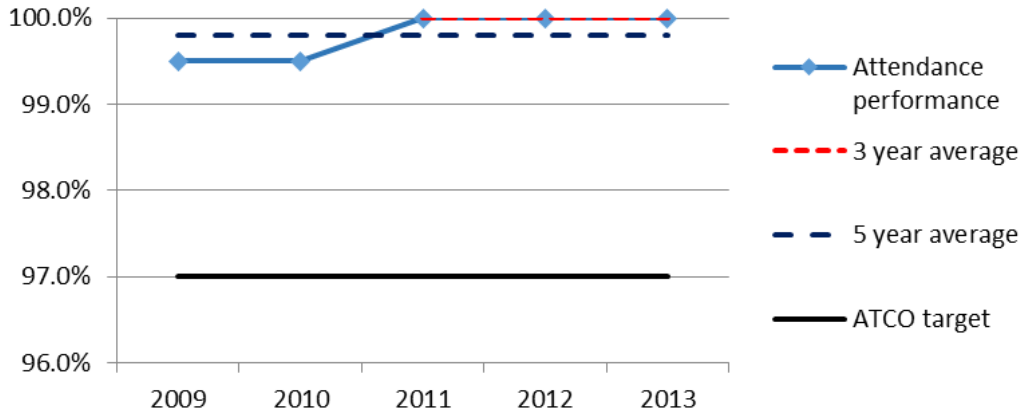
220. ATCO described *attendance to loss of gas supply within three hours* as the percentage of attendance to loss of gas supply within three hours of the service request being received.

221. ATCO's proposed target for this KPI was 97 per cent over the fourth access arrangement period.

222. ATCO's three-year average performance and five-year average performance were 99.7 per cent. ATCO's AMP designates a target of greater than 98 per cent over the fourth access arrangement period.

223. Figure 5 shows ATCO's five year performance and fourth access arrangement period target for *attendance to loss of gas supply within three hours*.

Figure 5 ATCO's Performance – Attendance to Loss of Gas Supply within Three Hours (per cent)



Source: EMCa, Review of Technical Aspects of the Proposed Access Arrangement, ATCO Gas Australia Proposed Access Arrangement for the Mid-West and South-West Gas Distribution Systems, June 2014. ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Figure 8.
Note: ATCO target refers to ATCO's proposed target for the fourth access arrangement period.

224. The Authority considered that ATCO's proposed target of 97 per cent for this KPI did not support ATCO's increased operating and capital expenditure requirements. Furthermore, the Authority considered that ATCO would likely achieve attendance within three hours 97 per cent of the time on average without any additional expenditure over the third access arrangement period levels.

225. The Authority considered that it was appropriate for ATCO to include *attendance to loss of gas supply within three hours* in its revised access arrangement for the fourth access arrangement period under rule 72 of the NGR. The Authority also considered that ATCO should be able to achieve a rate of attendance to loss of gas supply within three hours at or above 99.7 per cent over the fourth access arrangement period, as per ATCO's three-year and five-year average performance.

Total public reported gas leaks per one kilometre main

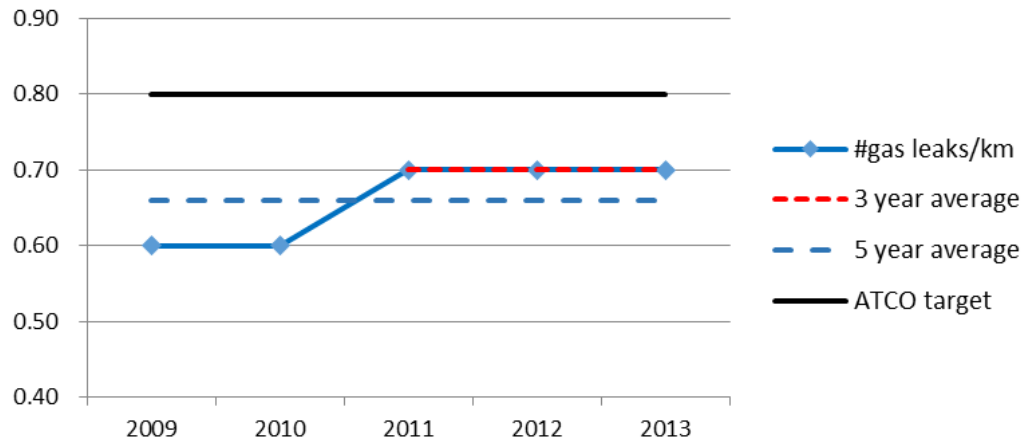
226. ATCO described *total public reported gas leaks per one kilometre main* as the total number of confirmed gas leaks reported by the public (excluding third party damage) per kilometre of main.

227. ATCO's proposed target for this KPI was 0.8 reported leaks per one kilometre main over the fourth access arrangement period.

228. ATCO's three-year average performance was 0.7, and ATCO's five-year average performance was 0.66.

229. Figure 6 shows ATCO's five year performance and fourth access arrangement period target for *total public reported gas leaks per one kilometre main*.

Figure 6 ATCO's Performance – Total Public Reported Gas Leaks per One Kilometre Main



Source: EMCa, Review of Technical Aspects of the Proposed Access Arrangement, ATCO Gas Australia Proposed Access Arrangement for the Mid-West and South-West Gas Distribution Systems, June 2014. ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Figure 9.
Note: ATCO target refers to ATCO's proposed target for the fourth access arrangement period.

230. The Authority noted that ATCO's preventative maintenance plan are designed to offset the impact of a steadily aging mains asset base, as well as its proposed increased expenditure on volumetric activities such as leak surveys and cathodic protection. Furthermore, ATCO's Medium and High pressure mains strategy was based on replacing end-of-life mains, prioritising the mains showing the highest leakage rates. The Authority considered that ATCO should be able to sustain, if not reduce the leakage rate.

231. The Authority considered that it was appropriate for ATCO to include *total public reported gas leaks per one kilometre main* in its revised access arrangement for the fourth access arrangement period under rule 72 of the NGR. The Authority also considered that ATCO should be able to achieve total public reported gas leaks per one kilometre main at or below 0.7 over the fourth access arrangement period, as per ATCO's three-year average performance.

System Average Interruption Frequency Index (SAIFI)

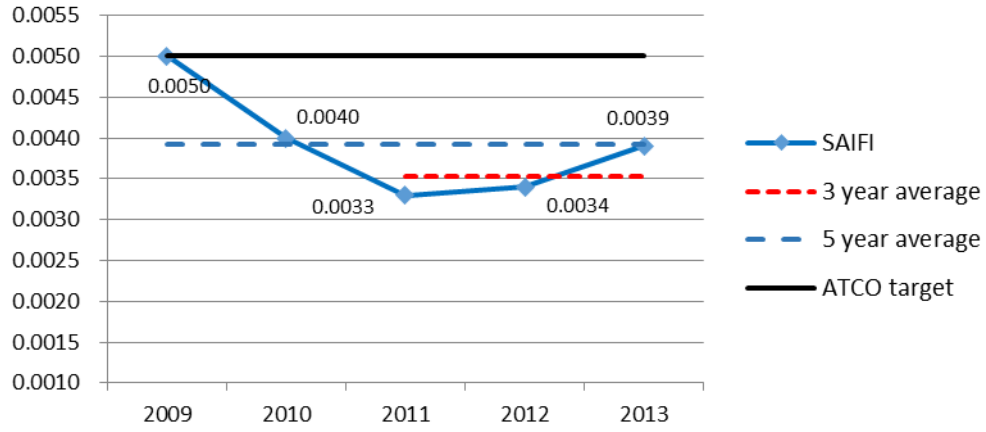
232. ATCO described *SAIFI* as the number of supply interruptions experienced by the average customer as a result of sustained interruptions, calculated as (sum of the number of customers interrupted)/(number of customers served).

233. ATCO's proposed target for this KPI is less than 0.005 over the fourth access arrangement period.

234. ATCO's three-year average performance was 0.0035, and ATCO's five-year average performance was 0.0039.

235. Figure 7 shows ATCO's five year performance and fourth access arrangement period target for SAIFI.

Figure 7 ATCO's Performance – SAIFI



Source: Energy Market Consulting associates, Review of Technical Aspects of the Proposed Access Arrangement, ATCO Gas Australia Proposed Access Arrangement for the Mid-West and South-West Gas Distribution Systems, June 2014. ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Figure 10.
Note: ATCO target refers to ATCO's proposed target for the fourth access arrangement period.

236. The Authority noted that ATCO's AMP and initial proposal were based on investing to improve SAIFI (among other things). The Authority also noted that the initial proposal included expenditure that should maintain or improve network condition and performance, through the installation of high pressure pipelines, interconnections and associated pressure reduction infrastructure to provide supply security for customers.

237. The Authority considered that it was appropriate for ATCO to include *SAIFI* in its revised access arrangement for the fourth access arrangement period under rule 72 of the NGR. The Authority also considered that ATCO should be able to achieve sustained SAIFI performance at or below 0.0035, based on performance over the past three years, over the fourth access arrangement period.

Unaccounted for Gas (UAFG)

238. The Authority considered that it was appropriate for ATCO to include an efficient amount of UAFG in its forecast operating expenditure for the revised access arrangement for the fourth access arrangement period under rule 72 of the NGR.

239. The Authority considered that ATCO should be able to achieve a UAFG target of 2.57 per cent. The Authority based this on a changed starting point for UAFG based on the trend over the third access arrangement period.

Operating expenditure per kilometre of main and per customer connection

240. ATCO defined *operating expenditure per kilometre of main* as the total operating expenditure per year per total kilometre of main. ATCO defined *operating expenditure per customer connection* as the total operating expenditure per year divided by the total number of customer connections.

241. ATCO's proposed target for *operating expenditure per kilometre of main* for the fourth access arrangement period was $6,068. ATCO's proposed target for *operating expenditure per customer connection* for the fourth access arrangement period was $116.

242. ATCO's proposed revised access arrangement referred to two benchmarking studies in relation to these two KPIs, with up to eight comparable Australian gas network businesses. The benchmarking information indicated that ATCO's *operating expenditure per kilometre of main* and *operating expenditure per customer connection* was the lowest of the distribution businesses in the sample.

243. The Authority considered that it was appropriate for ATCO to include *operating expenditure per kilometre of main* and *operating expenditure per customer connection* in its revised access arrangement for the fourth access arrangement period under rule 72 of the NGR. The Authority required an adjusted target for both KPIs based on the required amendments to ATCO's proposed Operating Expenditure, Opening Capital Base, Projected Capital Base and Demand Forecast chapters of the Draft Decision. The Authority approved a target for *operating expenditure per kilometre of main* of $4,774, and for *operating expenditure per customer connection* of $92.

Additional indicators

244. The Authority's technical advisor, EMCa, also recommended that ATCO develop an asset health KPI for the fourth access arrangement period, along with complementary models to support the necessary links between expenditure and service outcomes.

245. The Authority considered that ATCO should include an asset health KPI to provide a link between network management and the service level that is experienced by customers. The Authority considered that an asset health KPI was important, given the increase in forecast sustaining capital expenditure over the fourth access arrangement period. The asset health KPI would need to:

- Address how changes to asset condition data and models occurring during the access arrangement period will be accounted for; and
- Provide flexibility to make efficient adjustments within the access arrangement period, for example an efficient capital expenditure/operating expenditure trade-off allowing for deferral of an asset replacement.

246. The Authority therefore required that ATCO develop an asset health KPI and propose a target for it for the fourth access arrangement period.

247. Table 17 shows ATCO's proposed KPIs and targets for the fourth access arrangement period and the Authority's approved KPI targets for the Draft Decision.

Table 17 Authority Approved ATCO KPIs (AA4) for the Draft Decision

Key Performance Indicator	ATCO Proposed Target	Authority Approved Target
Customer Service		
Domestic customer connections within five days	>97 per cent	>99.5 per cent
Attendance to broken mains and services within one hour	>97 per cent	>99.7 per cent
Attendance to loss of gas supply within three hours	>97 per cent	>99.7 per cent
Network Integrity		
Total public reported gas leaks per one kilometre main	<0.8	<0.7
System Average Interruption Frequency Index (SAIFI)	<0.005	<0.0035
Unaccounted for Gas (UAFG)	<2.9 per cent	2.57per cent
Expenditure		
Operating expenditure per kilometre of main	$ 6,068	$4,774
Operating expenditure per customer connection	$116	$92

Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Table 2, p. 30, Economic Regulation Authority, Draft Decision, 14 October 2014, Table 10, p. 41.

ATCO's Response to the Draft Decision

248. ATCO has accepted the Authority's approach to setting KPI targets to reflect the three year average performance levels for customer service and network integrity KPIs (excluding UAFG). ATCO has conditioned this acceptance on maintaining its proposed operating and capital expenditure over the fourth access arrangement period.

249. ATCO has stated in the KPI section of the response to the Draft Decision that it accepts the Authority's UAFG target.[78] However, in the Operating Expenditure section of the response to the Draft Decision, ATCO states that it does not accept the Authority's approved UAFG target for the fourth access arrangement period.[79]

250. ATCO accepts the Authority's methodology for establishing the SAIFI target. However, ATCO has identified an error in the data it provided to the Authority in the initial proposal. The submission incorrectly referenced the data for 2008 to 2012 as 2009 to 2013. ATCO's corrected SAIFI performance in 2013 was 0.0050. This results in a three year average performance from 2012 to 2014 of 0.0048.[80] In

[78] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 36.

[79] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, paragraph 470, p. 100.

[80] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, paragraph 470, p. 100.

response to an ERA question on the worsening SAIFI performance, ATCO has updated the 2014 SAIFI value to 0.0044.[81]

251. ATCO states that it has not implemented the Authority's operating expenditure targets due to ATCO not accepting the Authority's required amendments for demand forecast, operating expenditure and capital expenditure. As ATCO has submitted revised figures for operating expenditure, network length and customer number forecasts as part of its revised proposal, ATCO has also submitted new KPI targets of $5,629 for operating expenditure per kilometre of main and $103.14 for operating expenditure per customer connection.[82]

252. ATCO states that the KPI targets that it initially proposed in the access arrangement information are aligned with those in the AMP, and are relevant to ensuring compliance with the GDS Safety Case. ATCO considers that there is a significant risk that the targets cannot be met if expenditure levels are reduced. Therefore, ATCO will not update the KPI targets in the AMP to align with the access arrangement.[83]

253. ATCO supports the inclusion of an asset health KPI as required by the Draft Decision, if the Authority provides allowances for one additional Full Time Employee (**FTE**) in the approved operating expenditure forecast ($120,000 per calendar year). ATCO submits that this FTE will be used to develop, collect and report on the health measure. ATCO considers that developing an asset health KPI will require time, and that it is unlikely that the KPI would be available until 2016. Moreover, given that the Authority's approach is to set KPI targets based on a three year average, ATCO states that it will not amend its access arrangement information to include the proposed target as a target would not be available until 2019.[84]

Submissions

254. The Authority has not received any submissions in relation to key performance indicators for ATCO's initial proposal, the Authority's Draft Decision or ATCO's revised proposal.

Considerations of the Authority

255. The Authority notes that ATCO has accepted the KPI targets for customer service and network integrity measures with the exception of SAIFI, which was recalculated by ATCO due to the provision of incorrect data in March 2014.

---

81 ATCO Gas Australia, *Email Response to ERA92*, 1 April 2015.

82 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, paragraph 470, p. 37.

83 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 36.

84 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 38.

256. The Authority also notes that while ATCO accepts the UAFG target in the KPI section of the response document,[85] ATCO has rejected the target in the Operating Expenditure section.[86] As a result, ATCO has effectively rejected the UAFG target that was required by the Draft Decision. As discussed in the Operating Expenditure chapter of this Final Decision, the Authority has accepted ATCO's UAFG rates. Accordingly, the Authority considers that an achievable UAFG target rate for the fourth access arrangement period would be the corresponding approved UAFG for each year of the fourth access arrangement as per Table 34 of the Operating Expenditure chapter.

257. In relation to ATCO's statement that it will not update the KPI targets in the AMP to align with the access arrangement,[87] the Authority considers that it cannot require ATCO to make modifications in its AMP that align KPI targets between AMP and the access arrangement. Regardless, the Authority considers that ATCO's KPI targets as a result of the Authority's Final Decision are binding. Moreover, the Authority will require reporting on these targets, and will link the KPI values to operating expenditure and capital expenditure allowances for the fifth access arrangement period.

System Average Interruption Frequency Index (SAIFI)

258. The Authority considers that ATCO has correctly recalculated the SAIFI KPI target in line with the Authority's approach set out in the Draft Decision. However, upon reviewing ATCO's revised SAIFI data, the Authority notes that ATCO's SAIFI performance deteriorated significantly in 2013 (0.0050) and 2014 (0.0056), compared to the period from 2009 (0.0040) to 2012 (0.0039).[88] The Authority sought an explanation from ATCO regarding its worsening SAIFI performance.[89]

259. In response to an ERA question on the worsening SAIFI performance, ATCO has updated the 2014 SAIFI value to 0.0044.[90] The Authority has updated the three year average for SAIFI as 0.0044, and has accordingly updated the SAIFI target. The Authority considers that ATCO should be able to achieve sustained SAIFI performance at or below 0.0044 over the fourth access arrangement period.

Operating expenditure per kilometre of main and per customer connection

260. The Authority notes that ATCO did not accept the KPI targets for operating expenditure per kilometre of main and operating expenditure per customer connection as a result of it also not accepting the required amendments for demand forecast and operating expenditure. The Authority rejects ATCO's revised KPI targets for operating expenditure per kilometre of main and operating expenditure per

---

85 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, paragraph 161, p. 36.

86 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, paragraph 468, p. 100.

87 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 36.

88 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, paragraph 468, p. 37.

89 Economic Regulation Authority, *ERA92*, 26 March 2015.

90 ATCO Gas Australia, *Email Response to ERA92*, 1 April 2015.

customer connection as a result of changes made in other chapters of this Final Decision.

261. As a consequence of the Authority's required amendments for ATCO in the proposed Operating Expenditure, Opening Capital Base, Projected Capital Base and Demand Forecast chapters of this Final Decision, the Authority has recalculated new targets for the two KPIs. The Authority approves a target for operating expenditure per kilometre of main of $4624, and operating expenditure per customer of $92.

Additional indicators

262. The Authority notes ATCO's response regarding the development of an asset health KPI. The Authority disagrees with ATCO's assertion that this would be an experimental index. The Authority does not consider it necessary to allow ATCO one additional FTE in its operating expenditure forecast to develop, collect and report on the asset health KPI.

263. The Authority considers that ATCO has misinterpreted EMCa's technical report to mean that EMCa was unable to identify an example of an asset health KPI being developed, adopted or used by any other gas distribution network in Australia or outside Australia.[91] The Authority clarifies that the Draft Decision required ATCO to identify an asset health KPI over the fourth access arrangement period rather than impose an unrealistic one, in order to ensure that ATCO could measure it.

264. The Authority notes that Victorian gas distributor SP AusNet's access arrangement information for the 2013-2017 period proposed three different KPIs in relation to asset health:[92]

- Mechanical Damage – Mains, which measures the frequency of mechanical damage per kilometre of mains.
- Mechanical Damage – Services, which measures the frequency of mechanical damage to services per customer connection.
- Mains Replacement, which measures the volume of mains replacement works (in kilometres per year) as part of the annual mains replacement program that replaces mains to reduce leaks and improve safety and reliability.

265. The Authority considers that any one, a combination, or all three of these KPI measures would be sufficient and suitable as an asset health KPI for the GDS because:

- All three KPIs are examples of indicators for asset health.
- The three KPIs have been used by at least one other operator, and so KPI targets can be benchmarked.

266. Furthermore, the Authority considers that ATCO should be able to collect, interpret and report on these measures without a significant impact on the productivity of its existing FTE count.

---

91 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 38.

92 SP AusNet, 2013-2017 *Gas Access Arrangement Review – Access Arrangement Information*, 30 March 2012, pp. 61-62.

267. Alternatively, if ATCO wishes to develop its own asset health KPI with its current proposed level of FTEs and available data over the fourth access arrangement period, then the Authority would not object to this. The end result would be that ATCO would have an improved understanding of its business to undertake efficient investment in the GDS.

268. The Authority accepts ATCO's proposal to defer the inclusion of an asset health KPI in the access arrangement until the fifth access arrangement period. The Authority requires the following from ATCO in relation to the asset health KPI:

- identify an asset health measure to the Authority following the Final Decision for use as a KPI during the fifth access arrangement period;
- report on the value of the asset health measure pursuant to the Final Decision; and
- link asset health KPI values and proposed target to operating expenditure and capital expenditure allowances for the fifth access arrangement period.

Final Decision

269. The Authority's Final Decision is:

- not to approve ATCO's proposed target for SAIFI, operating expenditure per kilometre of main, operating expenditure per customer connection and UAFG and replace these targets with those approved in Table 18;
- to require ATCO to identify an asset health measure for use as a KPI during the fifth access arrangement period and report on its value during the fourth access arrangement period;
- to require ATCO to link all KPI values and proposed targets to operating expenditure and capital expenditure allowances for the fifth access arrangement period.

270. Table 18 shows ATCO's proposed KPIs and revised targets for the fourth access arrangement period and the Authority's approved KPI targets for this Final Decision.

Table 18 Authority's Final Decision Approved and ATCO Revised Proposal KPIs and Targets (AA4)

Key Performance Indicator	ATCO Revised Target	Authority Final Decision Approved Target
Customer Service		
Domestic customer connections within five days	>99.5 per cent	>99.5 per cent
Attendance to broken mains and services within one hour	>99.7 per cent	>99.7 per cent
Attendance to loss of gas supply within three hours	>99.7per cent	>99.7 per cent
Network Integrity		
Total public reported gas leaks per one kilometre main	<0.7	<0.7
System Average Interruption Frequency Index (SAIFI)	<0.0048	<0.0044
Unaccounted for Gas (UAFG)	<2.57 per cent	See footnote[93]
Expenditure		
Operating expenditure per kilometre of main	$ 5,269	$4,624
Operating expenditure per customer connection	$103	$92

[93] Refer to paragraph 256 and Table 34 of the Final Decision.

Operating Expenditure

Regulatory Requirements

271. Rule 91 of the NGR sets the criteria the Authority must consider in approving a service provider's operating expenditure:

> 91. Criteria governing operating expenditure
>
> 1) Operating expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.
>
> 2) The [Authority's] discretion under this rule is limited.

272. Rule 74 of the NGR contains specific requirements for the provision of forecasts and estimates.

> 74. Forecasts and estimates
>
> 1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.
>
> 2) A forecast or estimate:
>
> a) must be arrived at on a reasonable basis; and
>
> b) must represent the best forecast or estimate possible in the circumstances.

273. Rule 71 of the NGR is also relevant to the Authority's consideration of forecast operating expenditure.

> 71. Assessment of compliance
>
> 1) In determining whether capital or operating expenditure is efficient and complies with other criteria prescribed by these rules, the [Authority] may, without embarking on a detailed investigation, infer compliance from the operation of an incentive mechanism or on any other basis the [Authority] considers appropriate.
>
> 2) The [Authority] must, however, consider, and give appropriate weight to, submissions and comments received when the question whether a relevant access arrangement proposal should be approved is submitted for public consultation.

ATCO's Proposed Revisions

274. ATCO initially forecast an increase in operating expenditure to total $421.14 million[94] for the fourth access arrangement period[95] (a five and a half year period). ATCO's first operating expenditure forecast in its initial proposed revised access arrangement for the fourth access arrangement period was $453.80 million. ATCO's updated forecast of $421.14 million incorporated revised UAFG costs and an amended IT service agreement.[96] Total actual operating expenditure for the third access

---

94 ATCO Gas Australia, *Tariff Model,* September 2014. All values are in real $ million at 30 June 2014.

95 Fourth access arrangement period refers to the five and a half years from July 2014 to December 2019.

96 ATCO Gas Australia, *Letter to ERA*, 30 July 2014.
ATCO Gas Australia, *Letter to ERA*, 29 August 2014.

arrangement period[97] was estimated at $284.48 million[98] (a four and a half year period).

275. ATCO identified the key drivers for the increase in forecast operating expenditure as GDS Safety Case requirements and network growth.[99] ATCO developed the GDS Safety Case in consultation with EnergySafety under the *Gas Supply and System Safety Standard Regulations 2000.*

276. ATCO also factored in an annual average increase in labour costs of two per cent above the Consumer Price Index (**CPI**). ATCO based this labour cost escalation factor on a qualitative assessment of modifications to the Communications, Electrical and Plumbing Union Enterprise Agreement, the Western Australian Wage Price Index forecasts and changes to superannuation legislation. ATCO also foresaw additional operating expenditure increases during the fourth access arrangement period not accounted for in the labour cost escalation factor, such as reforms to the Privacy Act, Fair Work Act, industrial relations legislation, and Work Health and Safety legislation.

277. Of the total ATCO forecast operating expenditure for the fourth access arrangement period:

- network operating expenditure accounted for 43 per cent ($182.80 million);
- corporate operating expenditure accounted for 31 per cent ($132.16 million), out of which $24.61 million was attributed to business development and marketing expenditure;
- IT operating expenditure accounted for 14 per cent ($58.70 million);
- UAFG operating expenditure accounted for 10 per cent ($43.70 million); and
- ancillary service operating expenditure[100] accounted for one per cent ($3.78 million).

278. ATCO initially forecast an increase in network operating expenditure from $125.47 million for the third access arrangement period to $182.80 million[101] for the fourth access arrangement period.[102] ATCO initially forecast baseline recurring network operating expenditure to account for 85.50 per cent ($156.30 million) of network operating expenditure, while incremental recurring network operating expenditure is expected to account for 13.51 per cent ($24.70 million) and one-off network operating expenditure accounts for 0.98 per cent ($1.80 million).

---

97 Third access arrangement period refers to the four and a half years from January 2010 to June 2014.

98 ATCO Gas Australia, *Tariff Model*, September 2014. All values are in real $ million at 30 June 2014.

99 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, pp. 59-117.

100 Ancillary service operating expenditure covers operating expenditure on ancillary services, which are deregistering a delivery point, applying a meter lock, removing a meter lock, disconnecting a delivery point, and reconnecting a delivery point.

101 ATCO's forecast network operating expenditure has been updated. ATCO Gas Australia, *Email response to ERA20*, 4 July 2014.

102 The third access arrangement period was 4.5 years, and the fourth access arrangement period is 5.5 years.

279. ATCO initially forecast an increase in corporate operating expenditure from $70.40 million for the third access arrangement period to $132.16 million for the fourth access arrangement period:

- $91.48 million on corporate support operating expenditure, which includes internal support costs (finance and tax, human resources and corporate affairs, legal and regulatory, IT cost centre) and intercompany support charges;[103]
- $24.61 million on business development and marketing operating expenditure;[104] and
- $16.07 million[105] on licence fees to EnergySafety, Economic Regulation Authority, Energy Industry Ombudsman, Retail Energy Market Company, Department of Mines and Petroleum, Office of the Gas Disputes Arbitrator, and Department of Regional Development and Lands.

280. ATCO proposed to apply the Massachusetts Method as defined by the American Gas Association to allocate intercompany support charges to ATCO Gas Australia.

281. ATCO forecast total spending of $24.61 million in the fourth access arrangement period on business development and marketing initiatives covering the following areas:

- development and execution initiatives to grow connection and throughput;
- commercial management;
- business case development and evaluation; and
- relationship development and management with retailers, builders, commercial and residential land developers and customers.

282. ATCO forecast an increase in IT operating expenditure from $35.29 million for the third access arrangement to $58.70 million for the fourth access arrangement. ATCO initially proposed $67.11 million of IT operating expenditure for the fourth access arrangement period, but adjusted its proposal to $58.70 million in light of updated IT arrangements.

283. ATCO forecast an increase in UAFG operating expenditure to $43.70 million for the fourth access arrangement period based on the following assumptions:

- Updated average gas price based on the conclusion of a competitive tender for the supply of UAFG gas.[106]
- Increase in the UAFG rate in July-December 2014 and then gradual decrease to 2.60 per cent.
- Increase in total GDS throughput over the fourth access arrangement period.

---

103 ATCO has corrected its proposed corporate support operating expenditure after submitting the access arrangement:

ATCO Gas Australia, *Email response to EMCa19*, 24 April 2014.

104 ATCO has corrected its proposed business development and marketing operating expenditure after submitting the access arrangement:

ATCO Gas Australia, *Email response to EMCa79*, 8 May 2014.

105 On 26 August 2014, ATCO revised proposed licence fees to $14.34 million in an email response to the Authority.

106 ATCO Gas Australia, *Letter to ERA*, 30 July 2014.

284. Table 19 shows ATCO's initially proposed operating expenditure forecast for the fourth access arrangement period.

Table 19 ATCO's Initial Proposal Operating Expenditure Forecast by Category (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Network Operating Expenditure	15.00	31.30	33.00	33.60	34.50	35.40	182.80
Corporate Operating Expenditure	11.52	23.90	22.80	23.64	24.83	25.47	132.16
IT Operating Expenditure	4.90	10.70	10.90	10.90	10.70	10.60	58.70
UAFG Operating Expenditure	4.40	7.60	7.70	7.90	8.00	8.10	43.70
Ancillary Service Operating Expenditure	0.32	0.63	0.68	0.70	0.72	0.74	3.78
ATCO Proposed – Operating Expenditure	**36.14**	**74.13**	**75.07**	**76.73**	**78.75**	**80.31**	**421.14**

Source: ATCO Gas Australia, Tariff Model, September 2014.

Draft Decision

285. The Authority considered that only $347.48 million of ATCO's forecast operating expenditure for the fourth access arrangement period satisfied rules 74 and 91 of the NGR:

- $163.65 million on network operating expenditure;
- $93.73 million on corporate operating expenditure;
- $43.67 million on IT operating expenditure;
- $42.68 million on UAFG operating expenditure; and
- $3.75 million on ancillary service operating expenditure.

286. Table 20 summarises the Authority's Draft Decision approved operating expenditure by category for the fourth access arrangement period.

Table 20 Authority's Draft Decision Approved Operating Expenditure Forecast by Category (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Network Operating Expenditure	14.45	29.80	30.00	29.90	29.70	29.80	163.65
Corporate Operating Expenditure	8.46	16.67	16.56	16.59	17.68	17.78	93.73
IT Operating Expenditure	4.05	7.82	7.88	7.91	7.98	8.02	43.67
UAFG Operating Expenditure	4.62	7.44	7.49	7.63	7.72	7.79	42.68
Ancillary Service Operating Expenditure	0.32	0.62	0.67	0.69	0.71	0.73	3.75
Authority Approved Operating Expenditure	**31.91**	**62.35**	**62.59**	**62.72**	**63.79**	**64.12**	**347.48**

Source: ATCO Gas Australia, Access Arrangement Information, March 2014. EMCa, Review of Technical Aspects of the Proposed Access Arrangement, June 2014. ERA, GDS Tariff Model, October 2014.

287. The Authority's technical advisor, Energy Market Consulting associates (**EMCa**), assessed ATCO's governance framework and processes in relation to operating expenditure forecasting. EMCa's main concerns in relation to ATCO's governance of operating expenditure forecasting were as follows:

- ATCO did not justify the Safety Case thresholds that it applied.
- ATCO developed its forecasts using a bottom-up approach by incremental aggregation of detailed activity forecasts that were largely determined by subjective assessments for which the assumptions used could not be independently verified. EMCa considered that the forecasts were not subject to sufficient top-down challenge, which lead ATCO to over-estimate operating expenditure forecasts.

288. The Draft Decision assessment of ATCO's proposed forecast operating expenditure for the fourth access arrangement period covered the following:

- Labour cost escalation factor;
- Network operating expenditure;
- Corporate operating expenditure;
- IT operating expenditure;
- UAFG operating expenditure; and
- Ancillary service operating expenditure.

289. The Authority's Draft Decision rejected ATCO's proposed labour cost escalation factor on the basis that the justification provided by ATCO did not satisfy rule 74 of the NGR. In particular, the Authority was not satisfied that there was a reasonable basis to support ATCO's proposed labour cost escalation factor (in accordance with

rule 74(1) of the NGR), or that ATCO's proposed labour cost escalation factor was the best forecast in the circumstances (in accordance with rule 74(2)(b) of the NGR). As a result, the Authority's Draft Decision only applied CPI escalation to expenditure.

290. The Authority's Draft Decision determined that of the $182.80 million[107] that ATCO proposed to spend on network operating expenditure in the fourth access arrangement period:

- $163.65 million satisfied rules 74 and 91 of the NGR.
- $19.15 million did not satisfy rules 74 and 91 of the NGR.

291. The Draft Decision approved forecast of $163.65 million on network operating expenditure in the fourth access arrangement period was based on the following:

- The Authority's assessment that only $168.30 million of ATCO's forecast baseline recurring and incremental recurring network operating expenditure of $181.00 million (network operating expenditure excluding one-off network operating expenditure) was consistent with rules 74 and 91 of the NGR because:
  - ATCO's approach to forecasting baseline recurring and incremental recurring network operating expenditure led to a significant overstatement of forecast expenditure; and
  - ATCO's proposed risk thresholds for forecasting baseline recurring and incremental recurring network operating expenditure were not assessed in the manner required by the relevant standards AS/NZS4645 and AS2885.
- The Authority's assessment that ATCO's proposed one-off network operating expenditure of $1.80 million satisfied rule 91 of the NGR.
- The Authority's decision to reject ATCO's proposed labour cost escalation factor of two per cent on the basis of rule 74 of the NGR, as noted above. The Draft Decision's approved forecast of network operating expenditure excluded labour cost escalation of $0.40 million for 2015, and baselined network operating expenditure in real terms from 2015.[108]
- The Authority's decision to deduct an IT efficiency gain of $6.05 million, or an annual IT efficiency gain of $1.10 million. The IT efficiency gain was equivalent to ten per cent of the Authority approved conforming IT capital expenditure for the third access arrangement period under rule 91 of the NGR.

292. The Authority's Draft Decision determined that of the $132.16 million[109] that ATCO proposed to spend on corporate operating expenditure in the fourth access arrangement period:

- $93.73 million satisfied rules 74 and 91 of the NGR.
- $38.43 million did not satisfy rules 74 and 91 of the NGR.

293. The Draft Decision's approved forecast of $93.73 million on corporate operating expenditure in the fourth access arrangement period was based on the following:

---

107 ATCO's forecast network operating expenditure has been updated as per ATCO Gas Australia, *Email response to ERA20*, 4 July 2014.

108 ATCO Gas Australia, *Email response to ERA27*, 30 July 2014.

109 ATCO's forecast network operating expenditure has been updated as per ATCO Gas Australia, *Email response to ERA20*, 4 July 2014.

- The Authority's assessment that only $69.75 million of ATCO's forecast corporate support operating expenditure was consistent with rule 91 of the NGR.
- The Authority's assessment that only $9.68 million of ATCO's proposed business development and marketing operating expenditure satisfied rule 91 of the NGR.
- The Authority's assessment that only $14.30 million of ATCO's proposed licence fees satisfied rule 74 of the NGR.
- The Authority's decision to reject ATCO's proposed labour cost escalation factor of two per cent on the basis of rule 74 of the NGR. The Authority's approved forecast of corporate operating expenditure used 2013 as a baseline, and thus excluded labour cost escalation.

294. The Authority's Draft Decision determined that of the $58.70 million of IT operating expenditure that was forecast by ATCO for the fourth access arrangement period:

- $43.67 million satisfied rules 74 and 91 of the NGR; and
- $15.03 million did not satisfy rules 74 and 91 of the NGR.

295. The Draft Decision determined that $42.68 million of ATCO's forecast UAFG operating expenditure for the fourth access arrangement period satisfied rule 91 of the NGR, in line with the following decisions by the Authority:

- change in the starting point used to project the UAFG rate over the fourth access arrangement period to the third access arrangement period trend (2.62 per cent), in order to ensure compliance with rule 74 of the NGR;
- reduction of the UAFG rate to 2.56 per cent by 2019, in order to ensure compliance with rule 91 of the NGR; and
- reduction in throughput arising from the Authority's demand forecast adjustment, in order to ensure internal consistency and compliance with rule 74 of the NGR.

296. The Authority's Draft Decision adjusted ATCO's forecast ancillary service operating expenditure in line with the Authority adjusted B3 demand forecast.

ATCO's Response to the Draft Decision

297. ATCO has not accepted the Draft Decision's operating expenditure amendments. Table 21 shows ATCO's revised proposal forecast operating expenditure by category for the fourth access arrangement period.

Table 21 ATCO's Revised Proposal Operating Expenditure Forecast by Category (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Network Operating Expenditure	13.70	31.30	33.10	33.70	34.60	35.40	181.80
Corporate Operating Expenditure	9.86	22.41	21.29	21.98	23.13	24.61	123.28
IT Operating Expenditure	4.30	10.60	10.70	10.70	10.50	10.40	57.20
UAFG Operating Expenditure	4.02	7.24	7.38	7.51	7.61	7.70	41.47
Ancillary Service Operating Expenditure[110]	0.31	0.57	0.59	0.61	0.62	0.64	3.33
ATCO Revised Proposal Forecast Operating Expenditure	**32.19**	**72.12**	**73.06**	**74.50**	**76.46**	**78.75**	**407.08**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 6-3, p. 49, ATCO Gas Australia, Tariff Model, December 2014.

298. ATCO's revised proposal operating expenditure forecast for the fourth access arrangement period on an annualised basis remains higher than its actual operating expenditure during the third access arrangement period.

299. ATCO considers that, in relation to the governance of operating expenditure:

- ATCO's risk management thresholds are aligned with those prescribed by AS/NZS4645 and AS2885.
- ATCO has incorporated a top-down challenge throughout the annual budgeting cycle. This included a number of challenge workshops conducted by the fourth access arrangement steering committee and attended by advisors, which tracked operating expenditure forecasts throughout the business plan process.

300. ATCO has not accepted the Draft Decision's application of the revealed cost approach. ATCO considers that the approach in the Draft Decision neglects allowances for network growth or real cost increases.

301. ATCO has not accepted the Authority's labour cost escalation amendment in the Draft Decision and has resubmitted that a labour cost escalation factor of two per cent above CPI takes into account WPI forecasts, interest rates, inflation, labour market conditions overall and in the EGWWS sector, ATCO's current labour costs, and recent AER determinations.

[110] The Authority notes that the amounts for Ancillary Service Operating Expenditure presented by ATCO in Table 6-28 of the ATCO Response to the Draft Decision do not correspond to the amounts in ATCO's tariff model for the purposes of calculating ATCO's total forecast operating expenditure for AA4. For the purposes of Table 21 above, the Authority has used the Ancillary Service Operating Expenditure from ATCO's tariff model.

302. ATCO has not accepted the Draft Decision network operating expenditure amendments. ATCO has retained most of its initial proposal, and has adjusted it to reflect the actual expenditure to date in the July to December 2014 forecast. ATCO's response has covered the following:

- ATCO disagrees with the Authority's determination that network operating expenditure would be offset by efficiencies gained from capital expenditure on asset replacement and telemetry and optimising. ATCO considers that the 10 per cent annual dividend appears to have been arbitrarily determined. ATCO says it has accounted for approximately $2.4 million in savings as a result of network capital projects and the IT Field Mobility project in the operational expenditure forecasts over the fourth access arrangement period.
- ATCO's forecasts for incremental recurring activity are driven by requirements for the Safety Case and the *Gas Standards Act*.

303. ATCO has not accepted the Draft Decision corporate operating expenditure amendments. ATCO has retained some of its initial proposal, and has adjusted the following:

- Corporate support operating expenditure: ATCO has revised the costs associated with preparing and managing access arrangements for the fourth and fifth access arrangements to $3.4 million and $3.3 million respectively. ATCO has made this adjustment to reflect costs incurred by ATCO in responding to questions from the Authority and EMCa during the course of the review of the initial access arrangement proposal.[111]
- Business development and marketing operating expenditure: ATCO has reduced its forecast expenditure from $24.6 million to $20.8 million as a result of further investigation of business development and marketing activities that are likely to be effective.
- Licence fees: ATCO has implemented the Draft Decision required amendments to the forecast licence fees with a modification to reflect the licence fees in 2014. The difference due to ATCO's amendment is $0.1 million (0.7%).

304. ATCO's response in relation to corporate operating expenditure has also covered the following:

- ATCO states that ATCO Group did not charge intercompany charges to ATCO Gas Australia in 2013, but did so in 2014. ATCO has also highlighted step changes in intercompany charges, as they are based on business size and annual earnings.[112] ATCO also claims that there is a degree of delineation between services provided in-house compared to those provided by ATCO Group,[113] which means that changes in the costs for these services are not necessarily directly proportional.[114] ATCO hired KPMG to review intercompany

---

111 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014*, p. 74.

112 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014*, pp. 70-71.

113 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014*, p. 75.

114 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014*, p. 76.

charges for 2014, and KPMG found that the allocation method is consistent with rule 93(2) of the NGR.

- ATCO considers that using 2013 as a base year for business development and marketing operating expenditure is inappropriate, because activities were limited during 2013 due to the entry of Kleenheat to the market and the desire not to introduce confusion as to the role of the GDS versus the retailer. ATCO claims that underspending its marketing budget during the third access arrangement period has led to a decrease in consumption among residential customers. ATCO has presented a revised NPV analysis that estimates outcomes for each of its six new proposed incentive programs over the fourth access arrangement period.[115] ATCO has provided benchmarking data as evidence that its proposed business development and marketing expenditure is prudent by industry standards.

305. ATCO has not accepted the Draft Decision amendments in relation to IT operating expenditure, because EMCa did not review ATCO's revised IT proposal that was provided in August 2014. ATCO considers that the Draft Decision applied recommendations based on the I-Tek agreement to the WIPRO agreement.

306. ATCO has not accepted the Draft Decision amendments in relation to UAFG operating expenditure. ATCO considers that the Authority's updated calculation of the starting point for the UAFG rate for the fourth access arrangement period does not account for anticipated seasonality in the UAFG unit rate in the second half of the calendar year. ATCO has recalculated UAFG rates to include data since July 2014.[116]

307. ATCO has accepted the Draft Decision amendments to ancillary service operating expenditure. ATCO has confirmed that ancillary services that are provided by ATCO are based on existing contracts.

Submissions

308. In response to the Draft Decision, Energy Networks Association (**ENA**) and Dampier to Bunbury Pipeline (**DBP**) raised the following points in relation to the Authority's revealed cost approach:

- The Authority's application of the revealed cost approach is inconsistent with other regulators and regulated businesses.
- The Authority's selected base year for the calculation of forecast network operating expenditure is inappropriate.
- The ability for network operating expenditure to be offset by efficiency gains is unsubstantiated.

309. In response to ATCO's initial proposal, Alinta Energy (**Alinta**) has submitted that ATCO's advertising campaign is high cost. The campaign includes television

---

115 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014*, p. 86.

116 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014*, p. 102.

commercials, outdoor ad shelters and press.[117] At the same time, Alinta has noted that ATCO's proposed marketing and business development activities for the fourth access arrangement period support very small increases in new connections (on average 1,316 per year) at a cost of approximately $3,000 per new connection.[118]

310. Both Alinta and Wesfarmers Kleenheat Gas (**Kleenheat**) have questioned the value of ATCO's marketing activities outside incentives for new customer connections and a general promotion of the "gas is good" message.[119] Alinta has mentioned that it has received calls from confused customers querying ATCO's role in the natural gas market. Alinta has cited its ongoing "Save with Gas" campaign and the Capricorn Estate project (undertaken in partnership with ATCO) as examples of other natural gas marketing campaigns.

311. During the second round of public consultation in response to the Draft Decision and ATCO's response, Kleenheat has reiterated that the increase in business development and marketing expenditure that is proposed by ATCO is excessive. Kleenheat considers that if increases in business development and marketing operating expenditure are approved, incentive mechanisms should be put in place with clearly defined targets and monitoring.

Considerations of the Authority

312. The Authority verified ATCO's operating expenditure over the third access arrangement period until 31 December 2013 as part of the Draft Decision review. This enables the Authority to review ATCO's proposed forecast operating expenditure for the fourth access arrangement period. Following its response to the Draft Decision, ATCO provided its actual operating expenditure for the 2014 calendar year.

Verification of Operating Expenditure

313. In order for the Authority to review ATCO's access arrangement proposal, the Authority requested that ATCO provide financial information in relation to its proposed revised access arrangement proposal.

314. On 16 July 2014, ATCO provided the Authority with copies of the statutory accounts for the year ending 30 June 2011, the six months ending 31 December 2011, and the years ending 31 December 2012 and 31 December 2013.

315. On 7 August 2014, ATCO provided the Authority with regulatory financial accounts for the year ending 30 June 2011, the six months ending 31 December 2011, and the years ending 31 December 2012 and 31 December 2013.

---

117 Alinta Energy, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014.

118 Alinta Energy, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014.

119 Alinta Energy, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014.

Kleenheat Gas, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014.

316. On 8 August 2014, ATCO provided the Authority with its Cost Allocation Method 2014 (**CAM**) document, which explains the methods that ATCO uses for allocating regulatory and non-regulatory costs.

317. The Authority undertook a review of ATCO's statutory accounts, and associated adjustments made to these accounts to obtain the regulatory accounts. These adjustments were reviewed to ensure they are in accordance with the methodology set out in the CAM.

318. The Authority noted that for the regulatory accounts for the third access arrangement period, ATCO has in fact calculated this percentage based on the haulage revenue for the Albany and Kalgoorlie networks as a proportion of total revenue rather than by delivery points as set out in the CAM.

319. ATCO confirmed that for the third access arrangement period, the indirect costs percentage for the Albany and Kalgoorlie networks was calculated using revenue. ATCO stated that from the beginning of 2014, ATCO will calculate the indirect costs percentage for the Albany and Kalgoorlie networks using delivery points.

320. The Authority noted that the difference between the percentages for the two calculation methods was minimal and in this case, not material. However, the Authority was concerned that the regulatory accounts were prepared inconsistently with the methodology outlined in the CAM.

321. The Authority accepted in the Draft Decision that the regulatory accounts provided by ATCO were free from material misstatement and apart from the calculation method mentioned above, prepared in accordance with the CAM for operating expenditure.

322. After the Authority published its Draft Decision, ATCO provided regulatory financial statements for the financial year 2014, which were externally reviewed by Price Waterhouse Coopers, signed WANH statutory accounts for the financial year 2014 and Information templates for the regulatory year ended December 2014, which includes separate reporting for the period 1 January 2014 to 30 June 2014, 1 July 2014 to 31 December 2014 and the period 1 July 2013 to 30 June 2014 on 23 February 2015.

323. ATCO provided a revised CAM for the calendar year 2014 on 23 February 2015. ATCO has made a number of amendments to the CAM from the version provided on 8 August 2014.

324. The main variations between the two CAM versions relate to a clarification of the allocation methods used for the allocation of capital expenditure between regulated and unregulated pipelines and the treatment of disposals in relation to the capital base. There were no changes to the operating expenditure section between the two CAM versions.

325. Accordingly, for operating expenditure, ATCO has stated in the CAM that a proportion of indirect costs that is not able to be directly attributed to services that relate to the Albany and Kalgoorlie networks, is calculated by dividing the number of delivery points in the Albany and Kalgoorlie networks by total delivery points in the network. This percentage is then multiplied by total indirect costs and the resulting cost portion is excluded from the regulatory accounts.

326. The Authority noted in the Draft Decision that ATCO had not in fact adhered to the CAM and had calculated the indirect percentage based on haulage revenue. It was

noted that this was not material and the Authority accepted that ATCO's regulatory accounts were free from material misstatement.

327. The Authority has reviewed the 2014 accounts provided by ATCO. The Authority notes that the actual amounts presented in the 2014 accounts differ to the amounts provided to the Authority in the ATCO Tariff Model on 10 December 2014. The Authority notes that the differences are not material and therefore is of the opinion that they are free from material misstatement.

Assessment of Operating Expenditure

328. ATCO's proposed revised operating expenditure forecast for the fourth access arrangement period is equivalent to an average annual operating expenditure forecast of $74 million. ATCO's proposed average annual operating expenditure forecast for the fourth access arrangement period is 17 per cent higher than the average annual operating expenditure that has been incurred by ATCO during the third access arrangement period.

329. To assist the Authority in the preparation of the Final Decision, its technical advisor (**EMCa**) has assessed ATCO's network operating expenditure in light of its Safety Case requirements, and ATCO's proposed IT operating expenditure. Moreover, EMCa has reviewed ATCO's assessment of the Draft Decision application of the revealed cost approach.

330. Assessment of ATCO's proposed forecast operating expenditure for the fourth access arrangement period has covered the following:

- Labour cost escalation factor;
- Network operating expenditure;
- Corporate operating expenditure;
- IT operating expenditure;
- UAFG operating expenditure; and
- Ancillary service operating expenditure.

Labour Cost Escalation Factor

331. ATCO has continued to propose a two per cent real labour cost escalation (above CPI), as per its initial proposal.

332. In response to the Draft Decision's requirement for ATCO to demonstrate the derivation of its proposed labour cost escalation estimate, ATCO has sought to provide evidence to justify its proposed labour cost escalation rate.

333. Table 22 summarises ATCO's derivation of its proposed labour cost escalation rate.

Table 22 ATCO's Derivation of Proposed Real Labour Cost Escalation Rate

Labour Cost Escalation Rate Component	Percent
Annual Average of Western Australian WPI over AA4	3.7
Plus Premium of EGWWS WPI over Western Australian WPI	0.6
Plus ATCO labour cost premium over EGWWS WPI[120]	0.2
Equals Nominal Labour Cost Escalation forecast per annum	4.5
Less Forecast CPI per annum	2.5
***Equals* ATCO Proposed Labour Cost Escalation Rate**	**2.0**

Source: ATCO Gas Australia, Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 27 November 2014, Table 6-5

334. This section assesses the items in Table 22 in order to verify the assumptions that have been used by ATCO to derive the associated values.

335. ATCO has referred to the 2013/14 Western Australian Treasury Budget in its response to the Draft Decision as evidence for its assumed annual average of Western Australian WPI over the fourth access arrangement period.[121] Table 23 presents this data.

Table 23 Western Australian WPI for AA4 based on Treasury Budget

	2013/14	2014/15	2015/16	2016/17
Annual Average of Western Australian WPI	3.75%	3.75%	3.5%	3.5%

Source: ATCO Gas Australia, Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 27 November 2014, par 243.

336. The Authority notes that the relevant years from Table 23 for the fourth access arrangement period are 2014/15-2016/17. The average Western Australian WPI for the three years is 3.58 per cent.

337. Moreover, ATCO has included in its response to the Draft Decision a report by Acil Allen (**Acil**) that looks into ATCO's proposed labour cost escalation rate.[122] Table 24 updates data that is referenced by Acil in the report.

120 Even though ATCO's Table 6-5 refers to this item as "ATCO labour cost premium over WPI", the Authority considers that the correct reference should be "ATCO labour cost premium over EGWWS WPI" based on the table build-up.

121 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 52.

122 Acil Allen, *Operating Expenditure Forecasting Using the Revealed Cost Approach*.

Table 24 Western Australian Treasury Economic Forecasts

	2014/15	2015/16	2016/17	2017/18
Annual Average of Western Australian WPI	2.75%	3.0%	3.25%	3.5%
Annual Average of Western Australian CPI	2.25%	2.5%	2.5%	2.5%
Premium of Western Australian WPI over CPI	0.5%	0.5%	0.75%	1.0%

Source: Western Australian Department of Treasury, Economic Forecasts, http://www.treasury.wa.gov.au/cms/content.aspx?id=604

338. ATCO has presented data on Western Australian WPI and EGWWS WPI from March 2013 to December 2013 to illustrate the premium of EGWWS WPI over Western Australian WPI. Table 25 presents this data.

Table 25 Past Trends of Western Australian WPI and EGWWS WPI

	March 2013	June 2013	September 2013	December 2013
Western Australian WPI	3.7%	3.4%	3.2%	3.0%
EGWWS WPI	4.4%	3.9%	3.3%	3.3%
Premium of EGWWS WPI over Western Australian WPI	0.7%	0.5%	0.1%	0.3%

Source: ATCO Gas Australia, Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 27 November 2014, Table 6-4

339. The Authority notes that Table 25 provides an indication of the premium of EGWWS WPI over Western Australian WPI, rather than an estimate. The premium ranges from 0.7 per cent in March 2013 to 0.3 per cent in December 2013, with a drop to 0.1 per cent in September 2013. The average over the period is 0.4 per cent. The Authority notes that the economic slowdown in Western Australia, including in the gas sector, is expected to dampen the EGWWS WPI.

340. The Authority considers that a longer averaging period would provide a better estimate for the EGWWS premium used for the forecast labour cost escalation than ATCO's proposal of just using four quarters to be indicative of the likely trend over the next five years.[123] The Authority considers that for an estimate of the EGWWS WPI premium, a period of at least four years would be reasonable. Accordingly, the Authority has calculated a four year average of the premium of EGWWS WPI over the Western Australian WPI to be 0.11 per cent.

341. In relation to ATCO's labour cost premium over EGWWS WPI, ATCO has mentioned that it expects a premium for the enterprise agreement that commences on 1 January 2016 and covers one third of its staff. ATCO has mentioned a labour cost premium over WPI of 1.4 per cent between 2010 and 2013. ATCO has also mentioned the expectation of the decrease of this premium due to slowing economic conditions.[124] However, ATCO has failed to demonstrate the reasonableness of a premium of 0.2 per cent. While some of ATCO's workforce may have received a premium over the WPI in the last enterprise agreement, this does not mean that it will occur again (albeit to a lesser extent). The Authority considers that ATCO's proposal

123 Australian Bureau of Statistics, Series 6345.0 Wage Price Index – Australia, A2603491L and A2607601L

124 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, pp. 56-57.

in this regard is not compliant with rule 74 of the NGR and does not represent a best estimate.

342. The Authority also notes that the Weighted Average CPI-Eight Capital Cities rather than the Western Australian CPI has been applied to ATCO's current access arrangement, and has been approved for the fourth access arrangement period. However, the labour cost escalation section of ATCO's response to the Draft Decision and the supporting Acil report refer to the Western Australian CPI. The Authority considers that any proposed real labour cost escalation rate for ATCO should reflect additional growth over the applied CPI.

343. ATCO has also stated that rather than resort to a "mechanical" derivation of labour cost escalation, it has resorted to information from recruitment groups. ATCO does not explain the link between this information and its derivation of a proposed labour cost escalation factor.[125] Moreover, the Authority considers that such a qualitative approach is not consistent with rule 74 of the NGR.

344. The Authority also notes that, in its response to the Draft Decision, ATCO no longer refers to the superannuation guarantee rate as justification for proposed labour cost escalation. At the same time, ATCO has not modified its proposed rate.

345. The Authority has adjusted Table 22 in Table 26, as per the above discussion.

Table 26 Authority's Derivation of Approved Real Labour Cost Escalation Rate

Labour Cost Escalation Rate Component	Per cent
Annual Average of Western Australian WPI over AA4	3.13
Plus Premium of EGWWS WPI over Western Australian WPI	0.11
Plus ATCO labour cost premium over EGWWS WPI	N/A
Equals Nominal labour cost escalation forecast per annum	3.24
Less Forecast CPI per annum (as per WACC Chapter)	1.90
***Equals* Authority Approved Labour Cost Escalation Rate**	**1.34**

346. The Authority notes that DBP and ENA made submissions in regard to the provision for a labour cost escalation rate in ATCO's revised proposal. The Authority considers that the methodology it has adopted to calculate its approved rate is reasonable and contains the most recent forecasts of the underlying components. The Authority does not agree with DBP's consideration that ATCO's proposed labour cost escalation rate meets the requirements of the NGR.

347. The Authority considers that a reasonable labour cost escalation factor for ATCO for the fourth access arrangement period is 1.34 per cent. This is consistent with the Draft Decision that stated that the labour cost escalation factor should not be higher than 1.75 per cent. Therefore, the Authority has approved a Labour Cost Escalation factor of 1.34 per cent for 2015-2019. Where Labour Cost Escalation is applicable for forecast operating expenditure it is discussed in the specific categories below.

---

125 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 57.

Network Operating Expenditure

348. ATCO states that it has not accepted the Authority's approach to forecasting network operating expenditure. ATCO does not consider that the Authority has made any assessment as to whether the productivity gains would mitigate increasing network costs.[126] As a result of ATCO not accepting the Authority's Draft Decision, the Authority has requested that its technical advisor for the Draft Decision prepare an addendum report, which takes into consideration ATCO's revised proposal.

349. ATCO has submitted a revised proposal forecast for network operating expenditure of $181.80 million, which includes a net reduction of $1.3 million over the fourth access arrangement from the initial proposal's forecast of $183.10 million.

350. ATCO states that its bottom up forecasting approach has been subject to a robust top-down challenge through the 2014 budget process and in its preparation of the initial submission in March 2014. ATCO states that it does not consider it is reasonable to freeze recurring network expenditure at 2015 levels and has submitted baseline and incremental recurring expenditure consistent with its original proposal.[127] However, as stated above, there is a net reduction of $1.3 million over the five and a half years of the fourth access arrangement period. EMCa, notes that this reduction is a result of ATCO having spent $1.6 million less in the six months actual to December 2014 than in its initial proposal. ATCO's forecast for the remainder of the fourth access arrangement period is $0.3 million higher than its initial proposal.[128]

351. ATCO submitted externally reviewed regulatory financial statements for 2014 on 23 February 2015. ATCO states that this information is directly relevant for the access arrangement review process and should be taken into account when considering the expenditure incurred and forecast for the fourth access arrangement period. The Authority considers that for the purposes of determining the best forecast for July to December 2014 as per rule 74(2) of the NGR, the best forecast would be the actual expenditure for this period.[129]

352. In addition to the reduction noted in paragraph 350 the Authority notes that there is a difference of $1.43 million between the regulatory financial statements and ATCO's Response to the Draft Decision. ATCO states that its network operating expenditure for 2014 reflects an under allocation of some Worker's Compensation insurance and rent costs which were instead recorded in the Corporate operating expenditure general ledger accounts. Additionally, ATCO's regulatory financial statements are further understated by $406,000 as a result of planned maintenance activities in the last quarter of 2014. ATCO states that these works will need to be undertaken in 2015.[130]

---

126 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 46.

127 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 47.

128 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement – Addendum Report*, April 2015, p. 64.

129 ATCO Gas Australia, *ATCO Gas Australia Regulatory Financial Statements 2014*, 23 February 2015.

130 ATCO Gas Australia, *ATCO Gas Australia Regulatory Financial Statements 2014*, 23 February 2015.

353. ATCO considers that efficiencies flowing from IT, network capital projects and operating efficiencies have already been incorporated into its network forecasts. ATCO also considers that growth in customer numbers and network extension are reasonable drivers of increasing network activity and costs, as are the increase in labour input costs.

354. ATCO states that it has used the findings of a report prepared by Zincara to question the capital and operating cost assumptions that the Authority has made or relied upon in its Draft Decision. ATCO has cited excerpts from Zincara to support its revised proposal forecast for network operating expenditure in relation to the development of incremental recurring expenditure and the reasonableness of this forecast.[131]

355. In addition to relying upon the findings from Zincara, ATCO states that it has also relied upon the findings of a report prepared by Acil to review the assumptions relating to growth and productivity supporting the Authority's application of the revealed cost approach.[132]

356. EMCa notes that ATCO's Response to the Draft Decision does not directly comment on EMCa's choice of 2013 as a base year for the purpose of projecting network operating costs. EMCa also notes that Zincara has endorsed EMCa's use of 2013 as the base year. Conversely, Acil claims that the Authority has not used ATCO's most recent actual operating expenditure as the base year.[133] EMCa considers it is unclear what year Acil has used in its alternative forecasts as it does not appear to be further discussed. Additionally, EMCa's initial report was prepared in June 2014, meaning that 2013 was the only period that had a full year of actual operating expenditure available for analysis. The Authority considers that Acil's claims in relation to the choice of base year to be ill-informed.[134]

357. Acil asserts that by the Authority accepting a portion (2014 and 2015) of ATCO's proposed incremental network operating expenditure, the Authority has incorrectly applied the revealed cost approach and equates to selecting the wrong base year. EMCa considers that 2013 remains a reasonable and valid year in applying the revealed cost approach. The Authority does not agree with Acil's assertion with respect to the correct application of the revealed cost approach. The Authority's reasons for allowing increases in network operating expenditure were stated in its Draft Decision.[135] EMCa considered the following factors in making its recommendations to the Authority as to whether there was a reasonable justification to increase or decrease the forecast network expenditure:[136]

- costs of complying with new regulatory obligations in the fourth access arrangement period;
- forecast changes in demand during the fourth access arrangement period;

---

131 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 47.

132 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 59.

133 Acil Allen Consulting, *Report to ATCO Gas Australia – Forecasting Using the Revealed Cost Approach*, 20 November 2014, p. 8.

134 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement – Addendum Report*, April 2015, p. 64.

135 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, pp. 55 -56.

136 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement,* June 2014, pp. 150 -151.

- productivity improvements in the fourth access arrangement period; and
- unit cost increases in the fourth access arrangement period.

358. The Authority agrees with EMCa and maintains its view from the Draft Decision that 2013 remains a reasonable and valid base year in applying the revealed cost approach. The Authority does not consider that allowing increases for the 2014 and 2015 years is an incorrect application of the revealed cost approach as claimed by ATCO's technical consultant, Acil. The Authority notes that DBP and ENA have made submissions with regard to the revealed cost approach recommended by EMCa. The Authority disagrees with the assertion that its selected base year is inappropriate.

359. The Authority notes that ATCO has not accepted the Draft Decision required amendment for an IT Efficiency Gain for the fourth access arrangement period, which EMCa and the Authority considered to be reasonable given the efficiency gains that ATCO has identified in its business case for the Field Mobility project. The Authority maintains its view from the Draft Decision that efficiency gains would occur and does not agree with ATCO and Acil's assertions with respect to the this figure.

360. In its review of the incremental step changes in recurring expenditure for the initial proposal, EMCa recommended accepting the significant step changes in operating expenditure for 2014 and 2015 based on what it considered to be reasonable as required by ATCO's safety case. However, EMCa notes in its Addendum Report that it did not accept further increases to incremental expenditure at the time of its initial report as it did not consider that there had been a sufficient challenge of the bottom-up build of ATCO's forecast. Additionally, EMCa notes that ATCO had provided no evidence that it had considered a range of factors that could potentially offset the proposed increments. EMCa considered that ATCO had only presented factors that would drive up expenditure, but did not include in its proposal a consideration of factors that might act in the opposite direction.[137]

361. The Authority notes that ATCO disagrees with EMCa's analysis regarding a challenge to the bottom-up build. However on the point of offsetting factors, EMCa considers that ATCO has not responded with its consideration of offsetting factors that would decrease expenditure, as presented in its initial report.[138] These factors include:[139]

- The relationship between monitoring and maintenance activities: For example, an increase in expenditure on monitoring should be offset by a decrease in reactive maintenance.
- The effect of extensive Sustaining Capital Expenditure program that ATCO has been undertaking. EMCa expects that this would have an effect on the need to carry out maintenance and/or monitoring.
- The potential for efficiency gains to be derived by optimising baseline and incremental maintenance and inspection activities and carrying them out in an integrated manner, rather than in an incremental manner.

---

137 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, p. 67.

138 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, p. 67.

139 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement*, June 2014, p. 148.

362. EMCa notes that Acil has suggested that it would be reasonable for ATCO to achieve efficiency gains of 0.86 per cent per year. EMCa notes that this would equate to an approximately five per cent aggregate downwards effect on operating expenditure over a six year period (2013 base year to 2019).[140]

363. As noted by the Authority in paragraphs 349 to 352, in the first six months of the fourth access arrangement period, ATCO underspent on network operating expenditure by $1.6 million (approximately 10 per cent). EMCa considers that this is inconsistent with the assertions made by ATCO regarding the importance of spending additional network operating expenditure to meet ATCO's safety case requirements.[141]

364. For the reasons discussed in paragraphs 362 and 363, and in view of ATCO's lack of consideration of the factors that would reduce network operating expenditure, which were discussed in EMCa's initial report, EMCa considers that ATCO has not provided sufficient evidence to justify the need for continuing to increase the incremental step in recurring network operating expenditure beyond the significant steps it recommended for 2014 and 2015. The Authority notes EMCa's analysis and agrees that ATCO has not given due consideration to the factors that would decrease network operating expenditure.

365. EMCa notes that ATCO has relied upon a series of statements from Zincara's review in its Response to the Draft Decision to justify retaining its initial proposal forecasts for network operating expenditure. EMCa has addressed this series of statements as part of its Addendum Report:[142]

- "It would seem improbable that prudent management methodologies applied to the existing business would be ignored in preparing forecasts for AA4".[143] EMCa considers that with prudent management methodologies applied, ATCO is likely to incur prudent and efficient costs in the fourth access arrangement period. However, as with its forecast for the first six months of this period, EMCa considers that ATCO has proposed more than it will reasonably incur.[144]
- "…Zincara is of the view that [the incremental recurring activities] represent good practice when compared with ATCO's peers across Australia...".[145] EMCa notes that in its initial report it accepted the need for incremental recurring activity to the level proposed by ATCO to the 2015 period. Having accepted the increments to implement its safety case, which was approved in 2011, ATCO has not justified the need to keep increasing this amount still further over the period from 2016 to 2019.[146]

---

140 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, pp. 67- 68.

141 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, pp. 67- 68.

142 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, pp. 67- 68.

143 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 68.

144 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, pp. 67- 68.

145 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 68.

146 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, pp. 67- 68.

366. EMCa suggests that a business that is currently prudent and efficient is more likely than not to be prudent and efficient in its future expenditure. EMCa considers it reasonable to assume that 2013 reveals an efficient base year expenditure level and that it is reasonable to assume from this, and recognising the incentives on ATCO, that ATCO will incur a prudent and efficient level of operating expenditure in the future. However, for the reasons stated in section 7.4.2 of its initial report, in particular the factors that would offset forecast network operating expenditure, and its comments in paragraph 365, EMCa does not consider it reasonable to draw a conclusion that ATCO's regulatory proposal forecast is necessarily a reasonable estimate of the prudent and efficient level of expenditure that ATCO will actually incur.

367. The Authority notes EMCa's analysis in relation to network operating expenditure for the fourth access arrangement period. The Authority considers that ATCO's forecast does not represent a reasonable estimate of prudent and efficient expenditure as it has not taken into account the factors noted by EMCa that would offset forecast network operating expenditure. As a result, the Authority does not consider that ATCO's forecast of baseline recurring and incremental recurring network operating expenditure meets the requirements of rule 74(2) of the NGR. For these reasons, the Authority maintains its Draft Decision with respect to allowing increases for only 2014 and 2015.

368. As discussed in paragraph 352, the Authority notes that ATCO has understated network operating expenditure by $406,000 as a result of planned maintenance, which was due to occur in the last quarter of 2014, not being undertaken. The Authority has decided to allow an additional one-off expenditure increase for 2015 to reflect the need to undertake planned maintenance in the 2015 period. This one-off allowance is in addition to the one-off expenditures for the fourth access arrangement period that the Authority approved in its Draft Decision. The Authority approved one-off expenditure for 2015 is $1.01 million.

369. With respect to the impacts on network operating expenditure as a result of sustaining capital expenditure, EMCa notes that ATCO is required to formally reassess its proposed reinforcement projects in accordance with the requirements of its safety case and AS 4645. In doing so, EMCa considers that ATCO would examine alternative means to reduce risk rather than building new pipelines. EMCa considers that this would be done in accordance with the ALARP test. EMCa has provided examples of operating procedures that could be implemented such as:

- increased frequency of pipeline patrols;
- enhanced contingency planning;
- improved maintenance on gate stations and regulators; and
- improved SCADA monitoring.[147]

370. EMCa notes that if ATCO were to adopt these enhanced operations or maintenance procedures, this would potentially increase ATCO's network operating expenditure.[148] The Authority has considered EMCa's recommendations and notes that as ATCO has yet to formalise a new safety case with EnergySafety, it is not in a position to determine any potential network operating expenditure as a result of the sustaining

147 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, pp. 54 -55.

148 EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, p. 55.

capital expenditure ATCO is undertaking. The Authority notes that it has made provision for ATCO to seek a cost pass through from the Authority for operating expenditure incurred as a result of addressing an "*Intermediate*" security of supply risk. This is further discussed in the Capital Expenditure and Haulage Tariff Variation Mechanism chapters of this Final Decision.

371. EMCa is of the view that growth in a network, other factors being equal, is likely to require an increased network operating expenditure to support it. In its initial report, EMCa's consideration of network operating expenditure growth was made in the context of low growth in the network. As ATCO has rejected the Authority's Draft Decision for network operating costs, for its Addendum Report, EMCa has reviewed ATCO's revised proposal and its supporting technical report from Acil.

372. EMCa notes that ATCO has adopted the network operating expenditure growth factor in the revealed cost approach from the report prepared by Acil. Additionally, EMCa notes that Acil has relied upon a report prepared by Economic Insights. EMCa has expressed concerns with the quality of the Acil report and ATCO's reliance upon it: [149]

- EMCa notes that Acil has not developed a growth factor for network operating expenditure, but instead has developed a growth factor for overall operating expenditure. In the context in which ATCO has presented these growth rates, EMCa notes that ATCO has taken these to be network operating expenditure growth rates.
- Based on EMCa's review of the Acil report, it appears that the author has relied directly and without any apparent due diligence on the work of another party. EMCa has not found any reference in the report specifying whether Acil has made contact with Economic Insights to verify whether its use of the report is valid.
- EMCa notes that the Economic Insights report analyses productivity growth and undertakes a comparative productivity analysis between Jemena and other gas networks. It uses an operating expenditure function to forecast future operating expenditure productivity growth. It would appear that Acil has attempted to use this work to forecast operating expenditure growth itself rather than forecast operating expenditure productivity growth.
- Based on EMCa's knowledge and understanding of gas network operating costs, it does not consider gas throughput to be a material driver of network operating costs. Instead, EMCa notes that network operating costs largely involve the inspection, maintenance and repair of the pipeline network. Accordingly, EMCa considers the extent of the pipeline network itself to be the main network operating cost driver. Acil has given a 50.1 per cent weighting to gas throughput in its review, which EMCa notes as giving a distorted perception of precision.
- EMCa notes that the Acil model forecast operating expenditure of $15 million to $18 million higher than ATCO's actual operating expenditure. EMCa notes that Acil has back-casted to calculate these. Additionally, Acil's model does not indicate the same turning points or lower growth rates that ATCO has proposed.

373. EMCa notes that while growth in the network will, other factors being equal, lead to an increase in network operating requirements, in its initial report it identified several factors which would offset the assumed network growth. The Authority notes that

[149] EMCa, *Review of Technical Aspects of the Revised Access Arrangement – Addendum Report*, April 2015, p. 65.

ATCO has asserted that these factors are not valid. However, EMCa considers that ATCO has not presented its analysis of these factors, nor has it provided evidence in response to EMCa's initial report. For these reasons, EMCa considers that ATCO has not taken such offsets to a growth forecast into account.

374. As stated in paragraph 370, EMCa considers that other factors being equal, an increase in the network is likely to require an increase in network operating expenditure requirements. Notwithstanding its concerns regarding the quality of the Acil report, EMCa considers it reasonable to allow for some growth in network operating expenditure from 2016 should the Authority allow for a greater level of capital expenditure than in its Draft Decision. The Authority's decision regarding ATCO's capital expenditure proposal is discussed further in the Capital Base chapters of this Final Decision.

375. The Authority notes EMCa's recommendation and considers that as it is not approving the level of capital expenditure growth that ATCO has proposed, it will require an adjustment to the recurring network operating amounts based on a pro rata adjustment between ATCO's regulatory asset base and the Authority's regulatory asset base to an amount of $1.51 million over the fourth access arrangement period.

376. The Authority has decided not to include an amount of $1.51 million in its Final Decision. Instead, it has removed the requirement for the IT efficiency gain deduction discussed in paragraph 359 from the overall network operating expenditure for the fourth access arrangement. The Authority notes that its position on the efficiency gains that ATCO will achieve over the fourth access arrangement period has not changed. Rather, the Authority considers that the removal of the IT efficiency gain will more than offset the potential network operating expenditure growth as a result of the increased size of the GDS over this period.

377. The Authority notes that, as it has rejected ATCO's proposed labour cost escalation factor of 2 per cent, it has had to adjust the forecast network operating expenditure to reflect its approved labour cost escalation factor of 1.34 per cent. Labour cost escalation is calculated by taking a ratio of the amount of network operating expenditure the Authority approved to ATCO's revised proposal forecast then multiplying by the ratio of the Authority's approved labour cost escalation factor to ATCO's labour cost escalation factor. The Authority considers that this represents a net increase for ATCO's forecast network operating expenditure as it had originally rejected the inclusion of a labour cost escalation factor in its Draft Decision. The Authority notes that as it has only approved the inclusion of the labour cost escalation factor from 2015 onwards, no labour cost escalation is present for the July to December 2014 period.

378. Table 27 shows ATCO's revised proposal network operating expenditure forecast and the Authority's approved network operating expenditure forecast for the fourth access arrangement period. The Authority notes that as it has substituted ATCO's forecast for actual expenditure for the period from July to December 2014, as per paragraph 351. No breakdown was available between baseline recurring, incremental recurring and one-off expenditure for the period from July to December 2014 as it was not provided by ATCO. The Authority used 2013 as a base year as it allowed for an assessment of baseline recurring, incremental recurring and one-off expenditure during the fourth access arrangement period. The Authority considers that applying the actual expenditure for this period represents the best estimate as per the requirements of rule 74(2) of the NGR. For the 2015 year, the Authority has

not explicitly set an amount for labour cost escalation as it has approved ATCO's 2015 forecast.

Table 27 ATCO's Revised Proposal Network Operating Expenditure Forecast and Authority's Final Decision Approved Network Operating Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July to Dec 2014[150]	2015[151]	2016	2017	2018	2019	Total
ATCO Proposed							
Baseline Recurring		27.10	28.30	28.50	29.20	29.60	
Incremental Recurring		3.60	4.30	4.80	5.20	5.60	
One-Off		0.60	0.40	0.30	0.10	0.20	
ATCO Proposed Network Operating Expenditure[152]	**13.70**	**31.30**	**33.10**	**33.70**	**34.60**	**35.40**	**181.80**
Authority Approved							
Baseline Recurring		27.10	27.10	27.10	27.10	27.10	
Incremental Recurring		3.60	3.60	3.60	3.60	3.60	
One-Off		1.01	0.40	0.30	0.10	0.20	
Labour Cost Escalation			0.20	0.54	0.74	1.14	
Authority Approved Network Operating Expenditure	**12.56**	**31.71**	**31.30**	**31.54**	**31.54**	**32.04**	**170.68**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, ATCO Gas Australia Regulatory Financial Statements 2014, 23 February 2015, ERA Analysis.

Corporate Operating Expenditure

379. ATCO has updated its forecast corporate operating expenditure for the fourth access arrangement period from $132.16 million[153] to $123.28 million,[154] broken down as follows:

- corporate support, the forecast for which ATCO has updated from $91.48 million to $88.11 million over the fourth access arrangement period;

---

150 ERA July to December 2014 forecast has been replaced by actual expenditure as submitted by ATCO in its ATCO Gas Australia Regulatory Financial Statements 2014 on 23 February 2015.

151 As the Authority has allowed ATCO a step increase for 2015, the Authority's approved forecast for 2015 is inclusive of ATCO's inbuilt labour cost escalation rate, and is not reflective of the ERA's approved rate in the Labour Cost Escalation section of this chapter.

152 ATCO Proposed Network Operating Expenditure is inclusive of ATCO's proposed labour cost escalation factor.

153 ATCO Gas Australia, *Tariff Model*, September 2014.

154 ATCO Gas Australia, *Tariff Model*, December 2014.

- business development and marketing, the forecast for which ATCO has updated from $24.61 million to $20.75 million over the fourth access arrangement period; and
- licence fees to Energy*Safety*, Economic Regulation Authority, Energy Industry Ombudsman, Retail Energy Market Company, Department of Mines and Petroleum, Office of the Gas Disputes Arbitrator, and Department of Regional Development and Lands, the forecast for which ATCO has updated from $16.07 million to $14.42 million for the fourth access arrangement period.

Corporate Operating Expenditure: Corporate Support

380. ATCO has updated its forecast corporate support operating expenditure for the fourth access arrangement period from $91.48 million to $88.11 million. Corporate support operating expenditure can be broken down into the following:[155]

- Internal support costs, whose forecast ATCO has updated from $63.53 million to $59.57 million, and cover the following:
  - Finance and tax
  - Human resources and corporate affairs
  - Legal and regulatory
  - IT cost centre
- Intercompany charges, whose forecast ATCO has updated from $27.96 million to $28.65 million.

381. Finance and tax internal support costs include the costs required to manage the ongoing legislative, regulatory and standard transactional requirements. According to KPMG, these costs are predominantly employee salary costs and cover positions that provide a minimum financial management transactional functionality.[156] These costs are still forecast by ATCO to increase by 24 per cent from 2011 to 2019.[157] ATCO has not adjusted finance and tax internal support costs from its initial proposal in response to the Draft Decision. The headcount for this cost centre has been forecast to increase by two staff members, one in 2015 and one in 2016.[158,159] Another reason for the increase in finance and tax internal support costs is ATCO's proposed labour cost escalation.[160]

---

155 ATCO Gas Australia, *Email Response to question ERA 83*, 26 March 2015 and
KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014.

156 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 32.

157 Attachment to ATCO Gas Australia, *Email response to question EMCa40*, 17 April 2014 and
ATCO Gas Australia, *Email response to ERA83*, 26 March 2015.

158 ATCO Gas Australia, *Email response to question EMCa63*, 28 April 2014.

159 Measured by full-time equivalents.

160 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 35.

382. According to KPMG, human resources and corporate affairs internal support costs predominantly cover employee salaries and related costs.[161] ATCO has forecast that human resources and corporate affairs internal support costs will increase by 28 per cent from 2011 to 2019.[162] ATCO has increased human resource and corporate affair internal support costs from its initial proposal in response to the Draft Decision. The headcount for this cost centre has been forecast to increase by three staff members in 2015. Another reason for the increase in human resources and corporate internal support costs is ATCO's proposed labour cost escalation, which KPMG states includes an assumed increase in the superannuation guarantee rate as announced in 2011.[163] The Authority notes that the increase in the superannuation guarantee rate is no longer expected (see earlier discussion on the approved labour cost escalation rate).

383. According to KPMG, legal and regulatory internal support costs predominantly cover employee salaries and supporting costs.[164] ATCO has forecast that legal and regulatory internal support costs will be 117 per cent higher in 2019 than in 2011.[165] This increase is driven by an additional two staff, increase in regulatory manager costs, labour cost escalation costs[166] and additional preparation costs for the proposed revised access arrangements for the fourth and fifth access arrangement periods.[167]

384. ATCO has rejected the Draft Decision's estimates of $2.10 million on preparation costs for this proposed revised access arrangement and $2.40 million on preparation costs for the next proposed revised access arrangement. ATCO has proposed $3.4 million on preparation costs for this proposed revised access arrangement and $3.3 million on preparation costs for the next proposed revised access arrangement. ATCO has justified additional costs by reference to expenses of answering additional questions on the proposal, and the required amendments of the Draft Decision.

385. The Authority did not include preparation costs in the revenue building block for the fourth access arrangement period in its Draft Decision which was evidenced by not including this expenditure in the total operating expenditure approved by the Authority. The Authority acknowledges that the wording in paragraph 243 of the Draft Decision may have caused some confusion. However, paragraphs 250 and 251 and Table 13 of the Draft Decision demonstrate that the Authority only approved one-off expenditure of $2.10 million for the preparation of the next access arrangement proposal (for the fifth access arrangement period), divided between 2018 and 2019.

386. The Authority does not approve preparation costs for this revised access arrangement in 2014 and 2015 as:

---

161 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 31.

162 Attachment to ATCO Gas Australia, *Email response to question EMCa40*, 17 April 2014 and ATCO Gas Australia, *Email response to ERA83*, 26 March 2015.

163 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 36.

164 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 33.

165 Attachment to ATCO Gas Australia, *Email response to question EMCa40*, 17 April 2014.

166 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 37.

167 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 74.

- Rule 91 of the NGR requires that operating expenditure must be such as that incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services. Prudent and efficient operating expenditure was forecast at the time of the third access arrangement review for expenditure during that period and incorporated into the calculation of total revenue. As a result, the forecast operating expenditure for the third access arrangement period was prepared on the assumption that expenditure related to the preparation of the fourth access arrangement review would have been incurred during the third access arrangement period. The inclusion of operating expenditure now for the preparation of the fourth access arrangement review during the fourth access arrangement period would be a windfall gain for ATCO and would not be in the long-term interest of consumers in accordance with the National Gas Objective.
- A prudent service provider acting efficiently would have incurred the majority of expenditure related to preparing an access arrangement review prior to submitting its access arrangement, which was during the third access arrangement period.
- ATCO has not demonstrated how answering questions in relation to unclear and deficient information in its proposal and addressing the Draft Decision's required amendments is not part of the daily operations of the regulatory team. The Authority notes that had it been provided sufficient information at the time of lodgement, most of these questions could have been avoided.
- ATCO also provided revised numbers and forecasts, particularly for Information Technology expenditure and Unaccounted for Gas a considerable time after lodgement of the access arrangement. Also, ATCO provided numerous other letters and submissions to the Authority following lodgement, outside of formal consultation processes, which has contributed to the delay in reviewing this access arrangement. The Authority considers that allowing a service provider to recoup costs for submitting further information after it has submitted its access arrangement would provide a perverse incentive to service providers. The Authority considers that consumers should not have to incur these costs.
- ATCO has not provided sufficient evidence to justify the additional costs, which is inconsistent with rule 74 of the NGR.

387. The Final Decision does not approve any preparation costs for this revised access arrangement and approves only $2.10 million on preparation costs for the fifth access arrangement period divided over 2018 and 2019.

388. ATCO has forecast that IT cost centre internal support costs will increase by 60 per cent[168] between 2011 and 2019. The headcount for this cost centre is forecast to increase by one in 2017, rather than the five advised in the initial proposal, due to

[168] Attachment to ATCO Gas Australia, *Email response to question EMCa40*, 17 April 2014 and ATCO Gas Australia, *Email response to ERA83*, 26 March 2015.

the enacted WIPRO IT service agreement.[169] According to KPMG, the increase in costs is driven by the additional staff member and labour cost escalation.[170]

389. ATCO has described intercompany charges as providing cost effective access to the skills and experience from ATCO Group. Intercompany charges also cover allocations to ATCO from ATCO Australia. In response to the Draft Decision, ATCO has qualified services provided by ATCO Group as additional assistance and consultancy support in relation to ATCO's corporate support functions. ATCO has listed services provided by ATCO Group as follows:[171]

- tax advice and planning assistance;
- treasury, debt management and banking assistance;
- risk management advice;
- human resource advice and succession planning;
- assistance on significant capital projects, including IT; and
- assistance on regulatory proceedings.

390. KPMG has discussed regulatory precedents for approving intercompany charges in Australia. The Authority notes that the Draft Decision did not reject the notion of an intercompany charge, but rather the efficiency of the magnitude of ATCO's proposed intercompany charges.

391. Intercompany charges increased by 156 per cent between 2011 and 2019.[172] ATCO attributes the increase in intercompany charges to the assumed growth in ATCO's business, and the intercompany allocation method (Massachusetts Method).[173] KPMG specifically refers to the relative increase in the size of the regulated business relative to the unregulated business.[174]

392. The Massachusetts Method is used to allocate intercompany support charges to ATCO and other utility businesses in the ATCO Group.[175] The method replaces the method that has been approved for the current access arrangement. The method draws on three allocators, asset value, revenues and labour costs, to allocate intercompany charges. There is an implicit assumption in the Massachusetts Method

---

169 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 74.

170 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 38.

171 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, pp. 75-77.

172 Attachment to ATCO Gas Australia, *Email response to question EMCa40*, 17 April 2014 and

ATCO Gas Australia, *Email response to ERA83*, 26 March 2015.

173 ATCO Gas Australia, *Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, p. 76.

174 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 34.

175 The American Gas Association defines the "Massachusetts Method" as a method used to allocate costs incurred by a parent company on behalf of its affiliates to those affiliates. The "mass formula" has three parts using the allocation factors (ratios comparing the affiliate to the company as a whole) of gross plant, gross revenues, and labour, which are added together and then divided by three to arrive at a simple average of the three factors. This formula attempts to weigh various aspects of each of the affiliates so that a fair distribution of the overhead cost is allocated.

ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, pp. 73-74.

that the larger the utility, the more it will draw on the group support services. KPMG has reiterated ATCO's statement in its initial proposal that the Massachusetts Method has been approved by the Alberta Utilities Commission. Moreover, KPMG has discussed intercompany charge allocations in a number of regulated Australian energy businesses to demonstrate that intercompany support charge allocation methods similar to the Massachusetts Method have been approved in Australia.

393. The Authority appreciates ATCO's elaboration of services provided by ATCO Group to ATCO in exchange for intercompany support charges. However, the Authority notes the following:

- ATCO has not elaborated the services that are provided by ATCO Australia to ATCO in exchange for intercompany support charges;
- ATCO has not justified why it requires the additional assistance from ATCO Group in the different areas, especially in areas such as tax and regulation that are influenced by the Australian context rather than the Canadian expertise;
- ATCO has not delineated the services that are claimed to be provided by ATCO Group from consulting support that is costed in internal support costs, particularly human resource and corporate affairs and IT cost centre;
- ATCO has not demonstrated that the Massachusetts Method allocators (assets, revenue, labour) are consistent with outcome requirements, as per KPMG's note of this regulatory requirement;[176] and
- ATCO has not demonstrated the degree of governance over the services and support it can access from ATCO Group.

394. KPMG has benchmarked the cost of services that are performed by ATCO's corporate support function. The benchmarks include services that KPMG considers ATCO's corporate support should be performing, but excludes services that are typically performed by corporate support but in ATCO's case are performed by other cost centres.[177] Table 28 shows KPMG's benchmark costs, ATCO's proposed corporate support costs and the variance between KPMG's low benchmarks and ATCO's proposal.

176 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, p. 119.

177 KPMG, *The Corporate Support Operating Costs of the Mid-West and South-West Gas Distribution System*, November 2014, pp. 69-72.

Table 28 Corporate Support Costs: KPMG Benchmarks and ATCO Proposal

($ million real at 30 June 2014)	Jul-Dec 2014	2015	2016	2017	2018	2019	Total
KPMG Benchmarks							
Low	6.26	12.76	12.91	13.08	13.25	13.39	71.65
Mid-point	7.49	15.17	15.30	15.44	15.57	15.69	84.66
High	8.63	17.40	17.50	17.61	17.71	17.80	96.65
ATCO Proposal	6.89	15.94	14.94	15.60	16.72	18.02	88.11
Variance from mid-point	**(0.60)**	**0.77**	**(0.36)**	**0.16**	**1.15**	**2.33**	**3.45**

Source: ATCO Gas Australia, Response to ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 27 November 2014, Table 6-16.

395. The Authority notes that in accordance with rule 91(1) of the NGR, operating expenditure must be such as would be incurred by a prudent service provider acting efficiently to achieve the lowest sustainable cost of delivering reference services. The KPMG report suggests that ATCO's compliance with rule 91(1) of the NGR should be measured against the mid-point of benchmark firms in relation to corporate support service costs. The Authority does not consider that the mid-point, by itself, without further explanation of the services provided by ATCO Australia and ATCO Group and the matters identified in paragraph 393 above demonstrate that this aspect of ATCO's operating expenditure meets the requirements of rule 91(1) of the NGR.

396. Additionally, the Authority does not consider that ATCO's revised proposal forecast for corporate support service costs meets the NGO, as it will not be in the long term interests of consumers to pay costs significantly higher than what ATCO incurred in the third access arrangement period for no identifiable benefit. The Authority maintains its view from the Draft Decision that the revealed cost approach recommended by its technical advisor, EMCa, would result in the costs incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost delivering pipeline services.

397. The Authority is not satisfied that the annual forecast corporate support expenditure, which includes both internal support costs and intercompany charges, should be increased above the level of corporate support expenditure incurred by ATCO in 2013 of $12.30 million[178] ($67.65 million over five and a half years). The Authority considers that the expenditure for 2013 represents the best forecast possible in the circumstances and is arrived at on a reasonable basis for the following reasons and is consistent with the NGO:

- ATCO has had an incentive to reduce operating expenditure in the current access arrangement because it can capture the resulting cost savings, so its revealed costs in 2013 should form a reasonable basis for determining the allowance required for corporate support operating expenditure;

[178] ATCO Gas Australia, *Email Response to EMCa22*, 4 April 2014.

- by 2013, ATCO would have had two years to determine the efficient corporate support spending level following its due diligence during the GDS purchase process; and
- using 2013 as the base year yields the closest forecast to KPMG's low benchmark.

398. The Authority has allowed one-off expenditure of $2.10 million for the preparation of the next access arrangement proposal, divided between 2018 and 2019, which, in the Authority's view, represents a reasonable forecast of the costs to be incurred based on the costs relating to the proposed access arrangement proposal for the fourth access arrangement period.

399. In response to the Authority's notice on proposed amendments to the Final Decision, for the return on debt, ATCO indicated that it does not have a Bloomberg terminal subscription or staff adequately trained in its use. Additionally, ATCO states that it would incur additional regulatory costs if these services are to be procured.[179]

400. Following an investigation of likely costs in relation to annual update to the debt risk premium, the Authority has allocated an amount of [redacted] to allow for the ATCO's expense of checking the annually updated value of the DRP (refer to paragraph 1767 in the rate of return section). Given that there are four annual updates to check, a total cost of [redacted] has been included into the Authority's approved corporate support operating expenditure forecast for the fourth access arrangement.

401. The Authority has decided to approve $63.64 million of the $88.11 million of corporate support operating expenditure proposed by ATCO for the 2015 to 2019 period. As discussed in paragraph 351, ATCO has submitted externally reviewed regulatory financial statements for the July to December 2014 period. The Authority considers that for the purposes of determining the best forecast for this period as per rule 74(2) of the NGR, the best forecasts would be the actual expenditure for July to December 2014.

402. As discussed in paragraph 347, as the Authority has rejected ATCO's labour cost escalation factor of 2 per cent, it has recalculated a new labour cost escalation cost for corporate support costs. Labour cost escalation is calculated by taking a ratio of the Authority's approved corporate support operating expenditure to ATCO's revised proposal forecast corporate support operating expenditure then multiplying by a ratio of the Authority's labour cost escalation factor to ATCO's labour cost escalation factor.

403. The Authority's approved labour cost escalation costs for the period between 2015 and 2019 is $0.89 million.

404. A summary of the Authority's approved corporate support operating expenditures is presented in Table 30.

---

179 ATCO Gas Australia, *ATCO Gas Australia response to the ERA Amendments to the Final Decision,* 27 August 2015, para. 39, p. 4.

Corporate Operating Expenditure: Business Development and Marketing

405. ATCO states that it has not implemented the Authority's required amendment for Business Development and Marketing as it considers the strategies and initiatives planned for the fourth access arrangement period will benefit customers.[180]

406. However, ATCO has amended its forecast of $24.6 million from its initial proposal to $20.76 million for the fourth access arrangement period. ATCO states that this is a result of reviewing the activity undertaken to date and further investigation on activities it considers likely to be effective for the fourth access arrangement period.

407. In response to the concerns expressed by the Authority's technical advisors, EMCa, ATCO states that it has revised its approach to the net present value (**NPV**) analysis for its campaigns. ATCO accepts that it is appropriate to use the expected consumption of new customers rather than existing customers. ATCO has provided its NPV analysis of six of the initiatives it plans to offer during the fourth access arrangement period.[181]

- Infill Program
- Hot Water System (**HWS**) Infill
- Existing Customer HWS
- Builder Appliance
- Gas Powered Air Conditioning (**GPAC**)
- Generation

408. ATCO states that the assessment period for its initiatives reflect the economic life of the assets installed to deliver the load. ATCO considers that existing customers will benefit from the initiatives as long as the payback period is less than the economic life of the assets.

409. ATCO has cited two recent campaigns in support of its forecasts, in response to the Authority's concerns regarding the effectiveness of business and development marketing campaigns.

- ATCO states that it is confident the successes of the Capricorn Estate pilot campaign can be replicated and multiplied across the network. ATCO considers that this provides evidence that similar campaigns will be effective.
- ATCO states that there is evidence of successful incentive programs from other jurisdictions in Australia. Australian Gas Networks in South Australia has provided ATCO with the performance of its advertising campaign since 2010. ATCO notes that the campaign has exceeded expectations.

410. In addition to the recent campaign evidence, ATCO states that it has sought expert opinion in the field of marketing and marketing research from Brent Stewart. ATCO notes that "Mr Stewart considers the Authority's decision to maintain expenditure at

---

180 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 83.

181 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 27 November 2014, p. 86.

2013 levels under the expectation that the increase in customer numbers will still be delivered is not supported by evidence". ATCO considers that Mr Stewart's expert opinion lends credibility to ATCO's view that its proposed business development and marketing activities will be effective and are consistent with industry practice.[182]

411. ATCO states that its business and development marketing expenditure undertaken in 2013 did not include the program of initiatives proposed for the fourth access arrangement period. It notes that the majority of the expenditure relates to employee costs and a limited amount of campaigns. ATCO does not consider that it can achieve the proposed initiatives with 2013 expenditure levels. In addition, ATCO notes that it scaled back its advertising initiatives in 2013 to allow Kleenheat clearer air time for its entry into the market.

412. ATCO states that it has reviewed its business development and marketing program to ensure the proposed activities meet its objectives, which are to increase connections and volume of gas flowing through the GDS by:

- Raising awareness in the use of natural gas
- Promoting gas connections and gas appliances
- Engaging market enablers and influencers to promote natural gas
- Researching new technologies

413. The Authority notes that ATCO has not implemented its required amendments in relation to forecast business development and marketing expenditure.

414. The Authority notes that ATCO has attempted to address the concerns raised in the Draft Decision regarding ATCO's approach to performing its NPV analysis for forecast Business Development and Marketing expenditure. For its revised proposal, ATCO has submitted six individual NPV analyses relating to each marketing initiative, as opposed to a combined business development and marketing NPV, which was part of its initial proposal. The Authority has performed an assessment for each one of these initiatives.

415. The Authority notes that there are inconsistencies with Table 6-20 in ATCO's Response to the Draft Decision, the data inputs within each NPV assessment and ATCO's confidential submission regarding the assumptions for each NPV.[183] In addition to the inconsistencies, the Authority notes the following in relation to ATCO's NPVs:

- The Project Analysis Period inputs in the NPVs do not correspond with the assessment periods stated in Table 6-20. For HWS Infill, ATCO states an assessment period of 25 years, but the NPV shows a period of 30 years. The Authority considers that there would need to be a replacement of capital if the analysis period was to be 30 years, given that the economic life is only for 25 years. The Authority notes that this could be a result of ATCO's templates which begin in 2014 and expenditure occurring in 2015, resulting in a delay of two years. However, this should result in a project analysis period of 27 years and not 30. There are similar inconsistencies with the other five NPVs and Table 6-20.

---

182 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 27 November 2014, p. 84.

183 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 27 November 2014, p. 86.

- The Authority notes that none of the six NPVs factor in potential disconnection rates and as such could be over estimating potential revenues.
- ATCO's payback periods for each initiative are based upon non-discounted incremental cash flows rather than discounted project cash flows (pre-tax or post tax). However, ATCO's NPV output calculation is based upon post tax cash flows discounted by its revised proposal Weighted Average Cost of Capital (**WACC**). Additionally, the Authority notes that the HWS Infill payback period in its NPV analysis states a period of 12 years rather than 11 years as submitted in ATCO's Response to the Draft Decision.
- The Authority notes that the payback periods are substantially different when assessing the initiatives using discounted cash flows. In some instances the payback periods are double the length of what ATCO has submitted in Table 6-20.
- ATCO's confidential submission that lists the assumptions behind each NPV states that for the HWS infill initiative, it has used an asset life of 25 years, which relates to meters and services. For the Existing Customer HWS initiative ATCO has used the appliance asset life of 15 years, which is for a gas hot water system. When combined with potential disconnections, the Authority notes that not all new connections for the HWS initiative would necessarily stay connected to the gas network, if the gas hot water system needs replacing at the end of its asset life. The Authority considers that this inconsistency between the HWS infill and Existing Customer HWS initiative could lead to overestimated revenues in the NPV for the HWS infill initiative.
- Additionally, the Authority notes that there is evidence in literature and from manufacturers that the asset lives of gas hot water systems is between 10 and 12 years, rather than 15 years as submitted by ATCO.[184]
- ATCO has used its revised proposal forecast tariffs and forecast WACC to calculate the respective NPVs. The Authority considers that this could lead to circularity issues with ATCO's NPVs and tariff modelling, given that ATCO's revised proposal tariff model includes new connections and consumption rates, which are a direct result of the initiatives being factored into the tariff model in the first instance. Whilst the NGR is silent on how the regulator is to assess proposed operating expenditure, for capital expenditure considerations the NGR requires the regulator to use the prevailing tariffs.[185] The Authority considers that adopting a similar approach and applying the prevailing tariffs and WACC removes the potential for circularity issues in assessing ATCO's NPVs. This is the Authority's preferred approach.

416. Taking the inconsistencies and the issues noted above into consideration, the Authority has reassessed each of ATCO's NPVs. Under the base case analysis, each of the initiatives has a payback period within the proposed asset life and are NPV positive. However, for the HWS Infill initiative the Authority notes that under ATCO's 10 per cent revenue reduction sensitivity scenario, the NPV becomes negative when applying the prevailing tariff and WACC. Additionally, under ATCO's 1 per cent CPI Reduction sensitivity scenario the NPV for this initiative also turns negative. For the Infill initiative, the Authority notes that all of ATCO's sensitivity

---

184 Wilkenfield and Associates with National Institute of Economic and Industry Research, *Regulation Impact Statement: For Decision – Phasing Out Greenhouse-Intensive Water Heaters in Australian Homes*, 15 November 2010, p. 24.

185 National Gas Rules 79(4) and 91.

scenarios return negative NPVs upon applying the prevailing tariff and WACC. The Authority considers that a prudent and efficient service provider would not proceed with projects that return negative sensitivity tests for its NPV analysis. For these reasons, the Authority does not approve of the inclusion of the Infill and HWS Infill initiative.

417. The Authority approves the inclusion of the remaining four initiatives over the fourth access arrangement period to the forecast Business Development and Marketing expenditure. The Authority does not approve the inclusion of $2.99 million for the Infill initiative and HWS Infill initiative. The Authority notes that this amount corresponds to the costs of the program as stated in Table 6-20 of ATCO's Response to the Draft Decision. The Authority has crosschecked this amount with each of the NPVs.

418. The Authority notes ATCO's concerns regarding the Draft Decision Business Development and Marketing expenditure amount of $9.68 million and its ability to deliver the forecast increase connections and consumptions.[186] This amount was set in the Draft Decision as the Authority considered that ATCO's 2013 spend on Business Development and Marketing provided a reasonable basis for the fourth access arrangement period. Additionally, EMCa noted that ATCO had not demonstrated to a sufficient level of confidence that the proposed expenditure would lead to lower sustainable costs for consumers.

419. The Authority notes that ATCO has tried to address its concerns regarding the effectiveness of its marketing campaigns by citing two recent campaigns in support of its proposed forecast.[187] The Authority is of the opinion that this is still an insufficient amount of evidence to warrant the level of ATCO's forecast expenditure. Additionally, one of the campaigns was not undertaken by ATCO in WA, rather it was in a different jurisdiction and undertaken by Australian Gas Networks in South Australia. However, the Authority has decided to approve the four initiatives, based on ATCO's NPV analysis rather than on the limited campaign evidence supplied by ATCO.

420. ATCO's Response to the Draft Decision states that its market research and analysis identified that WA gas consumers have a low awareness of either ATCO or its role. However, the Authority notes that, in submissions from Kleenheat and Alinta in response to ATCO's initial proposal, these activities may have caused confusion for customers as they queried ATCO's role in the gas market. Additionally, both Kleenheat and Alinta have questioned the value of ATCO's marketing activities outside of the incentives for new customer connections and a general promotion of the "gas is good" message.[188]

421. Kleenheat's analysis found that ATCO's recent campaigns have been weighted towards brand awareness rather than encouraging gas usage. Kleenheat does not

---

186 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 27 November 2014, p. 84.

187 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 27 November 2014, p. 82.

188 Alinta Energy, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014.
Kleenheat Gas, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014.

believe that marketing to promote brand awareness is necessary to deliver efficient pipeline services. The Authority considers that the role played by Kleenheat and Alinta is sufficient to promote gas in WA, and that ATCO is not required to engage in the additional marketing activities it is proposing to undertake. In response to ATCO's revised proposal, Kleenheat has reiterated that the increase in Business Development and Marketing expenditure proposed by ATCO is excessive.[189] The Authority agrees with the concerns raised by both retailers.

422. Notwithstanding ATCO's argument that it scaled back its marketing activities in 2013 due to the entry of Kleenheat into gas retailing, the Authority considers that the Business Development and Marketing expenditure incurred in 2013 still provides the best basis for forecast expenditure over the fourth access arrangement period. Additionally, given the concerns raised by both retailers regarding ATCO's proposed marketing activities, the Authority is of the opinion that $9.68 million over the fourth access arrangement is a reasonable forecast for non-initiative activities. Therefore, the Authority does not approve the remaining $7.63 million of ATCO's revised proposal forecast for Business Development and Marketing as the Authority considers that this amount does not meet the requirements of rule 91 of the NGR.

423. As the Authority has amended the demand forecast for the fourth access arrangement period and approved four of the six initiatives proposed by ATCO, the Authority considers that this additional $3.31 million over the fourth access arrangement period, in addition to the Draft Decision amount of $9.68 million is a reasonable and sufficient amount for ATCO's forecast Business Development and Marketing expenditure. However, as discussed in paragraph 351, ATCO submitted externally reviewed regulatory financial statements for the July to December 2014 period. The Authority considers that for the purposes of determining the best forecast for this period as per rule 74(2) of the NGR, the best forecast would be the actual expenditure for July to December 2014.

424. The Authority notes that as no breakdown was available beyond the general operating expenditure categories for July to December 2014, the Authority accordingly approves $8.80 million for baseline Business Development and Marketing, $3.31 million for Initiatives and $0.14 million for labour cost escalation costs at the Authority's approved labour cost escalation factor of 1.34 per cent for the period between 2015 and 2019. The Authority has used actuals provided by ATCO for July to December 2014.

425. The Authority notes that labour cost escalation is calculated by taking a ratio of the amount of the Authority approved Business Development and Marketing expenditure to ATCO's revised proposal forecast then multiplying by the ratio of the Authority's approved labour cost escalation factor to ATCO's labour cost escalation factor.

426. Table 29 shows ATCO's revised proposal and the Authority's Approved amounts for forecast Business Development and Marketing expenditure for the period between 2015 and 2019.

[189] Kleenheat Gas, *Submission on Draft Decision and Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution System Access Arrangement*, 12 January 2015.

Table 29 ATCO Revised Proposal and Authority's Final Decision Approved Forecast Business Development and Marketing Expenditure 2015 - 2019

Real $ million at 30 June 2014	2015	2016	2017	2018	2019	Total
ATCO Revised Proposal						
Business Development and Marketing	3.79	3.82	3.85	3.88	3.91	19.24
ATCO Proposed Corporate Operating Expenditure	**3.79**	**3.82**	**3.85**	**3.88**	**3.91**	**19.24**
Authority Approved						
Baseline Business Development and Marketing	1.76	1.76	1.76	1.76	1.76	8.80
Initiatives	0.66	0.66	0.66	0.66	0.66	3.31
Labour Cost Escalation	0.00	0.00	0.05	0.05	0.05	0.14
Authority Approved Business Development and Marketing Expenditure[190]	**2.42**	**2.42**	**2.47**	**2.47**	**2.47**	**12.25**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 6-22, p. 89, ERA Analysis.

Corporate Operating Expenditure: Licence Fees

427. ATCO initially forecast $16.07 million for licence fee corporate operating expenditure for the fourth access arrangement period. When requested by the Authority to provide a breakdown of licence fees, ATCO provided an updated forecast of $14.34 million for licence fee corporate operating expenditure for the fourth access arrangement period.[191] ATCO did not provide a rationale for forecasting a doubling of actual WA Energy Disputes Arbitrator charges in the forecast.[192] The Draft Decision adjusted industry charges for the WA Energy Disputes Arbitrator to be consistent with historical levels. Therefore, the Draft Decision's approved licence fee corporate operating expenditure for the fourth access arrangement period was $14.30 million.

428. In its response to the Draft Decision, ATCO forecast licence fees over the fourth access arrangement period at $14.42 million, and has provided a breakdown of its forecast in line with the requirements of rule 74 of the NGR. ATCO states that this

190 The Authority notes that any actuals for the July to December 2014 period can be found in Table 30.

191 ATCO Gas Australia, *Email response to ERA33*, 31 July 2014.

192 ATCO Gas Australia, *Email Response to ERA51*, 9 September 2014:

Historically, ATCO Gas has received WA Energy Disputes Arbitrator charges in excess of $5,000 in a single year period. ATCO Gas Australia has conservatively budgeted based on previous historical spend with the inclusion of a safety net to ensure that these costs can be met in any single year period. A forecast of approximately $13,000 per year was included in ATCO's AA4 forecast.

amount represents a $0.12 million increase from the Draft Decision due to the following:

- a reduction in the annual fee charged by the Energy Industry Ombudsman;
- a delay in receiving an ERA invoice for standing charges for the April 2014 quarter; and
- the recovery of an annual fee for access rights, levied by the Department of Lands.

429. The Authority notes that on 1 January 2015, the *Economic Regulation Authority (Licensing Funding) Regulations 2014* came into force. This amended the annual gas distribution licence to $2,778. The Authority considers that this new licence fee should replace the current figure in ATCO's breakdown of $7,400 from the years of 2015 onwards. The Authority has verified that the July – December 2014 of $7,400 has been charged correctly and remains valid.

430. The Authority has reviewed the licence fees proposed by ATCO and has rejected the licence fee corporate operating expenditure for the fourth access arrangement period of $14.42 million. The Authority requires ATCO to reduce its amounts for the Economic Regulation Authority Gas Licence – Annual Fee to $21,300 from $44,400 for the fourth access arrangement period. As discussed in paragraph 351, ATCO submitted externally reviewed regulatory financial statements for the July to December 2014 period. The Authority considers that for the purposes of determining the best forecast for this period as per rule 74(2) of the NGR, the best forecasts would be the actual expenditure for July to December 2014. Accordingly, the Authority's approved forecast for licence fees for the 2015 to 2019 period is $12.93 million.

431. The Authority notes that this is the best forecast of licence fees at the time of the access arrangement review. However, should there be a regulatory regime change in the future with respect to the transfer of access functions, the Authority notes that any changes to the licence fees as a result of that change could be considered a change in law and would be assessed under the Haulage Tariff Variation Mechanism.

Corporate Operating Expenditure - Summary

432. The Authority has decided that of the $123.28 million that ATCO proposes to spend on corporate operating expenditure in the fourth access arrangement period:

- $99.93 million satisfies rules 74 and 91 of the NGR
- $23.39 million does not satisfy rules 74 and 91 of the NGR

433. For the purposes of paragraph 432, $10.21 million of the $99.93 million is made up of actual corporate operating expenditure, as submitted by ATCO in its externally reviewed regulatory financial statements. The Authority considers this to be the best forecast for the July to December 2014 period, as per rule 74(2) of the NGR.

434. The Authority's approved forecast of $99.93 million on corporate operating expenditure in the fourth access arrangement period is based on the following:

- The Authority's assessment that $10.21 million of ATCO's forecast corporate operating costs satisfies rule 74(2) of the NGR for the July to December 2014 period.

- The Authority's assessment that only $63.64 million of ATCO's forecast corporate support operating expenditure is consistent with rule 91 of the NGR for the 2015 to 2019 period.
- The Authority's assessment that only $12.11 million of ATCO's proposed business development and marketing operating expenditure satisfies rule 91 of the NGR for the 2015 to 2019 period.
- The Authority's assessment that only $12.93 million of ATCO's proposed licence fees satisfies rule 74 of the NGR for the 2015 to 2019 period.
- The Authority's assessment that $1.03 million should be included as a labour cost escalation factor for Corporate Support and Business Development and Marketing.

435. Table 30 shows ATCO's revised proposal corporate operating expenditure forecast, and the Authority's approved corporate operating expenditure forecast for the fourth access arrangement period.

Table 30 ATCO's Revised Proposal Corporate Operating Expenditure Forecast and Authority's Final Decision Approved Corporate Operating Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July - Dec 2014	2015	2016	2017	2018	2019	Total
ATCO Revised Proposal							
Corporate Support	6.89	15.94	14.94	15.60	16.72	18.02	88.11
Business Development and Marketing	1.51	3.79	3.82	3.85	3.88	3.91	20.75
Licence Fees	1.46	2.68	2.53	2.53	2.53	2.68	14.42
ATCO Proposed Corporate Operating Expenditure	**9.86**	**22.41**	**21.30**	**21.98**	**23.13**	**24.61**	**123.28**
Authority Approved							
Corporate Support		12.31	12.31	12.31	13.36	13.35	
Business Development and Marketing		2.42	2.42	2.42	2.42	2.42	
Licence fees		2.68	2.53	2.53	2.53	2.68	
Labour Cost Escalation		0.05	0.11	0.26	0.31	0.29	
Authority Approved Corporate Operating Expenditure	**10.21**	**17.46**	**17.37**	**17.52**	**18.62**	**18.74**	**99.93**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, pp. 69-93, ERA Analysis.

IT Operating Expenditure

436. In its Draft Decision, the Authority rejected ATCO's proposed IT operating expenditure for the fourth access arrangement period of $58.70 million. The Authority decided that only $43.67 million of ATCO's proposed amount satisfied rules 74 and 91 of the NGR.

437. In its response to the Draft Decision, ATCO states that it did not accept the Authority's required amendment to remove $15.03 million of the proposed IT operating expenditure for the following reasons:[193]

[193] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 93.

- EMCa did not review ATCO's revised IT proposal with WIPRO, which was submitted in August 2014.
- ATCO considers that the Managed Service Fees for the fourth access arrangement period appear higher than those of the current access arrangement period due to confusion over the different charging methods; the requirement to support moderate growth in the business; and lower service delivery costs as a result of the competitive tender with WIPRO.
- The service delivery risk now sits with WIPRO, an arms-length provider, rather than I-Tek.

438. ATCO has accepted the Draft Decision with respect to the IT Licence Fees from 2015 - 2019 and the IT Usage Fee. However, the Authority notes that ATCO has updated its forecasts for actuals from July to September 2014 and a reforecast for the last three months of the 2014 calendar year.[194] Table 31 below shows ATCO's revised proposal IT operating expenditure for the fourth access arrangement period.

Table 31 ATCO's Revised Proposal IT Operating Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July – Dec 2014	2015	2016	2017	2018	2019	Total
ATCO Revised Proposal							
IT Licence Fees	1.0	2.4	2.4	2.4	2.5	2.6	13.3
IT Usage Fee	1.9	-	-	-	-	-	1.9
IT Managed Service Fee	1.4	8.2	8.3	8.3	8.0	7.8	42.0
ATCO Proposed IT Operating costs	**4.3**	**10.6**	**10.7**	**10.7**	**10.5**	**10.4**	**57.2**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 100.

439. In light of ATCO's rejection of the Draft Decision, the Authority requested its technical consultant, EMCa, to assess ATCO's revised proposal with respect to IT operating expenditure for the fourth access arrangement period. As ATCO has accepted the Authority's Draft Decision on the IT Usage Fee and IT Licence Fee, EMCa has restricted its assessment of IT operating expenditure to the Managed Service Fee.

440. The Authority notes that the Managed Service Fee consists of the following:

- Applications Managed services
- Distributed Server services
- Data – LAN/WAN
- Data Storage services
- Voice and Video services
- End User Computing services

[194] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 99.

- User Connectivity services

441. ATCO disagrees with EMCa's justification for reductions to ATCO's original forecast IT operating expenditure due to it being 'right sized' by the end of the current access arrangement. ATCO considers that these costs are efficient and reflect the ongoing growth in the business. ATCO's technical expert, KPMG, performed a benchmark study of ATCO's IT operating expenditure per customer against eastern states electricity distribution businesses and found that ATCO was at the very bottom of the benchmark range. [195]

442. ATCO lists the following as the main business drivers that increase the Managed Service Fee over time:

- Increases in IT users
- Changes in network operations
- Lifecycle refresh (replacement of aging and near end of life infrastructure)
- IT capital projects

443. In EMCa's original review of the IT operating expenditure under the agreement with I-Tek, its findings were that:

- with the exception of infrastructure replacement, ATCO had not provided sufficient evidence to demonstrate that the other drivers supported the extent of operating expenditure proposed; and
- ATCO had not provided sufficient evidence to demonstrate that the operating expenditure forecast was representative of efficient costs, with its primary concerns related to (i) the issues concerning I-Tek's role in procurement, and (ii) ATCO's capacity to deliver multiple IT capital expenditure projects.

444. EMCa considers that ATCO's revised proposal has mitigated one of its key concerns with its initial proposal by selecting WIPRO through a competitive tender process. EMCa notes that the selection process was managed by ATCO's parent company (Canadian Utilities Ltd) for provision of IT services to all ATCO companies worldwide. Whilst EMCa does not have visibility of the commercial terms achieved at the group level, it has made a working assumption that ATCO has achieved terms, conditions and prices under the Managed Service Fee commensurate with the average results from a global competitive tender process.[196]

445. With respect to ATCO's delivery capability, EMCa notes that as ATCO has moved to a commercial relationship with WIPRO, there are financial penalties for a breach of the service level agreement. Additionally, as WIPRO has access to 140,000 employees, this ensures that IT capital expenditure projects are delivered. EMCa's experience is that it is the capacity and commitment of businesses to support the development and implementation phases of complex IT projects that can cause

---

195 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, pp. 95-96.

196 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement – Addendum Report*, April 2014, p. 74 - 75.

delays and increased costs. Nonetheless, EMCa is generally satisfied that the new arrangement with WIPRO has substantially satisfied its initial concerns.[197]

446. EMCa has assessed the reasonableness of ATCO's forecast increase in IT operating expenditure from the current access arrangement period by each of its nominated cost drivers:[198]

- Increase in IT users – based on its findings with respect to ATCO's network growth expenditure, EMCa considers that the assumed 15 per cent growth in work force growth rate to be too high. Conversely, KPMG considers this rate to be a moderate amount. EMCa agrees that there is likely to be a proportional increase in IT operating expenditure with growth in the number of users and therefore considers the absolute impact to be somewhat less than what ATCO has assumed. EMCa estimates that there is likely to be 5 per cent ($1 million) less IT operating expenditure growth due to lower than forecast user growth.
- Changes in network operations – EMCa considers that ATCO's growth rate of approximately 12 per cent over the fourth access arrangement period to be optimistic. Despite its concern regarding the optimistic growth forecast, EMCa considers that it will have a minimal effect on IT operating expenditure
- Lifecycle refresh – WIPRO purchased IT assets from I-Tek and is responsible for replacements and upgrades, which were formerly paid for through the IT Infrastructure Usage Fee. The Managed Service Fee includes these. EMCa accepts that the renewal of IT assets is prudent in practice if taken in accordance with reasonable assumptions about asset lives. EMCa notes that the Managed Service Fee incorporates a 20 per cent reduction of servers in the final two years of the fourth access arrangement period, which it considers to be indicative of a reasonable expenditure forecast.
- IT capital projects – with the exception of its previous concerns regarding ATCO's capacity to deliver the nominated IT capital expenditure projects, EMCa considered that the bulk of ATCO's proposed IT capital expenditure to be justified. In its review of the revised proposal, EMCa's view has now strengthened.

447. EMCa notes that while there are limitations to the benchmarking data and analysis performed by ATCO's consultants, the combination of the more competitive approach to establishing the fees payable to WIPRO and benchmarking studies do support ATCO's claims that its revised IT operating forecast is reasonable.

448. On the basis of EMCa's assessment, the Authority considers that $51.9 million of ATCO's proposed IT operating expenditure is consistent with the requirements of rules 74 and 91 of the NGR for the 2015 to 2019 period. The Authority has not approved $1 million of ATCO's IT operating expenditure on the basis that there is likely to be 5 per cent less IT operating expenditure growth due to lower than forecast user growth. As discussed in paragraph 351, ATCO submitted externally reviewed regulatory financial statements for the July to December 2014 period. The Authority considers, for the purposes of determining the best forecast for this period as required

---

197 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement – Addendum Report*, April 2014, p. 75.

198 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement – Addendum Report*, April 2014, pp. 75 - 76.

by rule 74(2) of the NGR, the best forecast would be the actual expenditure from the July to December 2014 period. Accordingly actuals have been used for this period.

449. As the Authority has rejected ATCO's proposed labour cost escalation factor of 2 per cent, the Authority has recalculated labour cost escalation costs using its labour cost escalation factor of 1.34 per cent. Labour cost escalation is calculated by taking a ratio of the amount of IT operating expenditure the Authority approved to ATCO's revised proposal forecast then multiplying by the ratio of the Authority's approved labour cost escalation factor to ATCO's labour cost escalation factor.

450. The Authority's Final Decision is to approve $55.9 million of ATCO's revised proposal IT operating expenditure for the fourth access arrangement period.

451. Table 32 shows the Authority approved IT operating expenditure forecast for the fourth access arrangement period.

Table 32 Authority's Final Decision Approved IT Operating Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Authority Approved							
IT Licence Fees		2.4	2.4	2.4	2.5	2.6	
IT Usage Fee		-	-	-	-	-	
IT Services Fee		8.0	8.1	8.1	7.8	7.6	
Labour Cost Escalation		0.0	0.0	0.0	0.1	0.1	
Authority Approved IT Operating Expenditure	**3.9**	**10.4**	**10.5**	**10.5**	**10.4**	**10.3**	**55.9**

Source: ERA Analysis, EMCa, Review of Technical Aspects of the Revised Access Arrangement – Addendum Report, April 2015.

UAFG Operating Expenditure

452. In its Draft Decision, the Authority rejected ATCO's proposed UAFG Operating Expenditure of $43.70 million[199] and reduced it to $42.68 million.[200]

453. On 30 July 2014, ATCO updated its initial proposal forecast for UAFG operating expenditure to $43.70 million for the fourth access arrangement period based on the conclusion of a competitive tender to purchase UAFG gas.[201] ATCO forecast an increase in UAFG operating expenditure in the fourth access arrangement period based on the following assumptions:[202]

- ATCO assumed that the UAFG rate will increase in July-December 2014 to 2.67 per cent and then decrease gradually to 2.60 per cent.

199 Real $ million at 30 June 2014.

200 Real $ million at 30 June 2014.

201 ATCO Gas Australia, *Letter to ERA*, 30 July 2014.

202 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, pp. 104-110.

- ATCO has assumed that total GDS throughput will increase from 27,579 in 2014 to 30,574 TJ in 2019.

454. The Authority's technical consultant for the Draft Decision, EMCa, was of the view that the starting point for the UAFG rate for the fourth access arrangement period should be set by reference to the trend line observed for the third access arrangement period (2.62 per cent), rather than a single observation.[203] This is because the UAFG rate could exhibit some volatility throughout the year and over time.

455. The Authority noted in its Draft Decision that over the third access arrangement period, ATCO's performance data did not show a deterioration in performance outcomes. ATCO has succeeded in reducing the rate of UAFG over the last three years, with the rate falling from over three per cent to 2.65 per cent in December 2013. ATCO's performance has exceeded its proposed targets in each of its nominated key performance indicators (**KPI**), which indicated an overall improvement in performance outcomes. ATCO did not provide evidence to support any assertion that its performance level during the third access arrangement period has been unsatisfactory.

456. In its initial proposed revised access arrangement submitted in March 2014, ATCO used a placeholder value for the UAFG based on an assumed gas price. ATCO initiated a competitive tender for the purchase of UAFG, and subsequently replaced the placeholder value based on a reduced average UAFG price.[204] After considering EMCa's advice, the Authority considered ATCO's proposal to conduct a competitive tender to acquire UAFG to be consistent with both good industry practice and rule 91 of the NGR.

457. ATCO's throughput estimates for its initial proposal UAFG Operating Expenditure calculation were based on its initial proposal demand forecast. As the Authority adjusted ATCO's demand forecast based on other amendments in its Draft Decision, the Authority also adjusted the GDS throughput used to calculate UAFG operating expenditure for the fourth access arrangement period.

458. The Authority decided that $42.68 million of ATCO's initial proposal forecast UAFG operating expenditure for the fourth access arrangement period satisfied rule 91 of the NGR. The Authority's UAFG operating expenditure was based on:

- adjusted UAFG rate as per EMCa's recommendation;
- adjusted throughput forecast as per the Authority's demand forecast adjustment; and
- ATCO's updated wholesale gas price.

459. ATCO states in its response to the Draft Decision that it has not accepted the Authority's amendment to UAFG costs. As ATCO did not accept the Authority's Draft Decision demand forecast, it also did not accept the Authority's assumed gas throughput used to calculate the Authority's UAFG costs.[205]

---

203 EMCa, *Review of Technical Aspects of the Proposed Access Arrangement*, June 2014, pp. 176-180.

204 ATCO Gas Australia, *Letter to ERA*, 30 July 2014.

205 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 100.

460. ATCO does not accept EMCa's calculation of the starting point for the UAFG rate for the fourth access arrangement period. ATCO notes that the July 2014 starting point is a point on a trend-line that does not account for anticipated seasonality in the UAFG unit rate in the second half of the calendar year. ATCO considers that this underestimates UAFG for the period.[206]

461. ATCO notes that B3 customers typically account for over 70 per cent of UAFG and with increased gas usage for heating over the winter months, there is more throughput to B3 meters. A larger number of B3 meters and higher throughput can increase UAFG due to both gas loss and potential measurement error. ATCO has not accepted the Authority's Draft Decision reduction of the UAFG target to 2.56 per cent.[207]

462. ATCO states that it has recalculated its annualised, weather adjusted UAFG rates based on additional UAFG data available since its last submission to the Authority in July 2014. ATCO has also recalculated its total throughput based on its revised proposal demand forecast. Table 33 below shows ATCO's revised proposal UAFG Operating Expenditure forecast.[208]

Table 33 ATCO's Revised Proposal UAFG Operating Expenditure Forecast

	2014[209]	2015	2016	2017	2018	2019	Total
ATCO Proposed							
UAFG Rate	2.52%	2.63%	2.62%	2.62%	2.60%	2.58%	
Total Throughput (TJ)	26,850	26,964	27,424	27,966	28,604	29,266	167,074
ATCO Proposed UAFG Operating Expenditure (real $ million at 30 June 2014)	**4.02[210]**	**7.24**	**7.38**	**7.51**	**7.61**	**7.70**	**41.47**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 6 – 26, p. 101.

463. The Authority notes that ATCO has rejected the Draft Decision UAFG rate. The Authority notes the concerns raised by ATCO with respect to the starting point on the trend line calculated by EMCa and the omission of seasonality considerations. In the absence of weather adjusted UAFG data, the Authority considers that ATCO's

206 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 100.

207 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 100.

208 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 101.

209 This table is presented as prepared by ATCO. The Authority notes that the UAFG operating expenditure is for the period from July to December 2014.

210 The Authority notes that this figure is inconsistent with Table 6-26 of ATCO's Response to the Draft Decision. The Authority has sought further clarification from ATCO (ERA91, 27 March 2015) and it has confirmed that the correct value for UAFG Operating Expenditure for the July to December 2014 period is $4.02 million.

revised proposal UAFG rates are acceptable for the purposes of calculating the UAFG operating expenditure for the fourth access arrangement period.

464. As the Authority has rejected ATCO's revised demand forecast for the fourth access arrangement, the Authority has consequently also rejected the total throughput used by ATCO to calculate the UAFG operating expenditure. As such, the Authority has applied its own total throughput volume based on the demand forecast prepared by Deloitte. This is discussed in the Demand Forecast chapter of this Final Decision.

465. Consistent with the Authority's Draft Decision, the Authority maintains its position in accepting ATCO's competitively tendered UAFG unit price, as stated in paragraph 456. The Authority has not adjusted the UAFG unit price.

466. The Authority has recalculated its UAFG operating expenditure based on ATCO's revised proposal UAFG rates, the Authority's own total throughput and ATCO's UAFG unit price. The Authority rejects ATCO's revised proposal forecast for UAFG operating expenditure of $41.47 million and requires ATCO to amend its forecast as set out below per Table 34. As discussed in paragraph 351, ATCO submitted externally reviewed regulatory financial statements for the July to December 2014 period. The Authority considers that for the purposes of determining the best forecast for this period as per rule 74(2) of the NGR, the best forecast would be the actual expenditure from the July to December 2014 period. Accordingly actuals have been used for this period.

467. Table 34 shows the Authority's approved UAFG operating expenditure forecast for the fourth access arrangement period. The table also shows the UAFG rates and total throughput assumptions that underpin the forecast. .

Table 34 Authority's Final Decision Approved UAFG Operating Expenditure Forecast (AA4)

	July to Dec 2014	2015	2016	2017	2018	2019	Total
Authority Approved							
UAFG Rate		2.63%	2.62%	2.62%	2.60%	2.58%	
Total Throughput (TJ)		25,806	25,939	26,217	26,685	27,120	
Authority Approved UAFG Operating Expenditure (real $ million at 30 June 2014)	**3.98**	**7.15**	**7.17**	**7.25**	**7.32**	**7.38**	**40.24**

Source: ERA, GDS Tariff Model, September 2015.

Ancillary Service Operating Expenditure

468. ATCO's initial proposal calculated forecast ancillary service revenues by multiplying forecast ancillary service volumes with proposed ancillary service tariffs. ATCO forecast a decrease in ancillary service tariffs during the fourth access arrangement

period as a result of competitive service tenders.[211] Ancillary service revenues are considered by ATCO to be equivalent to ancillary service operating expenditure, and ancillary service tariffs are calculated by ATCO on a cost per service per volume basis. In its Draft Decision, the Authority assumed that these services were externally sourced by ATCO and required ATCO to confirm this.

469. ATCO's initial forecast ancillary service volumes were consistent with actual ancillary service volumes reported for the third access arrangement period. As per the Ancillary Service Tariff chapter of its Draft Decision, the Authority adjusted ATCO's forecast ancillary service operating expenditure in line with the Authority adjusted B3 demand forecast. The Authority's Draft Decision reduced ATCO's total Ancillary Service operating expenditure from $3.81 million to $3.79 million.

470. ATCO's revised proposal states that it did not implement the required amendment in relation to B3 customers. As ATCO also updated its demand forecast, this has resulted in an amended ancillary services operating expenditure for the revised proposal.[212] Table 35 shows ATCO's revised proposal ancillary service operating expenditure forecast for the fourth access arrangement period.

Table 35 ATCO Revised Proposal Ancillary Service Operating Expenditure (AA4)

(Real $ millions at 30 June 2014	July-Dec 2014	2015	2016	2017	2018	2019	Total
ATCO Revised Proposal							
Applying a meter lock	0.07	0.11	0.11	0.11	0.12	0.12	0.64
Removing a meter lock	0.02	0.04	0.04	0.04	0.04	0.04	0.22
Deregistering a delivery point	0.10	0.22	0.23	0.24	0.25	0.26	1.30
Disconnecting a delivery point	0.04	0.09	0.09	0.09	0.09	0.10	0.50
Reconnecting a delivery point	0.05	0.11	0.12	0.12	0.12	0.12	0.64
ATCO Revised Proposal Ancillary Service Operating Expenditure (AA4)[213]	**0.28**	**0.57**	**0.59**	**0.60**	**0.62**	**0.64**	**3.30**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 6-28, p. 102.

471. In its response to the Draft Decision, ATCO advised that its Ancillary Service tariffs are based on competitive service tenders. ATCO confirmed that these services are predominantly provided by third parties on a 95 per cent to 5 per cent split between third parties and ATCO. ATCO considers that the 5 per cent of ancillary services

211 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 280.

212 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 102.

213 The Authority notes that the amounts for Ancillary Service Operating Expenditure presented by ATCO in Table 6-28 of the ATCO Response to the Draft Decision do not correspond to the amounts in ATCO's tariff model for the purposes of calculating ATCO's total forecast operating expenditure for AA4. For the purposes of Table 35 above, the Authority has used the Ancillary Service Operating Expenditure from Table 6-28 in ATCO's Response to the Draft Decision.

performed by internal labour to be efficient due to labour costs being based on the current award and allocating no overheads to these services.[214]

472. As discussed in the Ancillary Service Tariff chapter of this Final Decision, the Authority notes that the Ancillary Service Tariff Variation Mechanism submitted by ATCO in Annexure C of the access arrangement does not achieve the tariff price for each of the ancillary services. The Authority has adjusted the tariff price of each activity and updated the ancillary tariff variation mechanism. Consequently, the Authority has calculated a new forecast ancillary service operating expenditure for the fourth access arrangement period. The Authority's reasons for rejecting ATCO's proposed ancillary service tariff prices and ancillary service tariff variation mechanism are discussed in the respective chapters of this Final Decision.

473. As discussed in paragraph 351, ATCO submitted externally reviewed regulatory financial statements for the July to December 2014 period. The Authority considers that for the purposes of determining the best forecast for this period as per rule 74(2) of the NGR, the best forecast would be the actual expenditure for July to December 2014. Accordingly, the Authority's approved ancillary service operating expenditure forecast for the fourth access arrangement consists of actuals for July to December 2014.

474. Table 36 shows the Authority's approved ancillary service operating expenditure by year over the fourth access arrangement period.

Table 36 Authority's Final Decision Approved Ancillary Service Operating Expenditure (AA4)

Real $ millions at 30 June 2014	July-Dec 2014	2015	2016	2017	2018	2019	Total
Authority Approved							
Applying a meter lock		0.11	0.11	0.11	0.12	0.12	
Removing a meter lock		0.04	0.04	0.04	0.04	0.04	
Deregistering a delivery point		0.22	0.23	0.23	0.23	0.24	
Disconnecting a delivery point		0.09	0.09	0.09	0.09	0.10	
Reconnecting a delivery point		0.11	0.12	0.12	0.12	0.12	
Authority Approved Ancillary Service Operating Expenditure (AA4)	**0.19**	**0.57**	**0.58**	**0.60**	**0.61**	**0.62**	**3.17**

Source: ERA, GDS Tariff Model, September 2015, ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 6-28, p. 102.

Final Decision

475. The Authority considers that only $369.94 million of ATCO's revised proposal for forecast operating expenditure for the fourth access arrangement satisfies rule 74 and 91 of the NGR:

- $170.68 million on network operating expenditure;

[214] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, pp. 101-102.

- $99.93 million on corporate operating expenditure;
- $55.93 million on IT operating expenditure;
- $40.24 million on UAFG operating expenditure; and
- $3.17 million on ancillary service operating expenditure.

476. Table 37 summarises the Authority approved operating expenditure by category for the fourth access arrangement period.

Table 37 Authority's Final Decision Approved Operating Expenditure Forecast by Category (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Network Operating Expenditure	12.56	31.71	31.30	31.54	31.54	32.04	170.68
Corporate Operating Expenditure	10.21	17.46	17.37	17.52	18.62	18.74	99.93
IT Operating Expenditure	3.89	10.40	10.50	10.50	10.37	10.27	55.93
UAFG Operating Expenditure	3.98	7.15	7.17	7.25	7.32	7.38	40.24
Ancillary Service Operating Expenditure	0.19	0.57	0.58	0.60	0.61	0.62	3.17
Authority Approved Operating Expenditure	**30.84**	**67.29**	**66.93**	**67.40**	**68.45**	**69.05**	**369.94**

Source: ERA, GDS Tariff Model, September 2015.

Required Amendment 3

Forecast operating expenditure must be amended to reflect Table 37 of this Final Decision.

Opening Capital Base

Regulatory Requirements

477. The capital base is the capital value attributed to the pipeline assets that are used to provide covered services. The capital base is used to calculate the return on capital and an amount of depreciation (return of capital).

478. Relevantly rule 77(2) of the NGR establishes the approach to determine the opening capital base for an access arrangement period that follows immediately on the conclusion of a preceding access arrangement period.

479. The Authority notes that the Australian Energy Market Commission (**AEMC**) published an updated version of the NGR on 2 October 2014, which added additional

text to rule 77(2)(a). This rule change does not affect ATCO's proposed revised access arrangement as ATCO has provided actual capital expenditure for the second access arrangement period.

480. Rule 77(2) of the NGR states:

> 77. Opening capital base
>
> ...
>
> 2) If an access arrangement period follows immediately on the conclusion of a preceding access arrangement period, the opening capital base for the later access arrangement period is to be:
>
> a) the opening capital base as at the commencement of the earlier access arrangement period adjusted for any difference between estimated and actual capital expenditure included in that opening capital base. This adjustment must also remove any benefit or penalty associated with any difference between the estimated and actual capital expenditure;
>
> plus:
>
> b) conforming capital expenditure made, or to be made, during the earlier access arrangement period;
>
> plus:
>
> c) any amounts to be added to the capital base under rule 82 [capital contributions by users to new capital expenditure], rule 84 [speculative capital expenditure account] or rule 86 [re-use of redundant assets];
>
> less:
>
> d) depreciation over the earlier access arrangement period (to be calculated in accordance with any relevant provisions of the access arrangement governing the calculation of depreciation for the purpose of establishing the opening capital base); and
>
> e) redundant assets identified during the course of the earlier access arrangement period; and
>
> f) the value of pipeline assets disposed of during the earlier access arrangement period.

481. Rule 79 of the NGR sets out the criteria for new capital expenditure. Rule 79 of the NGR states:

> 79. New capital expenditure criteria
>
> 1) Conforming capital expenditure is capital expenditure that conforms with the following criteria:
>
> a) the capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services;
>
> b) the capital expenditure must be justifiable having regard to one of the following grounds stated in rule 79(2).
>
> 2) Capital expenditure is justifiable if:
>
> a) the overall economic value of the expenditure is positive; or
>
> b) the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure; or
>
> c) the capital expenditure is necessary:
>
> (i) to maintain and improve the safety of services; or

(ii) to maintain the integrity of services; or

(iii) to comply with a regulatory obligation or requirement; or

(iv) to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity); or

d) the capital expenditure is an aggregate amount divisible into 2 parts, one referable to incremental services and the other referable to a purpose referred to in paragraph (c), and the former is justifiable under paragraph (b) and the latter under paragraph (c).

3) In deciding whether the overall economic value of capital expenditure is positive, consideration is to be given only to economic value directly accruing to the service provider, gas producers, users and end users.

4) In determining the present value of expected incremental revenue:

a) a tariff will be assumed for incremental services based on (or extrapolated from) prevailing reference tariffs or an estimate of the reference tariffs that would have been set for comparable services if those services had been reference services;

b) incremental revenue will be taken to be the gross revenue to be derived from the incremental services less incremental operating expenditure for the incremental services; and

c) a discount rate is to be used equal to the rate of return implicit in the reference tariff.

5) If capital expenditure made during an access arrangement period conforms, in part, with the criteria laid down in this rule, the capital expenditure is, to that extent, to be regarded as conforming capital expenditure.

6) The [Authority's] discretion under this rule is limited.

482. Rule 82(1) of the NGR provides that a user may make a capital contribution towards a service provider's capital expenditure. Any capital contributions by a user may, with the approval of the Authority, be rolled into the capital base for a pipeline on condition that the service provider does not benefit through increased revenue from the user's contribution to the capital base.[215]

483. Rules 88, 89 and 90 of the NGR specify particular requirements for the depreciation of pipeline assets in the Regulatory Asset Base (**RAB)**

484. Pursuant to rule 71(2) of the NGR, the Authority must consider and give appropriate weight to submissions and comments received on the question of whether a relevant access arrangement proposal should be approved.

ATCO's Proposed Revisions

485. ATCO initially proposed an opening capital base of $1,020.05 million for the fourth access arrangement period, which was calculated using a roll-forward method and escalated to 2014 dollars using the ABS's rebased CPI series.

486. ATCO's proposed opening capital base for the fourth access arrangement period included $273.87 million proposed conforming capital expenditure (of which

[215] Rule 82(3) of the NGR.

$3.32 million is associated with the acquisition of WestNet Energy assets) for the third access arrangement period.

487. Table 38 shows ATCO's proposed conforming capital expenditure by asset class for the third access arrangement period.

Table 38 ATCO's Initial Proposed Conforming Capital Expenditure by Asset Class (AA3)[216]

Real $ million at 30 June 2014	Jan to June 2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
High Pressure Mains	8.88	3.61	2.92	20.76	6.16	42.33
Medium / Low Pressure Mains	5.17	10.39	11.31	22.80	19.71	69.39
Regulators	0.28	0.24	0.46	1.24	1.43	3.66
Secondary Gate Stations	1.87	0.19	0.25	0.00	0.00	2.31
Buildings	0.13	1.19	0.79	4.45	11.20	17.76
Meter and Services Pipes	9.58	20.91	18.66	20.99	29.79	99.91
Equipment & Vehicles	3.19	0.80	1.22	4.21	9.49	18.92
Information Technology	2.03	4.36	3.30	5.27	4.62	19.58
ATCO Proposed Conforming Capital Expenditure	**31.13**	**41.70**	**38.91**	**79.73**	**82.40**	**273.87**

Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Table 23, p. 121. ATCO Gas Australia Tariff Model, September 2014.

488. ATCO's proposed depreciation of $133.51 million for the third access arrangement period.[217]

489. Table 39 shows ATCO's proposed opening capital base for the third access arrangement period.

Table 39 ATCO's Initial Proposed Opening Capital Base at 1 July 2014 (AA3)

Real $ million at 30 June 2014	Jan to June 2010	2010/ 2011	2011/2012	2012/2013	2013/2014
Opening Capital Base AA3	879.71	898.52	913.52	923.32	971.60
Plus: Capital Expenditure	31.14	41.69	38.91	79.72	82.40
Less: Depreciation	12.32	26.70	29.12	31.45	33.92
Closing Capital Base AA3	898.52	913.52	923.32	971.60	1,020.05
Opening Capital Base for AA4 at 1 July 2014					**1,020.05**

Source: ATCO Gas Australia, Access Arrangement Information, March 2014, Table 74, p. 209. ATCO Gas Australia Tariff Model, September 2014.

---

216 Buildings, Equipment & Vehicles and Information Technology include capital expenditure on WestNet assets.

217 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 82.

Draft Decision

490. In the Draft Decision the Authority determined different values of the opening capital base than proposed by ATCO reflecting:

- amendments to values of conforming capital expenditure in the 2010 to 2014 access arrangement period that may be added to the capital base; and
- corrections to ATCO's method of calculating CPI in the roll-forward calculation of capital base values.

491. The Authority also directed ATCO to provide an updated formula and more substantial information regarding its allocation of capital expenditure that relates to appropriate cost centres for regulated and non-regulated sections of the network.

492. The Authority engaged Energy Market Consulting associates, (**EMCa**) to assess ATCO's proposed capital expenditure, operating expenditure, and governance processes.

493. In the Draft Decision the Authority decided that:

- $263.60 million (96 per cent of ATCO's expenditure) of ATCO's conforming capital expenditure complies with the criteria set out in rule 79 of the NGR. Therefore, $9.91 million should not be included in the opening value of the asset base for the fourth access arrangement period.
- $0.36 million was not consistent with rule 77(2) and rule 74 of the NGR as the values for CPI are not appropriately indexed.
- $133.05 million of depreciation would be included in the opening capital base for the fourth access arrangement period.
- the opening capital base as at 1 July 2014 is $1,008.28 million compared with $1,020.05 million proposed by ATCO.

494. Table 40 shows a breakdown of ATCO's proposed capital expenditure excluded from the capital base by the Authority in the third access arrangement period and the Authority's CPI adjustment.

Table 40 Authority's Draft Decision Excluded Capital Expenditure from Opening Capital Base.

Real $ million at 30 June 2014	Jan to June 2010	2010/11	2011/12	2012/13	2013/14	Total
Blue Flame Kitchen	-	-	-	-	(0.80)	(0.80)
Jandakot Sewerage Extension	-	-	-	(0.70)	-	(0.70)
IT – Field Mobility reduction	-	-	(2.57)	(1.00)	-	(3.57)
IT – GIS reduction	-	-	-	(2.34)	-	(2.34)
IT – NDV reduction	-	-	-	-	(1.20)	(1.20)
IT - Variance	-	(0.30)	(0.20)	(0.20)	(0.60)	(1.30)
Total	**-**	**(0.30)**	**(2.77)**	**(4.24)**	**(2.60)**	**(9.91)**
CPI Adjustment	(0.03)	(0.10)	(0.07)	(0.15)	(0.00)	(0.36)

Source: ERA, GDS Tariff Model, October 2014.

495. Table 41 shows the Authority's approved conforming capital expenditure for the third access arrangement period by asset class.

Table 41 Authority's Draft Decision Approved Conforming Capital Expenditure by Asset Class (AA3)

Real $ million at 30 June 2014	Jan to Jun 2010	2010/11	2011/12	2012/13	2013/14	Total
High Pressure Mains - steel & PE	8.86	3.60	2.91	20.72	6.16	42.26
Medium / Low Pressure Mains	5.16	10.37	11.29	22.76	19.71	69.28
Regulators	0.28	0.24	0.46	1.24	1.43	3.65
Secondary Gate Stations	1.87	0.19	0.25	0.00	0.00	2.31
Buildings	0.13	1.19	0.79	3.74	10.40	16.25
Meter and Services Pipes	9.56	20.86	18.62	20.95	29.79	99.79
Equipment & Vehicles	3.20	0.80	1.22	4.20	9.49	18.91
Information Technology	2.03	4.05	0.53	1.73	2.82	11.15
Authority Required Conforming Capital Expenditure	**31.09**	**41.30**	**36.07**	**75.34**	**79.80**	**263.60**

Source: ERA, GDS Tariff Model, October 2014.

496. The Authority allowed a depreciation amount of $133.05 million to be included in the opening capital base for the fourth access arrangement period after an adjustment for CPI.

497. Table 42 shows the Authority's approved opening capital base for the third access arrangement period.

Table 42 Authority's Draft Decision Approved Opening Capital Base at 1 July 2014

Real $ million at 30 June 2014	Jan to June 2010	2010/11	2011/12	2012/13	2013/14
Opening Capital Base (AA3)	877.72	896.53	911.19	918.23	962.18
Plus: Capital Expenditure	31.09	41.30	36.07	75.34	79.80
Less: Depreciation	12.29	26.63	29.03	31.39	33.70
Closing Capital Base (AA3)	896.53	911.19	918.23	962.18	1,008.28
Authority Approved Opening Capital Base at 1 July 2014					**1,008.28**

Source: ERA, GDS Tariff Model, October 2014.

ATCO's Response to the Draft Decision

498. ATCO accepted the Authority's changes to CPI escalation. However, ATCO did not accept the Authority's view that $9.91 million of capital expenditure does not conform to the requirements of rule 79 of the NGR.

Verification of Capital Expenditure

499. ATCO provided regulatory financial statements for financial year 2014 externally reviewed by Price Waterhouse Coopers, signed WANH statutory accounts for financial year 2014 and Information templates for the regulatory year ended December 2014, which includes separate reporting for the period 1 January 2014 to 30 June 2014, 1 July 2014 to 31 December 2014 and the period 1 July 2013 to 30 June 2014 on 23 February 2015.

500. ATCO also provided an updated Cost Allocation Methodology for the calendar year 2014 on 23 February 2015. ATCO has made amendments to the allocation of indirect capital expenditure to the non-regulated and non-reference service network as required by paragraph 359 of the Draft Decision.

501. ATCO has updated its proposed conforming capital expenditure to include actual proposed conforming expenditure for the period until the end of June 2014. ATCO's proposed actual capital expenditure is $10.2 million less than the estimate provided to the Authority in March 2014.[218]

Assessment of Capital Expenditure

502. ATCO has not accepted the Authority's Draft Decision that $9.91 million of capital expenditure does not conform to the requirements of rule 79 of the NGR. ATCO's proposed revised conforming capital expenditure is shown in Table 43.

[218] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 117.

Table 43 ATCO's Proposed Revised Conforming Capital Expenditure by Asset Class (AA3)

Real $ million at 30 June 2014	Jan to June 2010	2010/ 2011	2011/2012	2012/2013	2013/2014	Total
High Pressure Mains - steel & PE	8.86	3.61	2.92	20.72	4.75	40.85
Medium/low pressure mains	5.16	10.37	11.29	22.76	16.88	66.46
Regulators	0.28	0.24	0.46	1.24	0.66	2.89
Secondary gate stations	1.87	0.19	0.25	-	-	2.31
Buildings	0.13	1.18	0.78	4.45	10.36	16.89
Meter and services pipes	9.56	20.87	18.62	20.95	30.10	100.09
Equipment and vehicles	3.19	0.73	1.21	4.11	5.11	14.35
Information technology	2.01	4.32	3.27	5.22	4.34	19.17
Total	**31.05**	**41.51**	**38.79**	**79.44**	**72.19**	**262.99**

Source: ATCO Gas Australia Tariff Model, November 2014.

Assessment of General Method of Calculating the Opening Capital Base

503. ATCO accepts the Authority's changes to CPI escalation. However, ATCO proposes that the 24 October 2012 rebased CPI apply to the capital base established from January 2010 onwards.

504. ATCO proposed a revised depreciation amount of $133.06 million to be included in the opening capital base for the fourth access arrangement period.

505. ATCO's proposed values for the capital base at the commencement of the fourth access arrangement period are shown in Table 44.

Table 44 ATCO's Proposed Revised Opening Capital Base at 1 July 2014 in response to the Draft Decision

Real $ million at 30 June 2014	Jan to June 2010	2010/ 2011	2011/2012	2012/2013	2013/2014
Opening Capital Base AA3	878.04	896.80	911.67	921.42	969.46
Plus: Capital Expenditure	31.05	41.51	38.79	79.44	72.19
Less: Depreciation	12.29	26.64	29.04	31.40	33.71
Closing Capital Base AA3	896.80	911.67	921.42	969.46	1,007.94
Opening Capital Base for AA4 at 1 July 2014					**1,007.94**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p 118

Submissions

506. Alinta states that ATCO's conforming capital expenditure for the third access arrangement period is greater than the approved forecast, and suggests that the Authority scrutinise its compliance with rule 79(1) of the NGR.

507. Kleenheat states that ATCO appears to have under-invested in prior access arrangement periods and has concerns over the magnitude of the proposed expenditure relative to the existing capital base. Kleenheat supports the depreciation methodology used in the Draft Decision.

Considerations of the Authority

508. The Authority has considered whether ATCO's proposed opening capital base for the fourth access arrangement period meets the requirements of rules 77 and 79 of the NGR. These considerations include:

- verification of capital expenditure;
- determination of the opening capital base for the fourth access arrangement period, taking into account an assessment of:
  - conforming capital expenditure in the third access arrangement period;
  - capital contributions;
  - depreciation; and
- assessment of ATCO's general method of calculating the opening capital base.

Verification of Capital Expenditure

509. The Authority undertook a review of ATCO's statutory accounts, and associated adjustments made to these accounts to obtain the regulatory accounts. These adjustments were reviewed to ensure they are in accordance with the methodology set out in the Cost Allocation Method 2014 (**CAM**).

510. The Authority accepted ATCO's allocation method in the Draft Decision based on ATCO providing further justification on how the 2 per cent allocation was calculated between regulated and non-regulated sections of the network.

511. ATCO has reviewed the allocation of indirect capital expenditure relating to the portion of Property Plant and Equipment (**PPE**) and IT directly relating to the Albany and Kalgoorlie unregulated network as per paragraph 359 of the Draft Decision. For IT costs, ATCO allocated costs according to the number of users or IT devices or performing non-reference services or the number of delivery points relating to regulated or unregulated networks where appropriate. For PPE, ATCO carried out a review of the portion of PPE directly relating to the Albany and Kalgoorlie unregulated networks. As a result of the review, ATCO has increased the allocations to the non-regulated and non-reference service network as a result of the review. ATCO has increased its allocation of IT expenditure by $0.1 million to $0.5 million and PPE by $0.5 million to $1.4 million.

512. The Authority accepts ATCO's approach to directly allocate indirect capital expenditure to non-regulated and non-reference services as set out in its CAM.

513. The Authority has reviewed ATCO's updated actual expenditure for the period until 30 June 2014 submitted on 23 February 2015. The actual end of period position is $10.2 million less than the estimate in ATCO's original submission. The Authority has assessed this reduction under each heading in the section below.

Assessment of Capital Expenditure

514. ATCO proposed to add $273.87 million for conforming capital expenditure in its initial proposal.

515. The Authority decided in its Draft Decision that $263.60 million (96 per cent of ATCO's expenditure) of ATCO's proposed conforming capital expenditure complies with the criteria set out in rule 79 of the NGR. The Authority was not satisfied that $9.91 million capital expenditure satisfies rule 79 of the NGR. The $9.91 million consisted of $1.5 million for structures and equipment and $8.41 million for IT expenditure.

516. As stated in paragraph 513, ATCO has spent $10.2 million less than estimated in its access arrangement information in 2013/2014.

517. The Authority engaged its technical consultant EMCa to review elements of ATCO's response to the Authority's Draft Decision.

Structures and Equipment Capital Expenditure

518. ATCO's initial proposal included proposed conforming structures and equipment capital expenditure of $33.47 million for the third access arrangement period.

519. The Authority required ATCO in the Draft Decision to reduce its proposed structures and equipment capital expenditure for the third access arrangement period by $1.5 million. The Authority decided that the following structures and equipment expenditure did not conform with rule 79 of the NGR:

- Blue Flame Kitchen ($0.80 million)
- Jandakot Sewerage extension project ($0.70 million)

520. ATCO has not removed $0.80 million for the Blue Flame Kitchen from its proposed capital base in its response to the Draft Decision. ATCO has sought to justify its expenditure under rules 79(2)(a),(b),(c)(i)-(ii). ATCO disagrees with the Authority's assessment that the Blue Flame Kitchen's link to safety is weak, and advises that it is an initiative to reduce the risk of harm to residential customers, as well as to educate them as to the responsibilities of ATCO as a gas provider. ATCO states that the Blue Flame Kitchen is the only gas-specific community engagement and safety-specific program in Western Australia.

521. The Authority has assessed ATCO's response to the Draft Decision. The Authority considers that ATCO's Blue Flamed Kitchen is primarily positioned as a marketing vehicle and there is a relatively weak link to the promotion of safe gas use. Therefore, the Authority does not consider that the Blue Flamed Kitchen meets rule 79(2)(c) of the NGR. The Authority considers that ATCO has not provided any new evidence to demonstrate that the Blue Flamed Kitchen satisfies the economic value or incremental revenue tests. Therefore, the Authority is not satisfied that $0.8 million for the Blue Flamed Kitchen satisfies rule 79(2) of the NGR.

522. ATCO has not removed $0.70 million for the Jandakot sewerage extension project. ATCO advises that the Jandakot sewerage extension and sewerage connection costs associated with the Jandakot redevelopment project business case are two discrete activities and therefore the costs have not been double counted.

523. The Authority has reviewed ATCO's response to the Draft Decision. The Authority accepts ATCO's explanation that the Jandakot sewerage extension and sewerage

connection costs associated with the Jandakot redevelopment project business case are two discrete projects. The Authority is satisfied that the sewerage extension project conducted in 2010 was not part of the Jandakot redevelopment project and was conducted in 2010 under a contribution arrangement with DBNGP Transmission Pty Ltd (**DBP**) and Western Power.[219] The Authority considers that the $0.70 million for the Jandakot sewerage extension conforms with rule 79(2)(c) of the NGR.

524. The Authority has decided that $0.80 million of ATCO's proposed structures and equipment for the third access arrangement period can be considered non-conforming under rule 79 of the NGR.

IT Capital Expenditure

525. ATCO's initial proposal included conforming IT capital expenditure of $19.50 million for the third access arrangement period.[220]

526. In the Draft Decision the Authority required ATCO to reduce its proposed IT capital expenditure for the third access arrangement period by $8.41 million. The Authority decided that the following IT expenditure did not conform with rule 79 of the NGR:

- Field Mobility ($3.57 million)
- GIS reduction ($2.34 million)
- NDV reduction ($1.20 million)
- Variance ($1.30 million)

527. ATCO has not removed the $3.57 million for the Field Mobility project from the opening capital base as it considers that the expenditure is conforming capital expenditure under rule 79 of the NGR. ATCO has provided business cases for the three phases of the Field Mobility project.[221] ATCO stated that the $4.7 million spent, compared to the internal business cases approved expenditure of $5.6 million complies with rule 79 of the NGR. ATCO advised that a second project Field Mobility Phase 2 is an independent project that did not take place in the third access arrangement period and will take place in the fourth access arrangement period (ATCO-05 - Field Mobility Enhancements).

528. The Authority's technical consultant EMCa has reviewed ATCO's response to the Draft Decision. EMCa are satisfied that ATCO has provided sufficient responses and evidence to its queries and that the confusion surrounding the integration of incomplete Phase 1 project and the two Phase 2 projects has been satisfactorily explained. The Authority accepts EMCa's view that the expenditure through the four stages of work that were completed in the third access arrangement period satisfy rule 79(2)(c) of the NGR. The Authority is also satisfied that $4.7 million for the Field Mobility project satisfies the prudent service provider test in rule 79(1)(a) of the NGR

---

219 ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 108.

220 ATCO Gas Australia, *Email response to EMCa84*, 9 May 2014.
ATCO Gas Australia, *Email response to EMCa88*, 4 June 2014.

221 ATCO Gas Australia, Appendix 7.1 Phase 1 business Case.

and can be considered as conforming capital expenditure under rule 77(2) of the NGR.

529. ATCO has not removed $2.34 million for the Geographic Information Systems (**GIS**) upgrade project from the opening capital base. ATCO has provided business cases for the four phases of the GIS upgrade project. ATCO advised that the scope of the original GIS upgrade project included in the third access arrangement period was supposed to be a straightforward upgrade, however, actual expenditure was significantly greater as the system had to be fully replaced due to performance issues and loss of vendor support. ATCO has summarised actual expenditure for the GIS upgrade project of $2.8 million in table 7-6 of its response to the Draft Decision.[222]

530. The Authority notes that the GIS upgrade project is separate from the GIS enhancement project.[223] ATCO's initial proposal of conforming capital expenditure contained $3.45 million for these two GIS projects. This included $2.8 million for the ESRI/GIS upgrade project and $0.65 million for the separate GIS enhancement project. ATCO has provided four business cases for the ESRI/GIS upgrade project that have a combined total budget of $2.8 million. The Authority has decided that ATCO's proposed ESRI/GIS upgrade project satisfies rule 79(1)(a) of the NGR.

531. ATCO initially included $2.6 million for two Network Data Visualisation (**NDV**) projects and two NDV enhancement projects. The Authority rejected $1.2 million in the Draft Decision as ATCO did not provide any evidence for this expenditure. In its response to the Draft Decision, ATCO provided business cases for two out of three phases and business cases and close-out reports for two enhancement phases that occurred in the third access arrangement period. ATCO was unable to provide supporting documentation for Phase 3 of the NDV project. The Authority has decided that $0.70 million of ATCO's proposed conforming capital expenditure for the NDV project does not satisfy rule 79(1)(a) of the NGR as no documentation was provided in support of its efficiency, purpose or scope.

532. ATCO has not removed $1.3 million for the variance in reported IT capital expenditure. ATCO advised that the costs were left out of the March 2014 Access Arrangement by mistake. ATCO states that the incorrectly omitted costs were later provided in August 2014 and has attributed the variance of $1.30 million to IT structures and equipment ($0.90 million), network telemetry ($0.10 million), miscellaneous IT ($0.10 million), and rounding error ($0.20 million).[224]

533. ATCO has only provided a breakdown of the $0.90 million IT capital expenditure.[225] The Authority has decided that $0.4 million for rounding and miscellaneous IT spending does not meet the criteria under rule 79(1)(a) of the NGR and therefore is not conforming capital expenditure.

534. The Authority has therefore decided that, instead of the $8.41 million referred to in paragraph 515 above, only $1.10 million of ATCO's proposed IT expenditure for the third access arrangement period (representing the total of $0.70 million for NDV and

---

222 ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West GDS, 27 November 2014, Section 7, pp.113-114.

223 Both projects are referred to in Table 51 of ATCO Gas Australia's Access Arrangement Information, 17 March 2014.

224 ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West GDS, 27 November 2014, Section 7, pp. 109-110.

225 ATCO Gas Australia, *Response to ERA Question 67*, 27 February 2015.

$0.4 million for IT Variance) can be considered non-conforming capital expenditure as it does not meet the criteria under rule 79(1)(a) of the NGR.

Consumer Price Index adjustment

535. ATCO accepts the Authority's changes to CPI escalation. However, ATCO proposes that the 24 October 2012 rebased CPI apply to the capital base established from January 2010 onwards so that the capital base for the third access arrangement period is escalated using the same CPI index. ATCO argues that the use of a single series throughout an access arrangement period ensures that there is alignment with rule 73(3) of the NGR where all calculations must be made consistently on the same basis. ATCO proposes a reduction of capital expenditure of $0.4 million rather than $0.3 million as proposed by the Authority.

536. The Authority does not accept ATCO's proposed method. The Authority uses the historical year to year change in CPI prior to October 2012, which does not change even when the ABS rebased the CPI. This enables the replication of historical values and values are not affected by the rounding error resulting from the ABS CPI rebase. The Authority considers that this method maintains the true value of the RAB and meets rule 74 of the NGR.

Revised end of period position

537. ATCO has updated its estimated proposed conforming capital expenditure to actual proposed conforming expenditure for the period until the end of June 2014. ATCO's proposed actual capital expenditure is $10.2 million less than the estimate provided to the Authority in March 2014.

538. ATCO's lower expenditure is due to the following;

- $5.7 million lower expenditure on sustaining capital expenditure reflected in the need to undertake mains replacement work in Albany that utilised the same resources, and was a high priority at the time. The new supply for Oakford and Forrestdale ($0.9 million) and the high Pressure Signs Projects ($0.3 million) were deferred.
- $0.9 million increase in growth capital expenditure due to a higher than expected number of greenfield connections. Mains expenditure was 14 per cent higher and expenditure on services was 9 per cent higher.
- $5.2 million lower expenditure on structures and equipment capital expenditure due to the deferral of the Mandurah Depot and warehouse upgrade ($1.8 million). There was also an underspend in fleet ($2.9 million) and associated operational equipment ($0.5 million) of which $1.5 million is carried forward to the fourth access arrangement period.
- $0.2 million lower expenditure in IT capital expenditure.

539. The Authority notes that the actual 2013/2014 capital expenditure amounts provided to the Authority in the ATCO Tariff Model, provided 10 December 2014, differs from the regulatory accounts provided on 23 February 2015 for IT capital expenditure. The Authority notes that the difference between the two amounts is not material and therefore accepts ATCO's actual expenditure as being free from material misstatement.

Assessment of General Method of Calculating the Opening Capital Base

540. In its response to the Draft Decision, ATCO accepts the Authority's changes to CPI escalation with a proposed variation as discussed in paragraph 535. ATCO states that its proposed method leads to a reduction of the opening capital base of $1.7 million rather than $2.0 million as proposed by the Authority.

541. The Authority has reviewed ATCO's revised approach in its response to the Draft Decision. The Authority is not satisfied that ATCO's revised method is consistent with rule 77(2) and rule 74 of the NGR as the values are not appropriately indexed.

542. The Authority has decided to maintain its approach from the Draft Decision as it complies with rule 74 of the NGR. The Authority's method is to use:

- the old ABS CPI series to escalate the capital base up to June 2012 when the ABS rebased the CPI to 100; and
- the new ABS CPI series after June 2012.

Assessment of Depreciation

543. The Authority has decided to approve a depreciation amount of $133.05 million to be included in the opening capital base for the fourth access arrangement period.

544. The Authority's amount for depreciation is $0.03 million less than ATCO's proposal due to CPI rebasing. The Authority is not satisfied that ATCO's revised method to escalate the capital base in line with ABS's CPI rebasing is consistent with the NGR. The Authority's considerations on CPI rebasing are discussed in paragraphs 535 to 536.

Final Decision

545. The Authority's Final Decision is to not approve ATCO's proposed capital expenditure for the third access arrangement period as submitted in its response to the Draft Decision.

546. The Authority has decided that:

- $261.09 million (99 per cent of ATCO's expenditure) complies with the criteria set out in rule 79 of the NGR and can therefore be included in the opening value of the asset base for the fourth access arrangement period.
- $1.90 million of the Blue Flame Kitchen, NDV and IT Variance as highlighted in Table 45 (1 per cent of ATCO's expenditure) does not comply with the criteria set out in rule 79(2) of the NGR and should not be included in the opening value of the asset base for the fourth access arrangement period.
- $133.05 million for depreciation is to be included in the opening capital base for the fourth access arrangement period.
- $0.37 million for CPI Adjustment as illustrated in Table 45 and discussed above at paragraphs 535 to 536 is not consistent with rule 74 of the NGR and should not be included in the opening value of the asset base for the fourth access arrangement period.

547. The Authority has escalated its approved conforming capital expenditure using the approach, mentioned in paragraph 542. Table 45 shows the Authority's approved conforming capital expenditure for the third access arrangement period.

Table 45 Authority's Final Decision Approved Conforming Capital Expenditure by Project (AA3)

Real $ million at 30 June 2014	Jan to Jun 2010	2010/11	2011/12	2012/13	2013/14	Total
ATCO Proposed Conforming Capital Expenditure	31.05	41.51	38.79	79.44	72.19	262.99
Blue Flame Kitchen					(0.80)	(0.80)
IT - NDV reduction					(0.70)	(0.70)
IT - Variance					(0.40)	(0.40)
Total proposed reductions	-	-	-	-	(1.90)	(1.90)
Authority Required Conforming Capital Expenditure	31.05	41.51	38.79	79.44	70.29	261.09
CPI Adjustment	(0.04)	(0.10)	(0.08)	(0.15)	(0.00)	(0.37)
Authority Approved Conforming Capital Expenditure	**31.01**	**41.42**	**38.71**	**79.29**	**70.29**	**260.73**

Source: ERA, GDS Tariff Model, September 2015.

548. Table 46 breaks down the Authority's approved conforming capital expenditure for the third access arrangement period by asset class.

Table 46 Authority's Final Decision Approved Conforming Capital Expenditure by Asset Class (AA3)

Real $ million at 30 June 2014	Jan to Jun 2010	2010/11	2011/12	2012/13	2013/14	Total
High Pressure Mains	8.85	3.59	2.91	20.68	4.75	40.78
Medium / Low Pressure Mains	5.16	10.34	11.27	22.72	16.88	66.36
Regulators	0.28	0.24	0.46	1.24	0.66	2.88
Secondary Gate Stations	1.86	0.19	0.24	0.00	0.00	2.30
Buildings	0.13	1.17	0.78	4.44	9.56	16.08
Meter and Services Pipes	9.54	20.82	18.58	20.91	30.10	99.95
Equipment & Vehicles	3.19	0.73	1.20	4.10	5.11	14.34
Information Technology	2.00	4.32	3.26	5.21	3.24	18.02
Authority Approved Conforming Capital Expenditure	**31.01**	**41.42**	**38.71**	**79.29**	**70.29**	**260.73**

Source: ERA, GDS Tariff Model, September 2015.

549. Table 47 breaks down the Authority approved depreciation to be included in the opening capital base for the fourth access arrangement period by year.

Table 47 Authority's Final Decision Approved Depreciation of Opening Capital Base (AA3)

Real $ million at 30 June 2014	Jan to Jun 2010	2010/11	2011/12	2012/13	2013/14	Total
ATCO proposed revised Depreciation of Opening Capital Base	12.29	26.64	29.04	31.40	33.70	133.08
CPI Adjustment	-	(0.01)	(0.01)	(0.01)	-	(0.03)
Authority Approved Depreciation of Opening Capital Base	12.29	26.63	29.03	31.39	33.70	133.05

Source: ERA, GDS Tariff Model, September 2015.

550. Table 48 shows the Authority's required amended values for calculating the opening capital base for the fourth access arrangement period taking into account the required amended CPI and required amendments to conforming capital expenditure in Table 46. The Authority requires that the opening capital base at 1 July 2014 be amended to $1,005.40 million.

Table 48 Authority's Final Decision Approved Opening Capital Base at 1 July 2014

Real $ million at 30 June 2014	Jan to June 2010	2010/11	2011/12	2012/13	2013/14
Opening Capital Base (AA3)	877.72	896.44	911.23	920.91	968.81
Plus: Capital Expenditure	31.01	41.42	38.71	79.29	70.29
Less: Depreciation	12.29	26.63	29.03	31.39	33.70
Closing Capital Base (AA3)	896.44	911.23	920.91	968.81	1,005.40
Authority Approved Opening Capital Base at 1 July 2014					**1,005.40**

Source: ERA, GDS Tariff Model, September 2015.

Required Amendment 4

The opening capital base for 1 July 2014 in the proposed revised access arrangement must be amended to reflect the values in Table 48 of this Final Decision.

Projected Capital Base

Regulatory Requirements

551. Rule 78 of the NGR establishes the approach to be used to determine the projected capital base for an access arrangement period.

552. Rule 78 of the NGR states that the projected capital base for a particular period is:

78. Projected capital base

(a) the opening capital base;

plus:

(b) forecast conforming capital expenditure for the period;

less:

(c) forecast depreciation for the period; and

(d) the forecast value of pipeline assets to be disposed of in the course of the period.

553. Rule 79 of the NGR sets out the criteria that must be met in order for capital expenditure to be considered conforming capital expenditure. Capital expenditure must be equivalent to that incurred by a prudent service provider acting efficiently, and must be justifiable on economic, safety or regulatory grounds. The criteria that must be met in order for capital expenditure to be conforming is set out in Paragraph 481.

554. The Authority's discretion is limited under rule 79. Rule 40(2) of the NGR sets out the Authority's limited discretion powers. Rule 40(2) states that the regulator must not withhold its approval of an element of an access arrangement proposal if it is satisfied that the element complies with the applicable requirements of the NGL and is consistent with any applicable criteria (if any) prescribed by the NGL.

555. Rule 74 of the NGR provides that information in the nature of a forecast or estimate must be supported by a statement of its basis, and must be arrived at on a reasonable basis, and must represent the best forecast or estimate possible in the circumstances.

556. Rule 71 of the NGR is relevant to the Authority's consideration of actual and forecast capital expenditure against the requirements of rule 79 of the NGR, and states that:

71. Assessment of compliance

1) In determining whether capital or operating expenditure is efficient and complies with other criteria prescribed by these rules, the [Authority] may, without embarking on a detailed investigation, infer compliance from the operation of an incentive mechanism or on any other basis the [Authority] considers appropriate.

2) The [Authority] must, however, consider and give appropriate weight to, submissions and comments received when the question whether a relevant access arrangement proposal should be approved is submitted for public consultation.

557. Rule 88 of the NGR provides that the forecast depreciation of the capital base for the purpose of determining a reference tariff is to be calculated for each year of the access arrangement period on the basis set out in the depreciation schedule(s). The requirements in relation to forecast depreciation are set out in rule 89 of the NGR as described in the opening capital base section (paragraph 483).

ATCO's Proposed Revisions

558. ATCO initially proposed a closing projected capital base of $1,551.93 million in nominal dollars for the end of the fourth access arrangement period.[226] ATCO's

[226] *ERA, GDS Tariff Model, October 2014.*

proposed projected capital base included proposed conforming capital expenditure of $606.92 million in real dollars as shown in Table 49.

Table 49 ATCO's Initial Proposed Capital Expenditure Forecast by Cost Driver (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Sustaining	17.72	42.01	51.53	64.15	63.30	72.59	311.30
Growth	18.72	39.20	51.81	42.64	41.46	34.70	228.53
Structures and equipment	3.75	16.69	3.45	3.47	5.62	5.47	38.45
IT	5.12	6.56	5.85	4.36	3.65	3.11	28.64
ATCO Initial Proposed Capital Expenditure Forecast	**45.31**	**104.46**	**112.64**	**114.62**	**114.03**	**115.87**	**606.92**

Source: ATCO Gas Australia, Tariff Model, September 2014.

559. Table 50 shows ATCO's proposed conforming capital expenditure of $606.92 million in real dollars by asset class.

Table 50 ATCO's Initial Proposed Capital Expenditure Forecast by Asset Class (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
High pressure mains - steel	2.63	16.92	37.70	36.78	30.42	29.48	153.92
High pressure mains - PE	0.22	0.50	0.00	1.17	4.23	6.76	12.89
Medium/low pressure mains	14.16	27.00	27.57	26.52	28.55	28.93	152.74
Regulators	1.78	2.84	1.52	1.48	1.50	1.95	11.08
Secondary gate stations	-	-	3.92	7.56	3.38	4.10	18.96
Buildings	1.00	9.45	0.63	0.43	0.02	0.02	11.54
Meter and services pipes	17.00	33.06	31.45	32.29	35.65	35.75	185.19
Equipment and vehicles	0.65	1.22	1.45	1.29	1.03	1.03	6.65
Vehicles	2.10	1.17	0.82	1.40	4.57	4.43	14.50
Information technology (including telemetry)	5.78	7.45	7.01	5.35	4.67	3.43	33.70
Full retail contestability	-	-	-	-	-	-	-
Land	-	4.85	0.55	0.35	-	-	5.75
ATCO Proposed Capital Expenditure Forecast	**45.31**	**104.46**	**112.64**	**114.62**	**114.03**	**115.87**	**606.92**

Source: ATCO Gas Australia, Tariff Model, September 2014.

560. ATCO's Initial proposed forecast depreciation is $127.68 million in nominal dollars. ATCO's forecast depreciation removes a double counting of inflation. ATCO has proposed the adoption of a depreciation schedule that transitions over a number of access arrangement periods. ATCO's transition approach applies straight-line depreciation to the Current Cost Accounting (**CCA**) value of the opening capital base

for existing assets before 1 July 2014 and removes an amount relating to the inflationary gain. ATCO then applies straight-line depreciation to the Historic Cost Accounting (**HCA**) value of forecast capital expenditure. [227]

561. Table 51 shows ATCO's proposed projected capital base for the fourth access arrangement period.

Table 51 ATCO's Initial Proposed Projected Capital Base (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019
Opening Capital Base (AA4)	1,020.05	1,061.09	1,153.97	1,253.32	1,353.42	1,451.94
Capital Expenditure	45.87	108.40	119.81	124.97	127.43	132.73
Total Depreciation:	(4.83)	(15.52)	(20.45)	(24.86)	(28.91)	(32.74)
Closing Capital Base (AA4)	**1,061.09**	**1,153.97**	**1,253.32**	**1,353.42**	**1,451.94**	**1,551.93**

Source: ERA, GDS Tariff Model, October 2014.

Draft Decision

562. In the Draft Decision the Authority determined different values of the projected capital base than proposed by ATCO, reflecting:

- amendments to values of conforming capital expenditure in the 2015-2019 access arrangement period that may be added to the capital base;
- amendments to the proposed forecast overhead expenditure;
- amendments to the projected labour cost escalation; and
- amendments to ATCO's transition approach for proposed depreciation.

563. In the Draft Decision the Authority:

- Decided that $320.48 million (53 per cent) does not comply with rule 79 of the NGR and therefore cannot be considered conforming under rule 78 of the NGR.
- Decided that the CCA transition approach for depreciation should be used, instead of the HCA transition approach proposed by ATCO.
- Revised the projected capital base for the end of the fourth access arrangement period to $1,219.73 million nominal, compared to $1,551.93 million proposed by ATCO.

564. Table 52 shows ATCO's Initial proposed capital expenditure that was excluded from the capital base by the Authority in the Draft Decision for the fourth access arrangement period by cost driver in real dollars.

[227] Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 102.

Table 52 Authority's Draft Decision Excluded Capital Expenditure by Cost Driver (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
ATCO Proposed Capital Expenditure Forecast	**45.31**	**104.46**	**112.64**	**114.62**	**114.03**	**115.87**	**606.92**
Sustaining reductions	-	-	(12.12)	(23.69)	(23.90)	(37.69)	(97.39)
Growth reductions	(15.34)	(32.31)	(44.22)	(40.66)	(39.29)	(32.71)	(204.53)
Structures and equipment reductions	-	(0.50)	(1.18)	-	(0.40)	(0.60)	(2.68)
IT reductions	(0.32)	(0.40)	(0.56)	(0.47)	(0.73)	(1.03)	(3.51)
Overheads	(1.58)	(3.20)	(1.79)	(1.24)	(1.57)	(1.18)	(10.56)
Labour cost escalation	-	(0.10)	(0.20)	(0.30)	(0.50)	(0.70)	(1.80)
Total reductions	(17.25)	(36.51)	(60.07)	(66.35)	(66.39)	(73.91)	(320.48)
Authority Approved Capital Expenditure Forecast	**28.06**	**67.95**	**52.57**	**48.27**	**47.63**	**41.97**	**286.44**

Source: ERA, GDS Tariff Model, October 2014.

565. Table 53 shows the Authority's required amendments for capital expenditure to be included in the projected capital base by asset class.

Table 53 Authority's Draft Decision Approved Capital Expenditure Forecast by Asset Class (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
High pressure mains - steel	2.42	12.18	8.78	0.66	0.96	1.84	26.85
High pressure mains - PE	0.07	0.13	-	-	0.31	-	0.51
Medium pressure mains	-	-	-	-	-	-	-
Medium/low pressure mains	8.53	16.85	17.65	17.45	16.77	11.69	88.93
Low pressure mains	-	-	-	-	-	-	-
Regulators	1.35	2.12	0.98	0.97	0.97	1.00	7.39
Secondary gate stations	-	-	3.75	7.28	3.20	3.89	18.13
Buildings	1.00	8.95	-	0.43	0.02	0.02	10.41
Meter and services pipes	6.48	13.43	12.68	13.56	16.25	16.28	78.68
Equipment and vehicles	0.65	1.22	1.45	1.29	1.03	0.83	6.45
Vehicles	2.10	1.17	0.82	1.40	4.17	4.03	13.70
Information technology including Telemetry	5.45	7.05	6.45	4.89	3.94	2.40	30.19
Full retail contestability	-	-	-	-	-	-	-
Land	-	4.85	-	0.35	-	-	5.20
Authority Approved Capital Expenditure Forecast	**28.06**	**67.95**	**52.57**	**48.27**	**47.63**	**41.97**	**286.44**

Source: ERA, GDS Tariff Model, October 2014.

566. Table 54 shows the Authority's approved Draft Decision projected capital base for the fourth access arrangement period.

Table 54 Authority's Draft Decision Approved Projected Capital Base (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019
Opening Capital Base (start of period)	1,008.28	1,032.82	1,089.96	1,129.97	1,164.21	1,196.11
Inflation	11.23	23.14	24.42	25.31	26.08	26.79
Opening Capital Base (end of period)	1,019.51	1,055.95	1,114.38	1,155.28	1,190.29	1,222.91
Capital Expenditure	28.37	70.35	55.56	52.16	52.62	47.41
Depreciation	(15.06)	(36.23)	(39.98)	(43.22)	(46.80)	(50.58)
Authority Approved Closing Capital Base	**1,032.82**	**1,089.96**	**1,129.97**	**1,164.21**	**1,196.11**	**1,219.73**

Source: ERA, GDS Tariff Model, October 2014.

ATCO's Response to the Draft Decision

567. ATCO has not implemented the Authority's required amendments 7 and 8.

568. ATCO did not accept the Authority's view that $320.48 million of capital expenditure does not conform to the requirements of rule 79 of the NGR.

569. ATCO did not accept the Authority's requirement to adopt the CCA approach for depreciation. ATCO remains of the view that the HCA approach is the preferred depreciation approach and has resubmitted its transition method so that the change in methodology occurs over more than one access arrangement period.

570. Following its response to the Draft Decision, ATCO provided its actual capital expenditure for the 2014 calendar year.

Assessment of Capital Expenditure

571. ATCO proposes an amended forecast capital expenditure of $592.22 million in real dollars for the fourth access arrangement period. This expenditure comprises:

- $291.76 million sustaining capital expenditure
- $233.90 million growth capital expenditure
- $40.23 million structures and equipment capital expenditure
- $26.34 million IT capital expenditure

572. Table 55 shows ATCO's revised proposed capital expenditure forecast by cost driver for the fourth access arrangement period.

Table 55 ATCO's Revised Proposed Capital Expenditure Forecast by Cost Driver (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
Sustaining	15.04	37.84	51.09	64.60	61.09	62.09	291.76
Growth	18.03	43.24	54.51	43.62	40.64	33.86	233.90
Structures and equipment	5.48	17.48	3.33	3.33	5.36	5.25	40.23
IT	4.62	6.32	5.63	4.22	3.19	2.36	26.34
ATCO Proposed Capital Expenditure Forecast	**43.17**	**104.88**	**114.55**	**115.77**	**110.28**	**103.57**	**592.22**

Source: ATCO Gas Australia Tariff Model, November 2014.

573. Table 56 shows ATCO's revised proposed capital expenditure forecast by asset class for the fourth access arrangement period.

Table 56 ATCO's Revised Proposed Capital Expenditure Forecast by Asset Class (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
High pressure mains - steel	0.51	11.38	41.59	37.91	30.53	24.95	146.88
High pressure mains - PE	1.04	1.43	-	-	3.05	0.80	6.31
Medium pressure mains	-	-	-	-	-	-	-
Medium/low pressure mains	13.68	28.76	27.94	26.16	26.76	26.52	149.82
Low pressure mains	-	-	-	-	-	-	-
Regulators	0.96	3.36	1.51	1.48	1.51	2.00	10.82
Secondary gate stations	0.01	0.00	0.57	8.20	4.14	6.23	19.14
Buildings	2.27	9.95	0.62	0.42	0.02	0.02	13.30
Meter and services pipes	16.59	35.19	32.83	33.50	34.75	35.14	188.01
Equipment and vehicles	0.21	1.50	1.39	1.23	0.97	0.97	6.27
Vehicles	3.00	1.18	0.76	1.33	4.37	4.27	14.91
Information technology including Telemetry	4.90	7.29	6.78	5.19	4.19	2.67	31.01
Full retail contestability	-	-	-	-	-	-	-
Land	-	4.85	0.55	0.35	-	-	5.75
ATCO Proposed Capital Expenditure Forecast	**43.17**	**104.88**	**114.55**	**115.77**	**110.28**	**103.57**	**592.22**

Source: ATCO Gas Australia, Tariff Model, November 2014.

Sustaining Capital Expenditure

Asset replacement

574. ATCO has accepted the Authority's view that some metallic mains expenditure can be deferred. ATCO proposes to defer $3.4 million of the Authority's required $11.0 million deferral from the fourth access arrangement period to the fifth access arrangement period.

575. ATCO has reduced its forecast for asset replacement as it has removed the high pressure HP017 pipeline project ($3.2 million). ATCO has also included a pipeline replacement project ($0.4 million) as a result of a deferral from the third access arrangement period.[228]

Asset Performance and Safety

576. ATCO has not accepted the Authority's required amendment to remove all interdependency projects from its projected capital base. However, ATCO has

[228] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014 p. 139.

reassessed its proposed interdependency projects as part of its annual AMP review and concluded that six projects can be deferred ($13.3 million). As a result the forecast capital expenditure on interdependency projects has been reduced from $47.3 million to $34.0 million.[229]

577. ATCO has not accepted the Authority's required amendment to exclude the Two Rocks and Peel spur line projects from the projected capital base. ATCO submits that the Two Rocks and Peel spur line projects are justified under the safety case, ASNZS4645 and are required to reduce the loss of supply risk level from its current rating of 'high'. ATCO also considers that its risk thresholds are consistent with benchmarked industry peers and have also been endorsed by EnergySafety.

Growth Capital Expenditure

578. ATCO has not accepted the Authority's required amendment to exclude $204.5 million from the forecast growth capital expenditure.

579. ATCO submits that EMCa has erred in its assessment of the NPV analysis undertaken and that all of the proposed growth capital expenditure meets rule 79 of the NGR. ATCO submits that the NPV:

- should use average consumption of new customers, however, ATCO disagrees with EMCA's rate of 12 GJ for the average consumption of B3 customers and proposes a revised average rate of 13.58 GJ for 2014;
- should adopt the prices that will actually apply during the period;
- that has a positive NPV over 30 years is appropriate given the economic life of the primary assets utilised to achieve that value can be up to 80 years and on average 38 years; and
- has been updated to reflect the new connection forecasts by ECS.

580. ATCO submits that the proposed greenfield capital investment for the fourth access arrangement period is based on a sound demand forecast, a targeted profile of greenfield locations and completion schedule, and a competitive unit rate cost.

581. ATCO submits that the proposed demand related capital investment for the Two Rocks and Peel spur line have been conservatively allocated based on a proportion of the total spur line expenditure that will return a neutral NPV (the remaining proportion is allocated to sustaining capital expenditure).

582. ATCO submits that the reinforcement projects are required so ATCO can comply with its Licence obligation to offer to connect brownfield customers that are within 20 metres of an existing gas main. ATCO does not accept the Authority's recommendation that reinforcements to the Capel to Busselton pipeline should be assessed under incremental revenue rule 79(2)(b) rather than the service integrity test rule 79(2)(c) of the NGR.

583. ATCO submits that the Draft Decision does not provide an explanation for the variance between ATCO's proposed $10.1 million for brownfield and the approved $9.0 million.

---

[229] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014 p. 138.

Structures and Equipment Capital Expenditure

584. ATCO does not agree with EMCa's view that growth is overstated. ATCO has not accepted the Authority's required amendment to defer investment in the Busselton Depot until the fifth access arrangement period. ATCO submits that forecast population growth in the region will lead to greater traffic congestion, which may prevent ATCO from attending the site within 1 hour as per its obligations.

585. ATCO has increased its plant and equipment related expenditure by $1.5 million for deferred fleet from the third access arrangement period and new equipment identified as part of supporting the Safety Case revision process. ATCO has removed expenditure associated with property plant and equipment directly relating to the Albany and Kalgoorlie unregulated networks.

586. ATCO has accepted the Authority's required amendment to remove $0.50 million for the Osborne Park Blue Flame Kitchen.

IT Capital Expenditure

587. ATCO has partially implemented the Authority's required amendment with a reduction of $2.2 million for IT capital expenditure. ATCO's $2.2 million reduction includes the following:[230]

- $0.3 million for a SAP project spending more than anticipated as a result of the transition from I-Tek to WIPRO.
- ($0.4 million) expenditure for unspecified future regulatory requirements for the GIS upgrade project in network operations.
- ($0.6 million) expenditure for unspecified future regulatory requirements for the commercial operations continuous improvements project.
- ($0.4 million) further expenditure in commercial operations.
- ($0.9 million) expenditure is no longer required for the cost of developing business cases for new technology under business support improvements because of the new arrangement with WIPRO.
- ($0.1 million) expenditure for business support upgrades.
- ($0.1 million) expenditure for IT hardware and Software expenditure.

Overheads

588. ATCO has not accepted the Authority's required amendment for a reduction to the percentage overhead allocation. ATCO's response states that ATCO's overhead costs represent undistributed costs which are not directly charged to discrete capital projects.

589. ATCO states that there is no reason to adjust the allocated percentage unless the underlying costs are inefficient or the allocation methodology is unreasonable. In determining the appropriate level of overheads that are efficient or in line with industry

---

230 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014 Table 8-29 p. 165.

practice the Authority must consider the costs themselves that are being allocated to capital expenditure and the basis upon which the allocation occurs. The resulting percentage of total capital expenditure is merely an output of this process.[231]

590. ATCO also states that a change in the allocation percentage simply results in a transfer of these costs to the operating expenditure category. The allocation method has been consistent over the third access arrangement period and will continue into the fourth access arrangement period. Any change to the current allocation method would require a restatement of the capital and operating expenditure forecast for the fourth access arrangement period.

Allocation of PPE and IT to non-regulated and non-reference services

591. ATCO has changed its approach to allocating indirect capital expenditure to the non-regulated and non-reference service network as required by paragraph 359 of the Draft Decision.

592. ATCO excluded $1.5 million PPE for its non-regulated network in its initial proposal. ATCO's revised approach is to identify the cost centres providing both reference and non-reference services and allocate the correct proportion of PPE costs to the reference services and non-reference services. This new approach has resulted in the exclusion of $2.4 million PPE.

593. ATCO excluded $0.5 million IT for its non-regulated network in its initial proposal. ATCO's revised approach is to allocate costs according to the number of users or IT devices related to performing services in the unregulated networks. This new approach has resulted in the exclusion of $0.7 million IT.

Labour cost escalation

594. ATCO has not accepted the Authority's required amendment to reduce capital expenditure by $1.80 million for labour cost escalation.

595. ATCO has continued to propose a two per cent real labour cost escalation (above CPI), as per its initial proposal.

Equity raising costs

596. ATCO will implement the modelling of equity raising costs in line with the Authority's Rate of Return Guidelines. However, ATCO states that the methodology described in the Draft Decision is not the same as in the Rate of Return Guidelines.

597. ATCO proposes to estimate equity raising costs based on the following:

- retained earnings of 30 per cent of after-tax profits will be available to increase equity at zero cost;
- dividends will be assumed to be paid at the benchmark payout ratio of 70 per cent of after-tax profits, consistent with the payout ratio used in the estimation of gamma;

[231] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014 p. 169.

- 25 per cent of dividends paid out will be treated as being reinvested through dividend reinvestment plans, with an equity raising cost allowance of 1 per cent; and
- any further required equity is raised at the Seasoned Equity Offering cost of 3 per cent.

Actual capital expenditure for the 2014 calendar year

598. ATCO provided its actual capital expenditure for the 2014 calendar year in externally reviewed regulatory financial statements for 2014 on 23 February 2015.

Assessment of Depreciation

599. ATCO did not accept the Authority's required amendment to adopt the CCA approach for depreciation. ATCO remains of the view that the HCA approach is the preferred depreciation approach and has resubmitted its transition method so that the change in methodology occurs over more than one access arrangement period.

600. ATCO's proposed depreciation schedule for the fourth access arrangement period will be determined by applying:

- straight-line depreciation to the CCA value of the opening capital base in any year of the period and subtracting an amount to remove the double counting of inflation; and
- straight-line depreciation to the HCA value of all capital additions to occur during the fourth access arrangement period (from 1 July 2014).

601. ATCO's proposed depreciation schedule is discussed further in the Depreciation section in paragraphs 1968 to 2091.

602. ATCO's revised proposed values for depreciation allowances for the fourth access arrangement period by asset class are shown in Table 57.

Table 57 ATCO's Revised Proposed Forecast Transition Depreciation (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
High pressure mains - steel	(1.23)	(2.42)	(2.24)	(1.65)	(1.09)	(0.62)	(9.23)
High pressure mains - PE	(0.51)	(0.06)	(0.03)	(0.03)	(0.03)	0.03	(0.64)
Medium pressure mains	(0.07)	(0.03)	0.11	0.26	0.41	0.58	1.26
Medium/low pressure mains	0.65	1.68	2.38	3.09	3.79	4.52	16.09
Low pressure mains	0.38	0.79	0.84	0.90	0.96	1.02	4.89
Regulators	0.21	0.46	0.58	0.65	0.72	0.79	3.40
Secondary gate stations	0.05	0.11	0.12	0.15	0.38	0.51	1.32
Buildings	-	0.10	0.37	0.40	0.43	0.44	1.76
Meter and services pipes	3.39	7.81	9.76	11.68	13.68	15.79	62.11
Equipment and vehicles	0.21	0.47	0.64	0.59	0.72	0.85	3.48
Vehicles	0.96	2.60	2.81	2.79	2.57	2.70	14.43
Information technology	0.84	3.94	5.28	6.21	6.57	6.50	29.34
Full retail contestability	-	-	-	-	-	-	-
Land	(0.05)	(0.09)	(0.10)	(0.10)	(0.10)	(0.10)	(0.53)
ATCO's Forecast Transition Depreciation	**4.84**	**15.35**	**20.54**	**24.94**	**29**	**33.01**	**127.68**

Source: ATCO Gas Australia, Tariff Model, November 2014.

603. ATCO's proposed transition depreciation schedule for the fourth access arrangement period is shown in Table 58.

Table 58 ATCO's Proposed Revised Forecast Transition Depreciation Calculation: 2014 to 2019

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
Forecast depreciation on opening capital base 1 July 2014	4.84	12.72	13.52	13.65	13.43	12.72	70.89
Straight line depreciation on CCA capital base	17.36	37.80	38.28	38.07	37.51	36.47	205.49
Less: Inflationary Gain	(12.52)	(25.08)	(24.76)	(24.42)	(24.08)	(23.74)	(134.60)
Forecast depreciation on forecast capital expenditure (straight line depreciation on HCA capital)	-	2.63	7.02	11.29	15.57	20.29	56.79
ATCO's Proposed Depreciation of Projected Capital Base	**4.84**	**15.35**	**20.54**	**24.94**	**29.00**	**33.01**	**127.68**

Source: ATCO Gas Australia, Tariff Model, November 2014.

Assessment of General Method Applied

604. ATCO has calculated the capital base using a roll-forward method, applied in a manner consistent with the method contemplated in the NGR. As discussed in paragraphs 540 to 542, ATCO accepted the Authority's changes to CPI escalation with a proposed variation.

605. Table 59 shows ATCO's proposed revised projected capital base for the fourth access arrangement period.

Table 59 ATCO's Proposed Revised Projected Capital Base (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019
Opening Capital Base (AA4)	**1,007.94**	**1,046.80**	**1,140.29**	**1,241.59**	**1,342.88**	**1,437.11**
Plus: Capital Expenditure	43.70	108.84	121.84	126.22	123.24	118.64
Less: Depreciation	(4.84)	(15.35)	(20.54)	(24.94)	(29.00)	(33.01)
Pre AA4 CCA Depreciation	(17.36)	(37.80)	(38.28)	(38.07)	(37.51)	(36.47)
Pre AA4 Inflation on opening capital base	12.52	25.08	24.76	24.42	24.08	23.74
Post AA3 HCA Depreciation	-	(2.63)	(7.02)	(11.29)	(15.57)	(20.29)
Closing Capital Base (AA4)	**1,046.80**	**1,140.29**	**1,241.59**	**1,342.88**	**1,437.11**	**1,522.74**

Source: ERA, GDS Tariff Model, October 2014.

Submissions

606. The following submissions addressed capital expenditure in response to the Authority's Draft Decision:

- Alcock Brown-Neaves Group
- Alinta Energy
- Cossill and Webley
- Danmar Homes
- DBNGP (WA) Transmission Pty Ltd
- EnergySafety
- Energy Networks Association
- Highbury Homes
- Housing Industry Association
- Kleenheat
- Master Builders Association of WA
- Master Plumbers and Gasfitters Australia
- Optimal Group Australia
- Property Council of Australia
- SolCogen
- Peet
- Property Council of Australia
- Rheem Australia
- Rinnai Australia
- The Chamber of Minerals and Energy of Western Australia
- Urban Development Institute of Australia (Western Australia) Inc.(**UDIA**)
- Western Australian Local Government Association (**WALGA**)

607. The submissions from housing development companies and gas appliance manufacturers largely focused on the possible impact of limiting ATCO's proposed capital expenditure for greenfield developments. Submissions stated that:

- not allowing capital expenditure may mean that it will never be economic for these homes to switch to gas;
- ATCO may have to seek capital contributions from home builders, which would be passed on to home buyers and reduce affordability of new homes;
- equity issues may arise where current generations of homebuyers who want gas reticulation will have to pay upfront costs that previous generations were not required to pay; and
- only having an option of electric/solar appliances may reduce the desirability of greenfield developments for new home builders.

608. Kleenheat raised concerns that greenfield capital expenditure would result in higher tariffs for existing customers, which may have a detrimental effect on future network growth. Kleenheat also raised concerns that ATCO's proposed increase in capital base is disproportionate to forecast network growth. WALGA noted that generally it supported the use of upfront charges for greenfield costs, as this would influence developers to select the most cost-effective areas for development.

609. Submissions raised concerns as to the energy efficiency of limiting natural gas reticulation to new greenfield developments and the impact that this may have on the environment. Increased cost of reticulation for natural gas may result in limited choices for new home owners, and may impede the uptake of environmentally friendly appliances.

610. Submissions addressed safety concerns and the potential impact on other energy sources. EnergySafety expressed concerns regarding safety issues associated with the possible increased uptake of Liquefied Petroleum Gas (LPG) in population dense areas if capital expenditure to greenfield developments is limited to the extent outlined in the Draft Decision. Cossill & Webley, UDIA and Peet Limited submitted that making natural gas infrastructure available for greenfield developments will assist with the reduction in peak load for Western Power. Optimal Gas Australia and ESAA submitted that impeding access to natural gas opposes the National Gas Objective. Optimal Gas Australia considered that it also contravenes the 2010 decision by the Australian Government to phase out inefficient hot water systems. SolCogen submitted that the proposed cap on capital expenditure may prove an impediment in providing new home builders with the opportunity to invest in cogenerated power for heating and electricity generation, which contradicts the ERA's objective of promoting economic efficiency.

611. Submissions addressed security of supply and risk management issues. EnergySafety considered that the Draft Decision incorrectly applies the risk model of AS/NZS2885. EnergySafety also noted that if reinforcement projects are not commenced during the fourth access arrangement period then ATCO will be in breach of the *Gas Standards Act 1972* and AS/NZS 4645. Kleenheat concurred with the Authority's appraisal of ATCO's risk profile. However, Kleenheat and Alinta suggested that the Authority should work closely with EnergySafety. Alinta agreed with EnergySafety that societal costs should be considered in a cost-benefit analysis. DBP submitted that diminished expenditure on maintenance for the GDS will have direct consequences for the Dampier to Bunbury Natural Gas Pipeline (**DBNGP**).

612. DBP and Energy Networks Australia (ENA) consider that ATCO's proposed labour cost escalation rate of 2 per cent above CPI for the period of the fourth access arrangement meets the requirements of rule 91 of the NGR.

613. Kleenheat Gas expressed concern with the short to medium term impact of the proposed transition from the CCA approach to depreciation to the HCA approach. Kleenheat Gas states that higher tariffs in the short term will create a barrier to entry for some customers connecting to natural gas and that this is counterintuitive to promoting efficient growth in the natural gas market.

Considerations of the Authority

614. The Authority has considered whether ATCO's proposed revised value of the projected capital base for the fourth access arrangement period meets the requirements of the NGR. These considerations include:

- determination of the projected capital base, taking into account an assessment of ATCO's:
  - proposed forecast conforming capital expenditure in the fourth access arrangement period against the requirements of rule 79 of the NGR;
  - proposed depreciation; and
- assessment of the general method applied in calculating the projected capital base.

Assessment of Capital Expenditure

615. ATCO initially proposed to add $606.92 million for conforming capital expenditure in the fourth access arrangement period. In the Draft Decision, the Authority decided that $286.44 million of ATCO's proposed conforming capital expenditure complied with the criteria set out in rule 79 of the NGR. In its response to the Draft Decision ATCO proposed an amended forecast capital expenditure of $592.22 million. This expenditure comprised of the following:

- $291.76 million sustaining capital expenditure
- $233.90 million growth capital expenditure
- $40.23 million structures and equipment capital expenditure
- $26.34 million IT capital expenditure

616. The Authority has reviewed ATCO's response to the Draft Decision under the following cost drivers:

- Sustaining capital expenditure
- Growth capital expenditure
- Structures and equipment capital expenditure
- IT capital expenditure

617. The Authority has also reviewed ATCO's response to reductions in overheads and labour cost escalation in its forecast capital expenditure.

618. The Authority appointed its technical advisor EMCa to assess parts of ATCO's response to the Draft Decision.

Sustaining Capital Expenditure

619. ATCO initially proposed to spend $311.30 million on sustaining capital expenditure:

- $133.60 million on asset performance and safety; and
- $177.69 million on asset replacement.[232]

620. In the Draft Decision the Authority required ATCO to reduce sustaining capital expenditure by $97.39 million. The Authority considered that the following projects did not conform with rule 79 of the NGR:

- Metallic mains replacement ($11.05 million)

[232] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Section 8.5.1, pp. 169-181.

- Interdependency projects ($47.29 million)
- Peel spur line ($20.93 million)
- Two Rocks spur line ($18.13 million)

621. ATCO proposed an amended forecast sustaining capital expenditure of $291.76 million for the fourth access arrangement period.

Asset replacement

622. In the Draft Decision the Authority determined that ATCO accelerated the replacement of unprotected metallic mains projects to meet the end of the access arrangement period. The Authority decided that $11 million for the replacement of unprotected metallic mains in 2018 and 2019 (i.e. $2.8 million in 2018 and $8.2 million in 2019) did not satisfy the prudent service provider test in rule 79(1)(a) of the NGR and should be deferred to the fifth access arrangement period.

623. ATCO has accepted the Authority's view that some replacement of unprotected metallic mains expenditure could be deferred. ATCO proposed to defer $3.4 million of the Authority's required $11.0 million from the fourth access arrangement period to the fifth access arrangement period. ATCO stated that unprotected metallic mains are replaced as part of the broader metallic mains replacement program, which covers a bundle of asset types.[233] ATCO states that all three metallic mains projects are delivered using the same resource base; therefore it is efficient to keep the resources engaged in delivering approximately the same annual volumes (km) over the period. ATCO assessed the impact of reducing the asset replacement program in 2018 and 2019 and considers 11 km of unprotected metallic mains can be deferred for replacement in the fifth access arrangement period.

624. EMCa has assessed ATCO's proposal to replace a steady 40 km for the metallic mains replacement program per annum from 2016 after ramping up from an annual rate of 36 km in 2014.[234] The Authority has reviewed EMCa's assessment and is satisfied that ATCO is capable of undertaking this level of replacement volume. The Authority is satisfied that ATCO's forecast expenditure on replacement of end-of-life metallic mains is consistent with the best estimate arrived at on a reasonable basis in accordance with rule 74(2) of the NGR.

625. ATCO has reduced its forecast for asset replacement ($3.2 million) as it has removed the high pressure HP017 pipeline project in Bibra Lake. Following on-site technical investigations ATCO has determined that the high pressure HP017 pipeline meets operating specifications under AS4645. ATCO has also included a pipeline replacement project ($0.4 million) as a result of a deferral from the third access arrangement period.[235]

---

233 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Table 8-7, p. 126.

234 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Table 8-8, p. 126.

235 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 139.

626. The Authority accepts that ATCO's revised asset replacement values satisfy rule 79(2)(c) of the NGR.

Asset Performance and Safety

627. In the Draft Decision the Authority was not satisfied that the manner in which ATCO applied the "as low as reasonably practicable test" (**ALARP**) test when assessing the need for the security of supply related portion of asset performance and safety ($86.34 million) was consistent with good industry practice as required by rule 79(1)(a) of the NGR. Therefore, in the absence of a cost benefit assessment the Authority did not consider that the following projects were justified under rule 79(2) of the NGR:

- Interdependency projects ($47.29 million)
- Two Rocks spur line ($18.13 million)
- Peel spur line ($20.93 million)

628. The Authority accepted EMCa's concerns with the manner in which ATCO applied ALARP. EMCa was concerned with the minimum threshold ATCO assumed for catastrophic security of supply-related events and, the fact that it has not undertaken a cost benefit assessment for any of the identified ALARP projects. EMCa considered that ATCO's risk threshold of 25,000 customers for loss of supply to be classified as 'catastrophic' is not prescribed in AS/NZS4645 and AS2885, nor mandated by EnergySafety, and is low by industry standards.

629. ATCO submits that its Safety Case has been developed to reduce the risk of operating the network to ALARP and that it's Safety Case complies with AS/NZ 4645.1.[236] ATCO considers that its risk tolerance criteria for loss of supply were designed to meet the AS/NZ 4645.1 and AS2885.1 standards criteria of 'long term', 'prolonged' and 'short-term'. ATCO considers that its approach to nominate a specific number of impacted customers provides greater certainty regarding the application of thresholds. ATCO states that an event that interrupts supply to 25,000 customers is likely to result in customers being off supply for an average of 4 weeks (although some may be off supply for days while others may be off supply for months), which is consistent with the standard requirement of long term.

630. ATCO considers that its threshold is comparable to other gas network owners and operators in Australia and is therefore consistent with good industry practice. ATCO states that although other gas distribution businesses use alternative means of expressing the threshold, ATCO's four week duration interruption to 25,000 customers is similar to that of Envestra, Allgas and Multinet's thresholds.[237] ATCO engaged Zincara, to provide technical advice on capital and operating costs in relation to the Draft Decision. Zincara, considered that ATCO's risk management practice was consistent with that of a prudent service provider acting efficiently in

---

236 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 4.

237 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 130.

accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.[238]

631. ATCO states that its forecast sustaining expenditure is necessary to enable it to comply with the Safety Case, which was accepted by EnergySafety in 2011.[239] ATCO considers that if the Authority excludes the security of supply related projects in the fourth access arrangement period, the Authority would place ATCO in a position of non-compliance with its principle governing standard AS/NZS 4645 and with its Safety Case. EnergySafety has advised that if ATCO conformed to the Draft Decision it would be in breach of *Gas Standards Act 1972*. ATCO urges the Authority to seek advice from EnergySafety to ensure alignment with the safety regulator. ATCO submits that EnergySafety has advised that the loss of supply risk threshold of 25,000 customers does constitute a high risk and that action is required to reduce the risk as mandated by AS/NZS 4645 without any requirement to conduct a cost benefit analysis.[240]

632. ATCO has identified six risk treatment actions (two 'spur line' projects and four 'interdependency projects'), which it considers necessary to treat the risk of the supply interruption to >25,000 customers from one of several possible failure events.[241] ATCO proposed these risk treatment actions as it ranked the risks as '*high*' based on its interpretation of incident severity and frequency in accordance with AS/NZ 4645.

633. ATCO's proposed security of supply projects all reduce the risk ranking to '*negligible*'. The two spur line projects are designed by ATCO to also provide for forecast growth in the Two Rocks and Peel regions. ATCO considers that its approach to categorising expenditure on shared objective projects remains appropriate and complies with rule 79(2)(d) of the NGR.

634. The Authority engaged its technical consultant EMCa to assess ATCO's application of its risk assessment framework, ATCO's proposed security of supply expenditure and comments from ATCO's technical consultant Zincara, and EnergySafety.

635. EMCa's assessment concludes that the risks on which ATCO seeks to justify the six security of supply projects should be classified as '*Intermediate'* rather than '*high*' as determined by ATCO.[242] EMCa considers that ATCO has been inconsistent with the guidelines in AS 4645. EMCa states that ATCO has principally misapplied the framework by failing to apply realistic probabilities to the consequences that it is

---

238 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System* Appendix 6.3 Review of ATCO Gas Australia Capital and Operating Expenditure, Zincara, November 2014, Section 3.1.3.

239 WAGN Gas Distribution System, *Safety Case*, July 2011.

240 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System Appendix 8.1 Correspondence from Energy Safety*, November 2014.

241 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Tables 8-12 and 8-13, pp. 137-138.

242 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 11.

considering and has, instead, applied the probabilities of events that may lead to such consequences.

636. EMCa does not accept EnergySafety's assumption that the standards-based assessment of the risk of having a single pipeline supply a region of more than 25,000 customers is '*high*' from a safety perspective.

637. One of ATCO's fundamental positions is that its expenditure is required to comply with its own Safety Case, which is in turn designed to ensure it complies with, among other things, AS 4645. Thus, EMCa has applied the requirements of AS 4645 as a foundation for the assessment of ATCO's proposed security of supply related sustaining capital expenditure.[243]

638. AS 4645 Appendix C, part C1, provides the following guidance for the evaluation of a failure event;

> 'where a failure event may have several outcomes, the consequence and frequency of each outcome shall be considered. Full evaluation of every outcome may not be necessary, but sufficient outcomes shall be evaluated to identify the outcome with the highest risk ranking.'

639. EMCa considers that this guidance links the failure event to the outcome. Specifically, it is the consequence and frequency of the outcome (e.g. loss of supply to customers for an extended period), rather than the event (e.g. pipeline failure) that is the key consideration. In addition, the focus must be on the outcome with the highest risk ranking.

640. The sequence of risk assessment in AS 4645 Appendix C is:[244]

- Consequence Analysis – in which a severity class is assigned to each failure event. Consequences include the potential for:
  - human injury or fatality;
  - interruption to the continuity of supply with economic impact; and/or
  - environmental damage.
- Frequency Analysis – in which the frequency of occurrence of each threat is assigned for each location where risk estimation is required. The contribution of operations and maintenance practices and procedures to the occurrence or prevention of failure events are to be considered in assigning the frequency of occurrence.
- Risk Ranking – in which the results of the frequency analysis and consequence analysis are combined. Risks determined to be '*low*' or '*negligible*', or which are determined to be '*intermediate*' and ALARP are considered to be acceptable risks.
- Risk Treatment – actions to reduce risks are to be taken based on risk rank.

641. ATCO has identified the potential for interruption to the continuity of supply (with economic impact) as the highest risk to be treated. EnergySafety has identified that

---

243 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 40.

244 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 40.

the interruption to the continuity of supply of the magnitude considered by ATCO also poses a risk to people's safety and has provided advice on this basis.

642. As will be shown, EMCa has stepped through the risk assessment sequence, considering both the continuity of supply and the human injury/fatality dimension in each case. In addition, EMCa compares both ATCO and EnergySafety's interpretation of AS 4645 to its own and considers the application of ATCO's approach.

Consequence Analysis – Interruption to the Continuity of Supply

643. ATCO's consequence analysis identifies six areas of the network that ATCO rates as being exposed to either '*catastrophic*' or '*major*' severity outcomes. This analysis is based on events that may potentially result in long term interruption of gas supply to customers.[245]

644. ATCO defines '*catastrophic*' severity as the '*interruption of supply affecting more than 25,000 customers*', whereas AS 4645 defines it as a '*long term interruption of supply*'. AS 4645 does not provide guidance as to the interpretation of '*long term*'. EMCa considers that ATCO draws the link between its definition and AS 4645 by reference to its estimate that loss of supply to 25,000 customers will take an average of four weeks per customer to restore (i.e. loss of supply of 100,000 customer-weeks in aggregate).

645. ATCO defines the 'major' severity class as the 'interruption or restriction of supply affecting more than 5,000 customers', whereas AS 4645 defines it as 'prolonged interruption; long term restriction of supply'.[246] ATCO submits that the loss of supply to approximately 10,000 customers in Port Pirie and Wyhalla in South Australia is an example of such an event.

646. In response to the finding in EMCa's 2014 Report, ATCO asserted that the risk definitions applied by other gas companies such as Multinet and Envestra are similar to its own.[247] Zincara, ATCO's technical consultant, states that based on its experience it considers that ATCO's estimate of the length of time for long term interruption is realistic. Zincara does not provide any examples but states that the author of its report, Mr Ed Teoh, has been emergency manager for a number of gas incidents including the Longford Gas Emergency in Victoria.

647. EMCa notes that the risk thresholds that ATCO has adopted have not been mandated by EnergySafety, however, it has accepted ATCO's 2011 Safety Case in which these definitions are nominated. EMCa states that it is unaware of a distribution network failure event (as nominated by ATCO) in Australia leading to the loss of supply to more than 25,000 customers, or of the loss of supply of this magnitude that has taken more than two weeks to restore.[248] EMCa therefore concludes that whilst the

---

245 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 41.

246 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 41.

247 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 42.

248 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 42.

consequence of the event (the loss of supply to more than 25,000 customers) is theoretically possible, it is not aware of such consequences having occurred on a distribution network in Australia.[249]

648. EMCa acknowledges Zincara's expertise in assessing the restoration times as a realistic likelihood and its view that ATCO's thresholds are commensurate with industry standards. EMCa states that in cases in which there is risk of interruption to continuity of supply to 25,000 customers or more, it has conservatively applied a consequence rating of 'Catastrophic'.

Consequence Analysis – Human Injury or Fatality

649. EnergySafety's view is that loss of supply to 25,000 customers can lead to a '*catastrophic*' safety outcome and according to the AS 4645 definition, this equates to multiple fatalities occurring.[250]

650. EMCa acknowledges that there is a material risk to the safety of workers during the restoration process following a loss of supply. In this regard, EMCa considers that the likely safety consequence could be described as '*severe*', which is defined as '*injury or illness requiring hospital treatment*'. In addition, despite EMCa's understanding that this has never happened, it notes that there is at least a possibility of a '*few fatalities, or several people with life-threatening injuries*' which would lead to a more conservative risk consequence ranking of '*major*'. EMCa, however, can find no evidence to support EnergySafety's view that the appropriate safety consequence rating for such a loss of supply is '*catastrophic*'.[251]

Frequency Class – Interruption to the Continuity of Supply

651. In terms of the frequency class of the interruption to the continuity of supply, EMCa concludes that ATCO's definitions are equivalent to AS 4645. In accordance with AS 4645, EMCa considers that the appropriate approach to designating the frequency class of the interruption to the continuity of supply is to consider the likelihood of the assessed consequence actually occurring with the existing risk mitigation controls in place.[252] This is described as not being the same as designating the frequency of the event which may trigger the consequence.

652. In EMCa's assessment, ATCO appears to designate frequency class based on the failure event occurring. ATCO then concludes that the risk of loss of supply from existing spur lines and infrastructure servicing the four areas for which it recommends interdependency projects can be classified as '*remote*'. EMCa highlights that ATCO provides no new statistical information to support its risk frequency assessment.

653. In its correspondence with the Authority, EnergySafety makes no reference to the occurrence of a '*catastrophic*' safety outcome with regards to plastic gas mains or

---

249 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 45.

250 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 43.

251 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 43.

252 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report,* April 2015, p. 44.

steel pipeline failures. According to EMCa, it would appear, therefore, that EnergySafety follows the same precept as ATCO in designating the frequency of occurrence to an event rather than to the consequence of the event.[253]

654. As stated earlier, EMCa concludes that whilst the consequence of the event (loss of supply to more than 25,000 customers) is theoretically possible, it has never occurred on a distribution network in Australia.[254] Based on AS 4645, this equates to a 'hypothetical' frequency class.

Frequency Class and Risk Rating – Human Injury or Fatality

655. EMCa states that it is unaware of any fatalities associated with large scale gas supply restoration projects. EMCa considers that the frequency class for consideration of the impact as a '*major*' consequence is best described as hypothetical.

656. This would lead to the risk being classified as '*low*' under the AS 4645 risk framework. Therefore, ATCO's '*high*' rating under the AS 4645 framework is described as being unfounded.[255]

Risk Ranking and Required Actions – Interruption of the Continuity of Supply

657. As stated earlier, driving each of the six sustain projects ATCO proposed to undertake in the fourth access arrangement period are risk rankings of '*high*' for supply interruption to more than 25,000 customers from one of several possible failure events. In each case, ATCO has recommended risk treatments that result in '*negligible*' residual risk.[256]

658. EMCa considers that ATCO has an obligation under the Safety Case to follow the steps described in Table C4 of AS 4645 for an '*intermediate*' ranked risk as follows:[257]

- repeat the threat identification and risk evaluation process to verify and, where possible, quantify the risk estimation;
- determine the accuracy and uncertainty of the estimation;
- if confirmed as *Intermediate*, if possible modify the threat, the frequency or the consequence to reduce the risk rank to '*low*' or '*negligible*'; and
- where the risk cannot be reduced to '*low*' or '*negligible*' action shall be taken to (a) remove the threats, reduce frequencies and/or reduce severity of consequences to the extent practicable, and (b) demonstrate ALARP.

659. With regards to a '*high*' risk rating, according to AS 4645, the action required is:

---

253 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 44.

254 EMCa, Review of Technical Aspects of the Revised Access Arrangement, addendum report, April 2015, p. 42.

255 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 45.

256 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 46.

257 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 47.

- modify the threat, the frequency or the consequences to ensure that the risk is reduced to *intermediate* of lower; and/or
- for a gas distribution network in operation, the risk must be reduced as soon as possible, typically within a timescale of not more than a few weeks.

660. EMCa rejects EnergySafety's conclusion that it relied upon AS 2885 in its assessment of ATCO's proposed fourth access arrangement sustaining capital expenditure projects. EMCa states that it only referred to that standard to assist in interpreting the guidelines in Appendix C of AS 4645. As AS 2885 applies to high pressure gas transmission pipelines and risk treatments can often incur significant costs EMCa states that ultimately, ATCO must comply with AS 4645, not AS 2885.[258]

661. EMCa also notes that ATCO has not provided Formal Safety Assessments (**FSA**s) as part of its Safety Case relevant to the Two Rocks spur line, Peel spur line and interdependency projects. AS 4645 and the prudent service provider test in rule 79(1)(a) of the NGR requires ATCO to diligently consider all options for reducing the risk ranking to '*intermediate*' or lower, applying a cost-benefit analysis test to support the risk assessment and treatment analysis.[259]

662. As EMCa considers that the risk ratings for the failure modes nominated by ATCO and EnergySafety are '*intermediate*' and not '*high*', EMCa considers that ATCO is required to demonstrate that the proposed expenditure satisfies the ALARP test.

Conclusion

663. The Authority has reviewed EMCa's assessment of ATCO's application of its risk assessment framework, the link between AS 4645, the Gas Standards Act and the NGR and comments from Zincara and EnergySafety.

664. The Authority accepts EMCa's conclusion that the risks on which ATCO seeks to justify the six security of supply projects should be classified as '*Intermediate*' rather than '*high*' as determined by ATCO. The Authority is satisfied with EMCa's approach to step through each sequence of the risk assessment in AS 4645 considering both the continuity of supply and the human injury/fatality dimension in each case and agrees with EMCa's interpretation of AS 4645.

665. The Authority accepts EMCa's view that the severity class for the interruption to the continuity of supply is '*Catastrophic*' whilst the rating for human injury or fatality is 'Major'.

666. The Authority accepts EMCa's assessment that the frequency class for the interruption to the continuity of supply is 'Hypothetical' rather than 'remote'. The Authority considers that EMCa's approach is the correct approach when assessing the frequency class under AS 4645.

667. The Authority provided ATCO the opportunity to review EMCa's assessment report prior to this Final Decision. The Authority considers that neither ATCO nor Zincara provide any new evidence that support a finding that a rupture or other event sufficient

---

258 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 48.

259 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 48.

to cause loss of supply to over 25,000 customers for over four weeks has occurred on a similar gas distribution network.

668. The Authority accepts EMCa's consideration that the frequency class for a human injury or fatality, 'major' consequence is best described as hypothetical.

669. Given that the Authority has decided that the severity class for the interruption to the continuity of supply is 'Catastrophic' and the frequency class is '*Hypothetical*' the Authority has determined that the risk rank is '*Intermediate*' and not '*high*' as determined by ATCO. Similarly, for human injury or fatality, the Authority has decided that the severity class is 'Major' and the frequency class is 'Hypothetical'. Therefore, the Authority has determined that the risk rank is '*low*' and not '*High*' as determined by EnergySafety.

670. The Authority has assessed ATCO's revised proposed sustaining capital expenditure for the two 'spur line' projects and four 'interdependency projects' below, taking its decision on risk rankings above into account.

Two Rocks Spur Line

671. In its revised proposal, ATCO identified two loss of supply risks to customers in the 'Northern Network' that it proposed to treat by constructing a new steel mains spur line from the DBNGP at Muchea-Bore Road gate station.

Loss of Supply to Northern Networks

672. ATCO identified 60,000 customers at risk of long term loss of supply due to the failure of either a pressure reduction station at Neaves Road or the high pressure pipeline itself. ATCO concluded that the severity class is '*catastrophic*' as the total customers at risk exceeds 25,000 customers, and the frequency class to be 'remote', however, ATCO does not provide the details of its risk frequency analysis to support this frequency rating.

673. ATCO presents four options for loss of supply to the Northern Networks. However ATCO presents only one stand-alone option for addressing the security of supply risk, which is the construction of a 44 km high pressure DN200 steel pipeline from the DBNGP at Muchea at cost of $39.9 million. With this risk treatment action ATCO concluded that the risk would be reduced to '*negligible*'.[260] ATCO's preferred option is to connect to the transmission supply and construct a 44km, 300mm steel pipeline with two pressure reduction stations, with a further 5km 200mm steel reinforcement in the fifth access arrangement period. This option is to provide security of supply to existing and new customers in the Northern Network and capacity for new growth customers.

674. In EMCa's assessment of the loss of supply to Northern Networks, for reasons outlined earlier, the frequency risk for loss of supply to 60,000 customers is described as more realistically '*hypothetical'* rather than ATCO's assessment of '*remote*'. This leads EMCa to conclude that the risk ranking for the designated failure scenarios is '*intermediate*'.

[260] EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 50.

675. EMCa considers that there are a number of other pipeline options ATCO could have considered for mitigating the supply risk, such as a new shorter pipeline from Bullsbrook - GS005 to the Southern nominated interconnection point at half the length and half the cost of the proposed option. EMCa therefore concludes that:

- the proposed expenditure is not required for ATCO to comply with rule 79(2)(c)(iii) of the NGR; and
- the expenditure that ATCO has proposed to reduce its considered security of supply risk does not satisfy rule 79(2)(c)(i) of the NGR.

Loss of Supply to Two Rocks

676. ATCO identifies that between 20,000 and 22,000 customers in the Two Rocks area will be at risk in the future. EMCa is unable to verify ATCO's numbers but accepts that for a single point failure on the Bullsbrook/Neaves Road spur line, the level of interconnection further south would not maintain safe pressures within the area without an increasing amount of load shedding if the load continues to grow in the fourth access arrangement period.

677. Assuming that 80,000 customers are at risk of loss of supply for failure of either the existing Neaves Road spur line or the existing pressure reduction station at the Bullsbrook gate station, EMCa considers that this constitutes a '*major*' consequence and not a '*catastrophic*' consequence as determined by ATCO.[261] This is because ATCO's 25,000 customer risk threshold is not forecast to be exceeded within the fourth access arrangement period.

678. For reasons outlined earlier, EMCa considers that the frequency risk for loss of supply for 80,000 customers is hypothetical rather than 'remote'. Thus, the risk ranking for the designated failure scenarios is '*low*' rather than '*high*'. On this basis, EMCa considers that ATCO has an obligation under its Safety Case (or AS 4645) to do no more than to '*determine the management plan for the threat to prevent occurrence and to monitor changes which could affect the classification*'.[262]

679. The Authority accepts EMCa's conclusion that the risk ranking for the 'Northern Networks' is '*intermediate*' and not '*high*'. The Authority shares EMCa's view that for intermediate risks AS 4645 and the prudent service provider test in rule 79(1)(a) requires ATCO to diligently consider all options for reducing the risk ranking to Intermediate or lower, applying a cost-benefit analysis test to determine if an Intermediate ranking is ALARP.

680. As the Authority accepts EMCa's recommendations that the risk ranking for the 'Northern Networks' and 'Two Rocks' is '*intermediate*' and not '*high*', the Authority considers that:

- the expenditure is not required for ATCO to comply with rule 79(2)(c)(iii) of the NGR; and
- the expenditure that ATCO has proposed to reduce its considered security of supply risk does not satisfy rule 79(2)(c)(i) of the NGR.

---

261 20,000 customers in Two Rocks and 60,000 for North Metro are at risk of loss of supply if Neave road spur line fails.

262 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 53.

681. As the Authority concludes that the risk ranking for the 'Northern Networks' is '*intermediate*' the Authority considers that ATCO is required to formally reassess its Northern Network security of supply risk in accordance with the required steps prescribed in Table C4 of AS 4645 for an '*intermediate*' ranked risk.

682. The Authority considers that ATCO can submit how it proposes to treat the intermediate risk in the form of a cost pass through which if accepted, would allow ATCO to commence recovery of these costs (through tariffs) during the fourth access arrangement period. The Authority has amended the cost pass through mechanism in the access arrangement to allow for the intermediate risk to be treated. The amended cost pass through mechanism is explained at paragraph 2344.

Peel Spur Line

683. ATCO identifies three events which could cause significant loss of gas supply to customers in the Peel region in the fourth access arrangement period. These scenarios are the loss of supply to the Mandurah, Pinjarra and Greenfields networks. ATCO proposes to treat the risks by constructing a new steel mains spur line from the DBNGP gate station at Fairbridge - GS011.[263]

684. ATCO identifies three options to address the supply risk:[264]

- Option 1 - construct 22.7km of 150mm steel pipeline at a cost of $26.9 million to connect the Pinjarra HP to the Rockingham HP. ATCO assesses that this would reduce the risk ranking to '*negligible*' for both the current customers at risk and for forecast growth.
- Option 2 - construct 2.2 km of reinforcement pipeline and two HP regulators at a cost of $1.0 million to increase the operating pressure of existing PE pipelines to allow for the connection of 13,780 new customers. ATCO assesses that this would not reduce the loss of supply risk to the Mandurah customer base or to the Pinjarra customer base.
- Option 3 – do nothing; which does not address the existing supply risk in Mandurah or Pinjarra and provides only limit growth capacity.

685. ATCO proposes to use option 1 to address the supply risk. This proposal is supported by its technical consultant Zincara and EnergySafety.

686. EMCa states that it is unable to verify whether 35,800 customers are at risk without assessing ATCO's detailed modelling. However, EMCa accepts that for a single point failure on the Readheads Road spur line, they would expect that the level of interconnection further north would not maintain safe pressures within the Peel area without significant load shedding. Therefore, EMCa accepts for the purpose of this assessment that this could be considered to constitute a Catastrophic consequence.

687. For reasons outlined earlier, EMCa considers that the frequency risk for loss of supply to 35,800 customers is '*hypothetical*' rather than ATCO's assessment of '*remote*'.

---

263 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 54.

264 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 55.

Thus, the risk ranking for the designated failure scenarios is '*intermediate*' for the Mandurah network and '*low*' or '*negligible*' for the Pinjarra and Greenfields networks.

688. On this basis, EMCa considers that ATCO has an obligation under its Safety Case to follow the steps prescribed in AS 4645 for '*intermediate*' ranked-risks for the Mandurah customers only.[265]

689. EMCa believes that other options exist to mitigate the supply risk including procedural controls or, if economically justified, a new shorter pipeline option from Fairbridge - GS011 to the nominated interconnection point in the Mandurah distribution system.

690. The Authority accepts EMCa's conclusion that the risk ranking for the 'Peel Region' is '*intermediate*' and not '*high*'. The Authority shares EMCa's view that for intermediate risks AS 4645 and the prudent service provider test in rule 79(1)(a) requires ATCO to diligently consider all options for reducing the risk ranking to Intermediate or lower, applying a cost-benefit analysis test to determine if an Intermediate ranking is ALARP.

691. As the Authority accepts EMCa's recommendations that the risk ranking for the 'Peel Region' is '*intermediate*' and not '*high*', the Authority considers that:

- the proposed expenditure is not required for ATCO to comply with rule 79(2)(c)(iii) of the NGR; and
- the expenditure that ATCO has proposed to reduce its considered security of supply risk does not satisfy rule 79(2)(c)(i) of the NGR.

692. As the Authority concludes that the risk ranking for the 'Peel Region' is '*Intermediate*' the Authority considers that ATCO is required to formally reassess its Peel Region security of supply risk in accordance with the required steps prescribed in Table C4 of AS 4645 for an Intermediate ranked risk.

693. The Authority considers that ATCO can submit how it proposes to treat the intermediate risk in the form of a cost pass through which if accepted, would allow ATCO to commence recovery of these costs (through tariffs) during the fourth access arrangement period. The Authority has amended the cost pass through mechanism in the access arrangement to allow for the intermediate risk to be treated. The amended cost pass through mechanism is explained at paragraph 2344.

Interdependency Projects

694. ATCO has not accepted the Authority's required amendment to remove all interdependency projects from its projected capital base. However, ATCO has reassessed its proposed interdependency projects as part of its annual Asset Management Plan (**AMP**) review and concluded that six projects can be deferred ($13.3 million). ATCO classifies the Hillarys, Canning Vale, Fremantle and Lathlain interdependency projects as '*high*' risk. As a result ATCO's forecast capital expenditure for interdependency projects has been reduced from $47.3 million to $34.0 million.

---

[265] EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 57.

695. ATCO offers three options for addressing its assessed '*high*' risk:[266]

- Option 1: install interdependency infrastructure to reinforce isolated networks with two independent high pressure feeds at a total cost of $34.0m. ATCO assesses that this will reduce the loss of supply risk ranking in each case to '*negligible*'.
- Option 2: Increase maintenance of assets and patrols against third party strikes; no cost is provided for this option. ATCO dismisses this option because the procedural controls would not reduce the likelihood from remote to hypothetical, which is required to reduce the risk from '*high*'.
- Option 3: do nothing, which is rejected by ATCO as it does not mitigate the '*high*' supply risks.

696. ATCO concludes that by not allowing the forecast expenditure for the interdependency projects, it would be in non-compliance with AS 4645.

697. In EMCa's view, considering that the frequency risk for the loss of supply for more than 25,000 people is hypothetical rather than '*remote*', the risk ranking for the designated interdependency project failure scenarios is '*intermediate'* in each case.[267]

698. EMCa believes that other options exist to mitigate the supply risk including the development of incident pre-plans to minimise the consequences and extent of low pressure and/or remote activation of network sector valves to quickly limit the extent of low pressure areas.

699. The Authority accepts EMCa's conclusion that the risk ranking for the 'Interdependency projects' are '*intermediate*' and not '*high*'. The Authority shares EMCa's view that for intermediate risks AS 4645 and the prudent service provider test in rule 79(1)(a) requires ATCO to diligently consider all options for reducing the risk ranking to Intermediate or lower, applying a cost-benefit analysis test to determine if an Intermediate ranking is ALARP.

700. As the Authority accepts EMCa's recommendations that the risk ranking for the 'Interdependency projects' are '*intermediate*' and not '*high*', the Authority considers that:

- the proposed expenditure is not required for ATCO to comply with rule 79(2)(c)(iii) of the NGR; and
- the expenditure that ATCO has proposed to reduce its considered security of supply risk does not satisfy rule 79(2)(c)(i) of the NGR.

701. As the Authority concludes that the risk ranking for the 'Interdependency projects' are '*intermediate*' the Authority considers that ATCO is required to formally reassess its Interdependency projects security of supply risk in accordance with the required steps prescribed in Table C4 of AS 4645 for an intermediate ranked risk.

702. The Authority considers that ATCO can submit how it proposes to treat the intermediate risk in the form of a cost pass through which if accepted, would allow ATCO to commence recovery of these costs (through tariffs) during the fourth access

---

266 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 58.

267 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 59.

arrangement period. The Authority has amended the cost pass through mechanism in the access arrangement to allow for the intermediate risk to be treated. The amended cost pass through mechanism is explained at paragraph 2344.

703. The Authority accepts that $218.69 million sustaining capital expenditure satisfies rule 79(2) of the NGR. The Authority has assessed whether ATCO's forecast sustaining capital expenditure is reasonable and meets the prudency test under rules 74 and 79(1) of the NGR in the overhead and labour cost escalation sections below. Table 60 shows ATCO's forecast sustaining capital expenditure, and the Authority's required reductions for the fourth access arrangement period.

Table 60 Authority's Final Decision Required Reductions for Sustaining Capital Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
ATCO Proposed Revised Sustaining Capital Expenditure Forecast	15.04	37.84	51.09	64.60	61.09	62.09	291.76
Two Rocks spur line reduction	-	-	(5.50)	(12.63)	-	-	(18.13)
Peel spur line reduction	-	-	-	-	(10.47)	(10.46)	(20.93)
Interdependency reduction	-	-	(6.62)	(9.89)	(10.50)	(7.00)	(34.00)
Authority's reductions	-	-	(12.12)	(22.51)	(20.97)	(17.46)	(73.06)
Sustaining Capital Expenditure	**15.04**	**37.84**	**38.97**	**42.09**	**40.12**	**44.64**	**218.69**

Source: ERA, GDS Tariff Model, September 2015.

Growth Capital Expenditure

704. ATCO initially proposed to spend $228.53 million on growth capital expenditure:

- $156.31 million on customer initiated; and
- $72.22 million on demand capital expenditure.

705. In the Draft Decision the Authority required ATCO to reduce Growth capital expenditure by $204.5 million. The Authority considered that the following projects did not conform with rule 79 of the NGR:

- Greenfield customer initiated ($146.24 million)
- Two Rocks spur line ($27.22 million)
- Peel spur line ($5.99 million)
- Baldivis spur line ($5.42 million)
- Capel to Busselton reinforcement ($5.21 million)
- Other reinforcements ($11.55 million)
- Volume related demand capital expenditure and regulating facilities ($2.89 million)

706. ATCO did not accept the Authority's required amendments and instead proposed an amended forecast growth capital expenditure of $233.8 million for the fourth access arrangement period. This increase in expenditure was said to be primarily due to an increase in forecast brownfield activity in the fourth access arrangement, compared to the initial proposal, which has a higher unit cost than greenfield developments.

707. Table 61 shows a breakdown of ATCO's revised proposed growth capital expenditure.

Table 61 ATCO's Proposed Revised Growth Capital Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Greenfield customer Initiated	14.3	28.2	27.0	25.7	24.2	24.4	143.8
Brownfield customer initiated	2.4	3.7	3.2	3.2	3.0	3.0	18.5
Two Rocks spur line	-	-	13.6	13.6	-	-	27.2
Peel Spur line	-	5.4	-	-	6.0	-	11.4
Baldivis spur line	-	-	-	-	5.4	-	5.4
Capel to Busselton spur line	-	-	-	-	-	5.3	5.3
Elizabeth Quay	-	3.6	5.0	-	-	-	8.6
Reinforcements	0.6	1.0	5.7	1.1	2.0	1.1	11.5
Other	0.9	1.4	-	-	-	-	2.3
Capital contributions	(0.2)	-	-	-	-	-	(0.2)
Total	**18.0**	**43.3**	**54.5**	**43.6**	**40.6**	**33.8**	**233.8**

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014 Table 8-25 p. 162.

Incremental revenue test

708. ATCO initially undertook an NPV assessment of its overall growth capital expenditure program of $228.54 million based on the incremental revenue test set out in rule 79(2)(b) of the NGR. ATCO estimated that the NPV of growth capital expenditure would be positive by 2035, which is 20 years.[268]

709. In its Draft Decision, the Authority considered the advice of its technical consultant, EMCa, which carried out a sensitivity analysis on ATCO's NPV assumptions. EMCa's assessment identified two assumptions that it did not consider to represent the best forecast or estimate possible to meet the requirements of rule 74(2) of the NGR. EMCa did not accept ATCO's average annual level of consumption for new customers and ATCO's proposed increase in tariffs of 5.6 per cent per year through to 2019. EMCa found that using an annual level of consumption for new customers and raising prices by inflation render the NPV negative. Therefore, EMCa concluded

[268] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Section 8.2.1, p. 162.

that ATCO's aggregated growth capital expenditure forecast for the fourth access arrangement period failed the incremental revenue test in rule 79(2)(b) of the NGR.[269]

710. In its response to the Draft Decision, ATCO undertook an NPV assessment of its overall growth capital expenditure program to demonstrate compliance with rule 79(2)(b) of the NGR. ATCO has also completed a preliminary NPV analysis for the majority of the individual projects and programs of work identified by the Authority in its Draft Decision that did not comply with the NGR, namely greenfield development, the spur lines and the Capel to Busselton reinforcement. ATCO stated that it has not provided an NPV analysis for brownfields development as ATCO has an obligation to offer to connect customers that are within 20 metres of an existing gas main.[270]

711. ATCO accepted that the overall growth capital expenditure NPV analysis should reflect the average consumption of new customers rather than existing customers. However, ATCO does not agree with the estimates provided by the Authority and proposes a revised average rate of 13.58 GJ for 2014.

712. ATCO maintains the view that it is appropriate when undertaking an assessment under rule 79(2)(b) of the NGR (the incremental revenue test) to adopt the prices that will actually apply during the period. Under ATCO's amended proposal, prices to customers will reduce over the regulatory period by on average 1.8 per cent in each year.

713. ATCO concluded that using these assumptions a positive NPV was achieved after 31 years, which ATCO considered reasonable, and conforms to rule 79(2)(b) of the NGR. ATCO considers that a positive NPV over 31 years is appropriate given the economic life of the primary assets utilised to achieve that value can be up to 80 years and are on average 38 years. ATCO undertook a number of sensitivity tests on the overall growth program of work and concluded that all NPV's turned positive by 35 years.[271]

714. EMCa has reviewed the NPV model that ATCO provided in support of its overall NPV assessment and observes the following matters of concern:[272]

- ATCO's incremental revenue model assumes the considerably-modified tariff structure and tariff levels that ATCO's tariff model has proposed. From 2020 it assumes a 2 per cent per annum decline in those tariffs (in real terms).
- ATCO has reduced assumed consumption by new connections from the value assumed in its initial proposal (17 GJ and declining to 14.9 GJ) to 13.2 GJ, this value still appears high from evidence ATCO has provided.
- ATCO has assumed no further decline in consumption and holds the value of 13.2 GJ through to the end of the analysis period in the model (2073).

---

269 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 109.

270 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, pp. 141-149.

271 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Table 8-19, p. 146.

272 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 28.

- ATCO's model includes continuing customer growth beyond the fourth access arrangement period to 2036 (with associated ongoing capital expenditure). Whilst this could be considered to be a valid inclusion in the test, EMCa found that excluding the additional new customers (from 2020) and associated capital expenditure from 2020 did not materially alter the NPV.
- While the model extends for 60 years (to 2073), no allowance has been made for replacement of the capital investment that is proposed for the next access arrangement period.
- The growth forecast to some extent relies on the advertising campaign and connection incentives program that ATCO proposes. The rules require that 'incremental operating expenditure for the incremental services' is deducted. ATCO has deducted some incremental operating expenditure, including incremental UAFG, but has not deducted any of the business development and marketing expenditure.

715. EMCa used the following assumptions:

- Prevailing tariffs.
- 12.6 GJ consumption per new customer, this being ATCO's weather adjusted average consumption of newly connected B3 customers for the third-year value for the cohort connected in 2011 and 0.1 GJ higher than the second-year value for the cohort connected in 2012.[273]
- Reduced business development and marketing by half in operating expenditure.[274]
- Retained the 2 per cent real-terms decline in revenue from 2020 that ATCO has proposed, though for different reasons:
  - to allow for further decline in consumption: and
  - to allow for disconnections.

716. EMCa concludes that, under more realistic assumptions than ATCO has applied, the overall growth capital expenditure that ATCO proposes does not pass the incremental revenue test.[275]

717. The Authority is also concerned about some of the assumptions used in ATCO's overall aggregate growth NPV. The Authority accepts EMCa's assumptions are more realistic and are consistent with the findings of its demand consultant Deloitte. For example, the Authority considers that EMCa's average new B3 consumption figure is similar to (and even slightly higher than) Deloitte's average 12.3 GJ usage up to 2019.[276] The use of Deloitte's average new B3 consumption would further lower the NPV.

---

273 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, Table 2, p. 29.

274 EMCa base this reduction of around 50% to reduce the proposed amount to around the base level that ATCO has incurred to date.

275 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, Figure 2, p. 30.

276 The average of 12.3 GJ for a new customer was determined by deducting the effect of the 6-star building requirement from the B3 demand per connection before 6-Star effect for the period 2015-2019.

718. The Authority agrees with EMCa's advice that after modifying ATCO's overall growth NPV model to take account of the factors in paragraph 715 the NPV becomes negative. The Authority considers that ATCO's overall aggregate growth capital expenditure NPV does not pass the incremental revenue test set out in rule 79(2)(b) of the NGR.

719. The Authority has also completed a separate assessment of ATCO's proposed NPV analysis for the majority of the individual projects and programs of work identified by the Authority in the Draft Decision, namely greenfield development, the spur lines and the Capel to Busselton reinforcement below.

Customer initiated

720. ATCO proposed revised growth customer initiated capital expenditure was $162.3 million:

- $143.8 million on greenfield customer initiated; and
- $18.5 million on brownfield customer initiated.[277]

Greenfield development

721. In the Draft Decision, the Authority was not satisfied that $146.24 million for greenfield expenditure was justified under rule 79(2)(b) of the NGR. The Authority considered that ATCO did not provide any evidence that the large and relatively generic expansion initiative of greenfield customer initiated capital expenditure satisfies the incremental revenue test.

722. In its response to the Draft Decision, ATCO did not accept the Authority's view that greenfield expenditure was not justified under rule 79(2)(b) of the NGR. ATCO has reduced its greenfield expenditure proposal to $143.8 million to reflect the new connection forecast updated by ECS, and its amended business development and marketing expenditure.[278] [279]

723. ATCO submits that its proposed greenfield capital investment for the fourth access arrangement period is based on;

- a sound forecast of connections and volume;
- a competitive unit rate cost; and
- a targeted profile of locations and schedule.

724. ATCO's revised business development and marketing activity focuses on brownfield development initiatives. ATCO states that 5,583 additional greenfield connections initially forecast as a result of business development and marketing activities are no longer added to the greenfield connection forecast.[280]

---

277 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Table 8-25 p. 162.

278 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 153.

279 ATCO Gas Australia, *ATCO Gas Australia Connection Forecast Economics Consulting Services (ECS),* June 2014.

280 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 153.

725. ATCO considers the greenfield program satisfies the incremental revenue test by returning a positive NPV of $49.3 million. ATCO considers that its forecast average annual greenfield connection rate for the fourth access arrangement period of 16,363 is reasonable when compared against the historical average of 17,491 since 2009. ATCO states that its proposed greenfield investment reflects the Department of Planning's Directions 2031 plan.

726. In its Addendum report, EMCa undertook an assessment of ATCO's NPV test for greenfield customer connections. EMCa highlighted that there are some discrepancies in comparing ATCO's test with the overall growth capital expenditure model. For example, the assumed number of greenfield B3 connections in the greenfield model slightly exceeds the total number of new B3 connections in the overall growth model.[281] In addition, EMCa noted that the greenfield model assumes a continuously declining consumption per new connection as opposed to the less realistic assumption in the overall growth model that there will be no further decline in the consumption of new customers.[282] EMCa concludes that despite the discrepancies it found it considers that ATCO has now provided satisfactory evidence that the greenfields development component of its proposed growth expenditure satisfies an incremental revenue NPV test.

727. The Authority has reviewed ATCO's greenfield NPV test and EMCa's assessment. The Authority notes the following in relation to ATCO's NPV:

- the NPV is based on a project analysis period of 30 years not the asset life of meters and services of 25 years;
- the NPV does not factor in disconnection rates; and
- ATCO has used its revised proposal forecast tariffs and forecast WACC to calculate the respective NPVs.

728. The Authority has completed a sensitivity check on ATCO's greenfield NPV, taking into account the issues raised in paragraph 727 and is satisfied that the NPV is still positive. The Authority changed the project period to 25 years, factored in a disconnection rate and used the prevailing tariff and WACC. Therefore, the Authority is satisfied that ATCO's model, which produces an NPV of $49.3 million in 9 years satisfies the incremental revenue test. In this regard, the Authority accepts that ATCO's proposed $143.8 million for greenfields customer connections complies with rule 79(2)(b) of the NGR.

Brownfield development

729. In the Draft Decision the Authority was satisfied that $10.09 million for brownfield customer initiated capital expenditure was justified under rule 79(2)(c)(iii) of the NGR.[283] The Authority acknowledged that ATCO is required under the terms of its

---

281 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 30.

282 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 31.

283 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 14 October 2014, p. 110.

licence to offer to connect any service that is on the line of gas main with up to 20 metres of service line.

730. In its response to the Draft Decision, ATCO states that it has increased its forecast brownfield expenditure from $10.09 million to $18.5 million, (an increase of $8.41 million).[284] ATCO states that it has attributed the increase to a change in business development and marketing initiatives (increase of 3,580 connections), a revised forecast from ECS (768 connections) and an increase of 94 actual brownfield connections from July to December 2014.[285]

731. ATCO attributes the main increase in brownfield connections to a change in business development and marketing initiatives. ATCO states that it has increased its forecast of brownfield customers by 4,442 from 5,191 to 9,633.[286]

732. The Authority has assessed ATCO's Business Development and Marketing initiative NPV's in paragraphs 415 and 416 in the operating expenditure section of this Final Decision. The Authority considers that ATCO's infill and hot water system infill incentive NPV's are not positive and do not meet rule 91 of the NGR. As in the Draft Decision the Authority acknowledges that ATCO is required under the terms of its licence to offer to connect any service that is on the line of gas main with up to 20 metres of service line. However, as the Authority has not approved ATCO's infill incentive program the Authority does not approve ATCO's forecast of 4,018 brownfield connections as a result of the infill incentive program. The Authority considers that $7.34 million for the 4,018 forecast brownfield connections does not meet rule 79(1) of the NGR.

733. The Authority notes that its demand consultant Deloitte Access Economics (Deloitte) has forecast 743 more B3 customer connections than ATCO by the end of the fourth access arrangement period. The Authority has used Deloitte's forecast of B3 connections to determine ATCO's tariffs. Therefore, the Authority has increased ATCO's approved customer initiated capital expenditure in line with Deloitte's forecast. The Authority has decided to only reduce ATCO's brownfield customers by the net amount of connections. The Authority has reduced ATCO's Brownfield expenditure by $5.98 million, which is for 3,275 Brownfield connections (4,018 for the infill projects – 743 for Deloitte's higher forecast).

Conclusion

734. The Authority has decided that $156.32 million ($143.80 million for greenfield and $12.52 million for brownfield customer initiated capital expenditure) is conforming capital expenditure under rule 79(2) of the NGR. The Authority has decided that $5.98 million for brownfields customer initiated capital expenditure does not satisfy rule 79(1) of the NGR.

---

284 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014 Table 8-25, p. 162.

285 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014 p. 157.

286 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014 Table 8-23, p. 157.

735. The Authority has further assessed whether ATCO's forecast customer initiated growth capital expenditure is reasonable and meets the prudency test under rules 74 and 79(1) of the NGR in the overhead and labour cost escalation section below.

Demand related expenditure

736. In the Draft Decision, the Authority was not satisfied that the following proposed demand spur line projects ($38.63 million) satisfied the incremental revenue test in rule 79(2)(b) of the NGR:

- Two Rocks (60 per cent of costs or $27.22 million);
- Baldivis (18 per cent of costs or $5.42 million); and
- Peel (22 per cent of costs or $5.99 million).

737. In the Draft Decision, the Authority was not satisfied that the following proposed reinforcement projects ($19.67 million) were justified under rule 79(2)(b) of the NGR:

- Capel to Busselton ($5.21 million);
- Other reinforcements ($11.55 million of ATCO's proposed $16.2 million); and
- Volume related capital expenditure and regulating facilities ($2.91 million).

738. In its response to the Draft Decision, ATCO has not accepted the Authority's required amendment to reduce demand related expenditure by $58.30 million.

739. ATCO maintains its view that the Two Rocks and Peel spur line projects should be assessed as both security of supply (within sustaining capital expenditure) and growth projects. ATCO states that its assessments demonstrate that the cost of undertaking two discrete projects to achieve the security of supply and growth objectives separately is greater than the combined projects costs proposed by ATCO.[287] Consistent with its initial proposal, ATCO has allocated expenditure to the growth category based on the amount of expenditure that delivers a neutral NPV. ATCO remains of the view that this is a conservative approach to categorising expenditure between sustaining and growth categories.

740. ATCO states that an alternative method of allocation might include adopting the stand alone security project costs as the costs to be allocated to sustaining capital expenditure and only allocate the incremental cost of a joint project to the growth project. ATCO states that this approach returns a positive NPV of $16.1 million for the Two Rocks spur line and a positive NPV of $5.3 million for Peel spur line. ATCO therefore considers that the growth element of these projects satisfy rule 79(2)(b) of the NGR[288].

741. EMCa has assessed ATCO's NPVs and considers it ambitious for ATCO to justify the Two Rocks and Peel projects based on assumed 60 year cashflows which are then assumed to continue in perpetuity thereafter.

742. EMCa identified that the Two Rocks NPV contains a large 'terminal value' of $505 million, which is a calculation of an in-perpetuity assumed net cash flow based

---

287 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 137.

288 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 155.

on the last year of the model (year 60). EMCa recommends that the terminal value should be removed and calculates that if you remove the assumed terminal value, the NPV for Two Rocks becomes negative.

743. EMCa has identified that the Peel NPV also contains a 'terminal value' of $101 million. EMCa has determined from information provided by ATCO that the Pinjarra reinforcement would only be required to meet the needs of an assumed 241 additional connections within the fourth access arrangement period, with the remainder of its projected new connections occurring from 2020 onwards. EMCa considers this to be a significant qualification of the information that it relied on in its 2014 assessment. EMCa considered that Peel stage 1 was required to provide reinforcement to meet brownfields obligations. EMCa does not consider it appropriate to consider Peel stage 1 as a reinforcement project, nor does it appear that ATCO has proposed it as such. However, in its incremental revenue test model, EMCa finds that ATCO has excluded the cost for stage 1 in its NPV analysis. EMCa concludes that if the cost of Peel stage 1 is added to the Peel NPV and the terminal value (as discussed above) is excluded, this leads to a negative NPV of $4.4 million.

744. The Authority has assessed EMCa's assessment of ATCO's NPVs and has decided that the Two Rocks and Peel spur lines do not meet a reasonable application of the incremental revenue test. The Authority also considers that if the NPVs were further adjusted to include EMCa's consumption per new customer of 12.6 GJ and a reasonable provision of disconnections, the NPVs would be further negative. The Authority has considered EMCa's advice regarding Peel stage 1 and agrees that it is part of the Peel project and not a reinforcement that is required for brownfield connections. The Authority is not satisfied that the $27.22 million for the Two Rocks Spur line project and $11.4 million for the Peel spur line project are justified under rule 79(2)(b) of the NGR.

745. The Authority has decided in paragraphs 675 and 691 that the sustaining elements of the Two Rocks and Peel spur lines expenditure does not satisfy rule 79(2)(c) of the NGR. As the Authority has rejected the sustaining components of the Two Rocks and Peel spur lines the Authority has assessed whether the total expenditure for the spur lines ($45.3 million for Two Rocks and $32.3 million for Peel) satisfies the remaining tests under rule 79(2) of the NGR. The Authority concludes that as the lower amounts ($27.22 million for the Two Rocks and $11.4 million for Peel spur lines) failed to meet the tests in rule 79(2)(b) a higher amount for the total expenditure will also fail the tests. The economic tests are discussed in more detail in the 'Economic Value Test' section below.

746. ATCO submits that the Baldivis spur line project has a positive NPV of $2.6 million and therefore conforms to rule 79(2)(b) of the NGR. The Baldivis spur line project involves the construction of a high pressure steel pipeline to support growth in the Baldivis South-Keralup region at a cost of $5.4 million.[289]

747. EMCa's understanding is that the Baldivis spur line is for an area that is currently zoned as rural. EMCa considers that development of these currently rural areas are still subject to re-zoning and notes that a time lag would occur, if and when it is re-zoned, to reach the stage of subdivision and housing development. EMCa considers

[289] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 156.

that ATCO's proposal does not seem to accurately reflect this current status and that apart from the NPV, ATCO has not provided further information on the justification for the Baldivis pipeline.[290]

748. The Authority shares EMCa's concerns that ATCO's proposal does not seem to accurately reflect its current planning status and notes that this project has already been deferred from the third access arrangement period due to lower than forecast new activity and subdivision growth on the periphery of the network.[291] The Authority considers that the Baldivis spur line is speculative given that the need for this line would depend on re-zoning and firm indications of development in this area. The Authority notes that the latest information from the Department of Planning indicates that this land will be developed beyond 2031.[292] The Authority considers that the $5.4 million expenditure for the Baldivis spur line does not pass the prudency test in rule 79(1)(a) of the NGR and should be deferred.

749. ATCO proposed $5.21 million in capital expenditure for the Capel to Busselton reinforcement project for the fourth access arrangement period. ATCO initially submitted that this project was required to connect new customers to grow the network or maintain gas supply to the area.[293] ATCO advised that the impact of not completing this reinforcement would include increased operating expenditure associated with relight costs and with resolving intermittent to frequent supply loss events in the area.[294]

750. EMCa considered that the project description in ATCO's access arrangement information suggested that the project was required to maintain pressure to connect new customers, rather than existing customers. For this reason, the Authority required in the Draft Decision that this project should be reviewed under the incremental revenue test under rule 79(2)(b) of the NGR.

751. In its response to the Draft Decision, ATCO maintained that this project should be assessed by the service integrity test under rule 79(2)(c)(ii) of the NGR.[295] ATCO considered that the Capel to Busselton reinforcement project is required in order to sustain sufficient pressure and capacity to support new brownfields connections and to ensure the integrity of existing gas supply to the area. Furthermore, ATCO advised that the reinforcements are required to facilitate compliance with its licence obligations to provide customers within 20 metres of an existing gas main the opportunity to connect to it. ATCO also argued that accommodating for forecast greenfield growth in the Capel to Busselton reinforcement project includes only a small incremental cost relative to the additional financial outlay that would be required to increase the diameter of the pipeline as an independent project when the forecast demand is realised. ATCO contends that because the reinforcements are required for it to meet its licence obligations, the proposed expenditure on this project should

---

290 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 33.

291 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 129.

292 Department of Planning, http://www.planning.wa.gov.au/dop_pub_pdf/South_Metro_Peel_Sub-regional_Framework.pdf, p. 54.

293 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 193.

294 ATCO Gas Australia, *Asset Management Plan (AA4) 2014-20198*, 3 April, 2014, p. 58.

295 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 156.

be approved. Nevertheless, ATCO submits that the project has an NPV of $0.2 million and therefore complies with rule 79(2)(b) of the NGR.[296]

752. In response to a question from EMCa, ATCO has clarified that the impact of not completing the Capel to Busselton reinforcement will not affect connecting new B3 connections in the fourth access arrangement period but will affect customers in the fifth access arrangement and beyond.[297] Therefore, EMCa still considers that this project should be reviewed under the incremental revenue test under rule 79(2)(b) of the NGR. EMCa's assessment has revealed that the Capel to Busselton NPV includes a terminal value of $114.77 million and if this is excluded the proposed reinforcement has a negative NPV.[298] The Authority has reviewed EMCa's assessment and agrees that the Capel to Busselton should be considered under the incremental revenue test. The Authority considers that the NPV should not include a terminal value and therefore is of the view that the proposed Capel to Busselton reinforcement is not justified under rule 79 of the NGR. The Authority also considers that if the NPV were further adjusted to include EMCa's consumption per new customer of 12.6 GJ and disconnections the NPV would be further negative.

753. ATCO has proposed $16.2 million in expenditure for 21 reinforcement projects, including $5.3 million for the reinforcement of the Pinjarra pipeline and $10.9 million for 20 smaller reinforcement projects over the fourth access arrangement period.[299]

754. In the Draft Decision, EMCa counselled that ATCO had provided insufficient justification for the proposed expenditure on the various reinforcement projects, and advised that they were likely to be associated with ATCO's forecast greenfield demand. EMCa recommended that a pro-rata adjustment be applied to ATCO's proposed expenditure amount because ATCO's demand forecasts for new greenfield connections were overstated, and the number of required reinforcements would vary with the amount of actual demand on the existing pipelines. EMCa advised that 71 per cent, or $11.55 million of the proposed expenditure was not compliant with rule 79 of the NGR.

755. In its response to the Draft decision, ATCO advised that EMCa's assumptions regarding the ratio of reinforcement expenditure between brownfield and greenfield customers was erroneous, and that the percentage of the reinforcement expenditure associated with greenfield growth related reinforcement was 8 per cent. ATCO advised that 92 per cent of the proposed expenditure was for brownfield reinforcement projects.

756. ATCO advised that the reinforcement projects are required to accommodate ATCO's compliance with its licence obligation to offer to connect brownfield customers that are within 20 metres of an existing gas main. ATCO also advises that not proceeding with the reinforcements during the fourth access arrangement period will result in intermittent to frequent supply loss events in the area. For this reason, ATCO submits

---

296 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 157.

297 ATCO Gas Australia, *Response to EMCa 97b*, 1 May 2015.

298 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report,* April 2015, p. 33.

299 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Table 65, p. 184.

that the forecast expenditure is required and conforms to rule 79(2)(c)(ii) and (iii) of the NGR.

757. The Authority has reviewed ATCO's response to the Draft Decision, and based on EMCa's assessment of ATCO's proposed greenfield expenditure, all reinforcement expenditure is accepted as it is justified under rule 79 of the NGR. In this regard, EMCa assessed that the NPV of greenfields development is sufficiently positive to absorb related reinforcements and ATCO's justification for proposed greenfield expenditure is reasonable.[300]

758. ATCO proposed $2.9 million in volume related demand capital expenditure over the fourth access arrangement period for the purposes of upgrading its existing medium pressure regulating facilities to ensure that integrity is maintained during peak winter periods.

759. EMCa advised that ATCO's proposed volume related capital expenditure does not meet the requirements of the incremental revenue test in rule 79(2)(b) of the NGR because ATCO has not provided a cost benefit analysis to justify it.

760. In its response to the Draft Decision, ATCO advised that upgrading the capacity of existing medium pressure regulating facilities is more cost effective than the construction of new mains to elevate network pressure. This is because upgrading existing regulator sets will enable ATCO to maintain pressure for 5 to 10 years, whereas adding additional mains to elevate pressure will only increase capacity for 1 to 2 years.[301]

761. The Authority accepts ATCO's proposed expenditure on volume related capital expenditure based on EMCa's assessment and information ATCO provided in its amended proposal that this expenditure is largely required to meet brownfields obligations.[302]

Conclusion

762. The Authority considers that $178.70 million of ATCO's forecast growth capital expenditure satisfies rule 79(2) of the NGR. The Authority has decided, for the reasons described in paragraphs 736 - 761 that $49.22 million of ATCO's proposed demand growth capital expenditure for the fourth access arrangement period does not conform with rule 79(2) of the NGR. This expenditure is for the following projects:

- Two rocks spur line;
- Peel spur line;
- Baldivis spur line; and
- Capel to Busselton reinforcement.

---

300 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, addendum report*, April 2015, p. 28.

301 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 27 November 2014, p. 159.

302 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Fig 8-14 and Fig 8-15, p. 158.

763. The Authority has assessed whether ATCO's forecast demand growth capital expenditure is reasonable and meets the prudency test under rules 74 and 79(1) of the NGR in the overhead and labour cost escalation section below.

Economic value test

764. ATCO asserted at a meeting on 9 April 2015 and in a subsequent letter dated 10 April 2015 that its proposed growth capital expenditure had been assessed in its response to the Draft Decision by applying the economic value test in rule 79(2)(a) and that it complies with this rule. ATCO stated that the Authority is required to consider ATCO's growth capital expenditure submissions under the entirety of rule 79 of the NGR. ATCO considers that this assertion was based on references in paragraphs 684, 685, 704, 705, 706, 707 and 710 of its response to the Draft Decision.

765. ATCO provided an NPV model as supporting information in its letter, which uses current tariffs to support its economic value test. ATCO states that the model shows a positive NPV after 24 years and $44.1 million after 30 years. ATCO argues that when undertaking an economic value test under rule 79(2)(a) of the NGR the price adopted in an NPV analysis should be the price customers would be willing to pay which is at least the price they are currently paying.

766. ATCO also provided an assessment of the lost value to new customers over the fourth access arrangement period of the provision of gas in its 10 April 2015 letter. ATCO provided a calculation and supporting analysis for the value of $209 million that it considers new customers would be willing to pay for gas over the period. ATCO also provided an assessment of the additional costs that would be incurred by these customers as a result of utilising electricity instead of gas appliances as $98 million over the fourth access arrangement period.

767. The Authority considers that ATCO has not stated clearly and unambiguously in its response to the Draft Decision that the economic value test has been met. Notwithstanding this, the Authority has made an assessment of ATCO's claims that the economic value test has been met in the paragraphs outlined in paragraph 764 and supporting analysis provided by ATCO.

768. The Authority considers that the application of the economic value test means that customers should not be connected where the value of the service is less than its cost. The Authority considers that the economic value test requires consideration of 'economic value directly accruing to the service provider, gas producers, users and end users.'

769. The Authority's technical consultant EMCa has assessed ATCO's claims for its economic value test. EMCa concludes that ATCO's economic value test NPV model appears to be identical in structure to the overall growth incremental revenue test model it provided in its response to the Draft Decision, with two changes:

- tariffs have been maintained constant in real terms (i.e. increasing only with inflation), and
- ATCO has removed the assumed 2 per cent per annum tariff decline from 2020.

770. EMCa considers that ATCO's newly-provided economic value test model is not sufficient as it is much narrower in scope and considers only incremental pipeline revenues and pipeline costs. EMCa accepts ATCO's assumption to use current tariffs and considers it reasonable that an economic test would use current tariffs as

a proxy for the (lower bound of) willingness to pay. EMCa believes as the model is the same as the incremental revenue test model, with two changed assumptions to the tariffs the NPV model is simply a sensitivity analysis of the incremental revenue test model. Moreover, EMCa considers that ATCO's economic value test suffers from the same assumptions that EMCa considered to be 'not reasonable' in the incremental revenue test, as discussed in paragraph 714 to 715.

771. The Authority has reviewed ATCO's claims and EMCa's assessment. The Authority shares EMCa's view that ATCO's model is simply a sensitivity check of the incremental revenue test model. The Authority is not satisfied that ATCO's amended incremental revenue test NPV model demonstrates that the economic value test has been met under rule 79(3) of the NGR.

772. As stated in paragraph 766, ATCO's assessment of the lost value to new customers over the fourth access arrangement period is a calculation of the amount that customers are willing to pay for gas over the period and the additional costs that would be incurred by utilising electricity appliances instead of gas appliances. ATCO has determined a value of $209 million for loss of value to new greenfield customers by taking ATCO's forecast demand for new connections, less the number of connections allowed in the Draft Decision multiplied by a typical customer retail bill. ATCO has determined a value of $98 million for the additional costs by taking ATCO's forecast demand for new connections, less the number of connections allowed in the Draft Decision multiplied by the difference in an electricity bill and gas bill which ATCO calculates as $333.

773. EMCa considers that ATCO has provided a rudimentary estimate of the claimed loss of economic value to greenfields customers, if they were not supplied with gas. EMCa believes that the information provided lacks any tie-back to the customer usage assumptions in ATCO's greenfields assessment model, does not take into account the more-than-doubling of network fixed charges that ATCO is proposing and does not take into account differential appliance costs which would factor into a customer's assessment of economic value. EMCa states that ATCO's assessment is of consumer economics only, and does not take account of direct value to "the service provider, gas producers, users and end users" as is required under rule 79(3).

774. The Authority notes that under rule 79 of the NGR, capital expenditure is justifiable if it meets either the economic value test or the incremental revenue test. The Authority has accepted ATCO's proposed greenfield expenditure under the incremental revenue test in rule 79(2)(b) of the NGR in paragraph 727 of this Final Decision. The Authority notes that ATCO's assessment of the economic value test in Attachment 1 of its letter is only for new greenfield customers over the fourth access arrangement period.[303] Therefore, as the Authority has now accepted ATCO's proposed greenfield customer connections, ATCO's lost value to new greenfield customers is zero, as the number of lost new greenfield customers is zero. For the same reason, the additional cost to customers by utilising electricity appliances instead of gas appliances is also zero.

775. The Authority does not consider that the overall economic value of ATCO's growth capital expenditure is positive and therefore does not meet rule 79(2)(a) of the NGR.

303 ATCO Gas Australia, *Letter to the ERA*, 10 April 2015, p. 6.

Conclusion

776. Table 62 shows ATCO's proposed growth capital expenditure forecast, and the Authority's reductions to growth capital expenditure forecast for the fourth access arrangement period.

Table 62 Authority's Final Decision Required Reductions for Growth Capital Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
ATCO Proposed Revised Growth Capital Expenditure Forecast	**18.03**	**43.24**	**54.51**	**43.62**	**40.64**	**33.86**	**233.90**
Two Rocks spur line	-	-	(13.64)	(13.58)	-	-	(27.22)
Peel spur line	-	(5.38)	-	-	(5.99)	-	(11.37)
Baldivis spur line	-	-	-	-	(5.42)	-	(5.42)
Capel to Busselton reinforcement	-	-	-	-	-	(5.21)	(5.21)
Brownfield	-	(1.54)	(1.11)	(1.11)	(1.11)	(1.11)	(5.98)
Authority's total reductions	-	(6.92)	(14.75)	(14.69)	(12.52)	(6.32)	(55.19)
Growth Capital Expenditure	**18.03**	**36.32**	**39.76**	**28.93**	**28.12**	**27.55**	**178.70**

Source: ERA, GDS Tariff Model, September 2015.

Structures and Equipment Capital Expenditure

777. ATCO initially proposed to spend $38.45 million on structures and equipment over the fourth access arrangement period. ATCO's proposed expenditure was broken down as follows:

- Operational depots and training centre ($17.29 million)
- Fleet ($14.5 million)
- Plant and equipment ($6.65 million)

778. In the Draft Decision, the Authority required ATCO to reduce its proposed structures and equipment capital expenditure for the fourth access arrangement period by $2.68 million. The Authority decided that the following proposed structures and equipment expenditure did not conform with rule 79 of the NGR:

- Osborne Park Blue Flame Kitchen ($0.50 million)
- Busselton depot ($1.18 million)
- Fleet ($0.80 million)
- Plant and equipment ($0.20 million)

779. In its response to the Draft Decision, ATCO has increased its proposed structures and equipment capital expenditure by $1.78 million from $38.45 million to $40.23 million.[304]

780. In its response to the Draft Decision, ATCO removed $0.50 million for the Osborne Park Blue Flame Kitchen from the proposed projected capital base, and will reconsider the benefits of this project at a later date.

781. ATCO has not removed $1.18 million for the Busselton depot project. ATCO advises that population growth and congestion in the region will result in ATCO being unable to meets its obligations with regards to attending a site within one hour in the event of a class 1 leak if a more local depot is not constructed. ATCO advises that the requirement for this project is not contingent on greenfield growth in the Busselton region.

782. The Authority has reviewed ATCO's response to the Draft Decision and recognises that traffic congestion is broadly related to population growth. In this regard, the 2012 Department of Planning review of population growth resulted in an increase to previous population growth projections for the Busselton region. When coupled with the increase in traffic during public and school holidays, the Authority acknowledges that traffic congestion is likely to be an increasing impediment to operational efficiency and effectiveness. Therefore, based on EMCa's review, the Authority concludes that the proposed expenditure of $1.18 million for the Busselton depot project conforms with rule 79(2)(c) of the NGR.[305]

783. ATCO initially proposed to spend $14.5 million in fleet ownership related expenditure over the fourth access arrangement period as it moved from leasing to purchasing vehicles over a 20 year period and $6.65 million on plant and equipment.

784. In the Draft Decision, the Authority considered that only $13.75 million for fleet and $6.45 million for plant and equipment was justified under rule 79(2) of the NGR as ATCO's growth projections could not be supported.

785. In its response to the Draft Decision, ATCO disagreed with the Authority's assessment regarding its growth projections for the fourth access arrangement period and proposed an increase of $0.3 million in fleet and plant and equipment.

786. In its response to the Draft Decision, ATCO has reassessed the allocation of costs for PPE relating directly to the Albany and Kalgoorlie unregulated networks. As a result of the assessment ATCO has excluded a further $1.1 million from its projected capital base to bring the total exclusion of PPE to $2.4 million.[306]

787. The Authority considers that there is a proportional relationship between network growth and the requirement for fleet, plant and equipment. The Authority has accepted ATCO's proposed greenfield and some brownfield growth as explained in

---

304 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 162 and ATCO Gas Australia, GDS Tariff Model.

305 EMCa, *Review of Technical Aspects of the Revised Access Arrangement* (Confidential). April 2015, p. 17.

306 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 164.

paragraphs 727 and 731. Therefore, the Authority is satisfied that ATCO's proposed growth related expenditure on structures and equipment now satisfies rule 79(2)(c) of the NGR.

Conclusion

788. The Authority has reviewed ATCO's proposed increase of $1.78 million from its initial proposal. The Authority concludes that the $1.78 million includes the following:

- $1.7 million for the Mandurah depot deferred from AA3;[307]
- $1.5 million for fleet and associated operational equipment deferred from AA3;[308]
- a reduction of $1.1 million for the reallocation of costs; and
- a reduction of $0.5 million for the Osbourne Park blue flamed kitchen.[309]

789. The Authority accepts ATCO's proposed increase of $1.78 million. The Authority accepted ATCO's deferral of structures and equipment from the third access arrangement period as discussed in paragraphs 538 to 539. The Authority also accepts ATCO's approach to directly allocate indirect capital expenditure to non-regulated and non-reference services as set out in its CAM 2014 as discussed in paragraphs 511 to 512. Therefore, the Authority is satisfied that ATCO's proposed $40.23 million for structures and equipment for the fourth access arrangement period is compliant with rule 79(2) of the NGR.

790. Table 63 shows the Authority's approved structures and equipment capital expenditure for the fourth access arrangement period.

Table 63 Authority's Final Decision Approved Structures and Equipment Capital Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
ATCO Proposed Revised Structures and Equipment Capital Expenditure Forecast	**5.48**	**17.48**	**3.33**	**3.33**	**5.36**	**5.25**	**40.23**
Authority's Approved Structures and Equipment Capital Expenditure Forecast	**5.48**	**17.48**	**3.33**	**3.33**	**5.36**	**5.25**	**40.23**

Source: ERA, GDS Tariff Model, September 2015.

307 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 118.

308 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 118.

309 Numbers do not exactly match due to rounding.

IT Capital Expenditure

791. ATCO proposes to spend $28.65 million on IT capital expenditure during the fourth access arrangement period:[310]

- $3.0 million for acquisition of unique IT Infrastructure from ATCO I-Tek;
- $8.8 million for network operations;
- $5.4 million for commercial operations;
- $8.8 million for business support improvements;
- $2.0 million for business support upgrades; and
- $0.7 million on IT hardware and software.

792. ATCO has sought to justify its proposed IT capital expenditure under rule 79(2)(c) of the NGR.

793. On 17 July 2014, ATCO advised the Authority that ATCO was selling its IT provider I-Tek and from 1 January 2015 WIPRO a fully arm's length IT provider would provide IT services to ATCO Gas Australia. As a result of this change, ATCO resubmitted its IT capital cost forecast with an increase of $1.2 million from $27.4 million to $28.6 million.

794. EMCa completed its review of IT capital expenditure in June 2014 before ATCO changed provider. Therefore, EMCa's review was on $27.4 million of IT capital expenditure. EMCa's report recommended that $4.82 million of ATCO's proposed IT capital expenditure did not comply with rule 79 of the NGR.

795. The Authority considered that EMCa's review on ATCO's initial proposal remained applicable as ATCO has not removed any of the projects as a result of the new IT agreement it has entered into. The Authority adjusted EMCa's proposed reductions to $3.51 million in accordance with ATCO's revised project amounts.

796. The Authority decided that the following amounts in the following projects were not justified under rules 74 and 79 of the NGR:

- AGA-01, commercial services continuous improvements, $1.79 million;
- AGA-02, GIS continuous improvements, $0.25 million;
- AGA-11, business process standardisation, $0.70 million;
- AGA-19, new technology business cases, $0.07 million; and
- IT hardware and equipment, $0.70 million.

797. ATCO provided its regulatory financial statements for the year ended December 2014 on 23 February 2015. ATCO stated in its cover letter that the information provided is directly relevant for the access arrangement review process currently underway and should be taken into account when considering the expenditure forecast for the fourth access arrangement period. The Authority notes that ATCO has provided actual data for the July 2014 to December 2014 period for IT and specifically for the acquisition of I-Tek assets. ATCO states that it spent an extra $0.2 million than forecast on the acquisition. ATCO also states that it has underspent on IT expenditure during the

[310] ATCO Gas Australia, *Letter to ERA*, 29 August 2014.

July 2014 to December 2014 period due to the impact of the transition phase between I-Tek and WIPRO.

798. The Authority decided in the Draft Decision that $1.79 million proposed for AGA-01 commercial operations and continuous improvement project under commercial operations did not meet the requirements of rule 79(2)(c)iii of the NGR. EMCa advised the Authority that it was speculative to assume that there will be sufficient new retailers in the fourth access arrangement period to warrant the expenditure proposed. In response to the Authority's Draft Decision, ATCO reduced its forecast expenditure for this project by $0.6 million for unspecified future regulatory requirements. ATCO stated that where new regulatory requirements occur, ATCO will seek to pass the costs through in the annual tariff variation process. ATCO considers that the remaining $1.2 million reflects the forecast cost of a number of continuous improvement initiatives to support commercial services – in particular accuracy of metering and volume of information.

799. EMCa has further assessed ATCO's proposed changes and is generally supportive of ATCO's proposal to automate its manual systems.[311] EMCa considers that the robustness of the business case can be reviewed by the Authority's fifth access arrangement period ex-post review. Based on EMCa's advice, the Authority has accepted ATCO's proposed changes and is satisfied that $1.2 million meets the requirements of rule 79(2)(c)iii of the NGR.

800. ATCO has accepted the Authority's Draft Decision that an allowance of $0.25 million for unspecified future regulatory requirements in ATCO's AGA-02 GIS continuous improvement project under network operations is speculative and therefore not compliant with rule (74)(2) of the NGR.

801. ATCO accepted the Authority's recommendation to defer its business process standardisation project AGA-11 until 2017. ATCO has made a reduction of $0.9 million under Business support improvements in Table 8-29 of its response to the Draft Decision. This reduction includes a reduction of $0.70 million for AGA-11 and $0.2 million in 2014. With regards to AGA-19 new technology business cases, ATCO has accepted the exclusion and has amended its forecast.

802. ATCO has revised its proposed forecast for IT hardware and equipment to only include $0.3 million for mobile phones. ATCO states that it remains responsible for the provision of mobile phones for its employees.[312] EMCa has advised the Authority that ATCO's forecast seems reasonable based on the typical average asset life of two-three years for such devices. The Authority is satisfied that $0.3 million for mobile phones is compliant with rule 79(2)(c) of the NGR.

803. ATCO has reviewed its allocation of IT between its regulated and non-regulated network in response to the Authority's Draft Decision. ATCO has reduced its allocation to its regulated network by a further $0.2 million.

311 EMCa, *Review of Technical Aspects of the Revised Access Arrangement, Addendum Report*, April 2015, p. 15.

312 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 168.

Conclusion

804. The Authority accepts ATCO's overall proposed reduction of $2.2 million for IT capital expenditure. The Authority is satisfied that ATCO's proposed $26.34 million for IT expenditure for the fourth access arrangement period is compliant with rule 79(2) of the NGR.

805. Table 64 shows ATCO's proposed forecast for IT capital expenditure, and the Authority's approved forecast for IT capital expenditure for the fourth access arrangement period.

Table 64 Authority's Final Decision Approved IT Capital Expenditure Forecast (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
ATCO Proposed Revised IT Capital Expenditure Forecast	**4.62**	**6.32**	**5.63**	**4.22**	**3.19**	**2.36**	**26.34**
Authority's Approved IT Capital Expenditure Forecast	**4.62**	**6.32**	**5.63**	**4.22**	**3.19**	**2.36**	**26.34**

Source: ERA, GDS Tariff Model, September 2015.

Capitalised indirect overheads

806. ATCO initially proposed to capitalise $96.22 million operating expenditure for indirect overheads. ATCO proposed to allocate this over $496.64 million of sustaining and growth expenditure, which is an average of 19.6 per cent.

807. After a request for information from the Authority, ATCO explained that a number of network operating and support cost centres, support the capital investment program for sustaining and growth projects and are required to complete the capital projects. ATCO also explained that it allocates overheads to sustaining and growth projects using the following bottom up approach:

- each cost centre is reviewed annually to identify the percentage of costs in that cost centre that support the capital program;
- this percentage is then used to calculate the portion of costs that relate to capital projects; and
- the sum of all indirect costs is then calculated as a percentage of capital expenditure. This forms its overhead allocation percentage rate.

808. In the Draft Decision, the Authority considered that ATCO's proposed average rate of 19.6 per cent for indirect capital expenditure overheads was higher than its peers and considerably higher than the 13 per cent forecast by WAGN in the 2010 – 2014 access arrangement period. The Authority decided that ATCO's proposed overhead costs were not arrived at on a reasonable basis and therefore did not meet the requirements of rule 74 of the NGR. The Authority considered that an overhead allocation of 15 per cent would be more in line with industry practice. Therefore, the Authority reduced the relevant capital expenditure asset classes by $10.56 million on a pro rata basis.

809. In its response to the Draft Decision, ATCO did not accept the Authority's amendment to its overhead allocation. ATCO considers that in determining the appropriate level of overheads that are efficient or in line with industry practice the ERA must consider the costs themselves that are being allocated to capital expenditure and the basis upon which the allocation occurs. The resulting percentage of total capital expenditure is merely an output of this process.

810. ATCO states that there is no reason to adjust the allocated percentage unless the underlying costs are inefficient or the allocation methodology is unreasonable and ATCO submits that neither is the case.

811. With regard to its allocation method, ATCO highlighted that the company's core activities are managed based on cost centres. Each cost centre is assessed for the activities that individuals and teams within them contribute to the operating and capital program of work. Based on this assessment, a portion of the cost centre's operating expenditure is capitalised for sustaining and growth capital projects. ATCO provided a table of cost centres, which provide services to sustaining and growth capital projects, along with the percentage of costs which is allocated to capital, and what portion of the overall overheads they represent.[313] The key services that are capitalised include environmental advice, gas distribution officers, planning, project management and administration, operational supervisor advice and technical compliance. ATCO states that with more than 80 per cent of the total allocated costs made up of salaries and labour costs, the increase in overhead is largely due to the increased headcount required to support the capital program.

812. With regard to costs ATCO states that its expenditure is prudent and efficient. ATCO states that as the capital program moves (increases or decreases), the relative impact and percentage of total expenditure will in turn increase or decrease for the variable components of the cost.

813. ATCO states that the overhead allocation method is not a measure of efficiency as any change to the percentage allocated to capital expenditure would have to be reflected in the operating expenditure forecast.

814. The Authority notes that ATCO uses a bottom up approach to allocate indirect overheads to capital expenditure. However, the Authority was not provided with any evidence that this approach is reviewed or goes through a top down challenge.

815. The Authority notes that ATCO has provided inconsistent data between its initial proposal and revised proposal for capitalised overheads, but has not explained the differences. ATCO in its response to the Draft Decision has allocated $85.09 million (real dollars 2014) from its operating expenditure for capitalised indirect overheads. This is allocated over $435.41 million capital expenditure, which is an average of 19.4 per cent. The Authority believes that ATCO has used different time periods to allocate the capitalised indirect overheads, which results in different amounts but similar percentages. The Authority notes that neither set of figures relate to the five and a half years in the fourth access arrangement period.

816. The Authority also notes that ATCO in its response to the Draft Decision has reduced its growth and sustaining capital expenditure program by circa $14 million but has not

[313] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Table 8-34, p. 171.

reduced the amount of indirect overhead it has capitalised from operating expenditure. These matters are of concern for the Authority as it demonstrates the weakness in a bottom-up approach with no top-down review.

817. The Authority notes that to date, regulators in Australia have accepted capitalised overhead allocations based on either historic proportions or a base year.[314] ATCO's proposal to use a bottom-up approach does not consider historic indirect overheads. Further, ATCO has not provided any reason or evidence for the increase from 13 per cent in the third access arrangement period to 19.4 per cent in the fourth access arrangement period.

818. ATCO's states that as the capital program moves (increases or decreases), the relative impact and percentage of total expenditure will in turn increase or decrease for the variable components of the cost. The Authority is unable to assess this further as ATCO's has not provided the fixed and variable proportions for each cost component or explained what impact a reduction or increase in sustaining or growth capital expenditure would have on capitalised indirect overheads.

819. The Authority considers that a useful check on the reasonableness of a proposed level of overhead is where annual expenditures are high the average rate of overhead is generally low and conversely where annual expenditure is low, the average rate of overhead is generally high. ATCO's proposed forecast capital expenditure is higher in the fourth access arrangement period than the third access arrangement period. Therefore, the Authority would expected indirect overheads to decrease rather than increase. Further, the Authority would have expected to see efficiencies in indirect overheads as a result of ATCO's proposed increase in IT expenditure.

820. In the Draft Decision the Authority determined that an overhead allocation of 15 per cent was more reasonable. This was based on WAGN's rate of 13 per cent in the third access arrangement period and benchmarks from recent AER decisions (SP Ausnet 15 per cent, Envestra Victoria 13 per cent and Multinet Victoria 5 per cent).

821. The Authority does not accept ATCO's suggestion that any change to the percentage allocated to capital expenditure would have to be reflected in the operating expenditure forecast as the Authority expects that ATCO's capitalised overheads should be lower given the Authority has reduced ATCO's 'base' operating expenditure such that a lower amount of overheads needs to be capitalised.

822. The Authority considers that ATCO's capitalised indirect overhead allocation of 19.4 per cent is not arrived at on a reasonable basis and is not the best forecast possible in the circumstances. The Authority considers that an allocation of 15 per cent meets rules 74 and 79(1) of the NGR as it is more reasonable and more in line with a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

823. The Authority notes that ATCO has allocated its capitalised overheads to 92 per cent of its sustaining and growth capital expenditure. The Authority has calculated its capitalised indirect overheads by applying 15 per cent to 92 per cent of the Authority's approved sustaining and growth capital expenditure. The Authority considers that the difference of $16.91 million does not meet rules 74 and 79(1) of the NGR.

---

314 Parsons Brinckerhoff Australia Pty Limited, *Report on overheads for Envestra*, 2011, p. 3.

Therefore, the Authority has decided to reduce the relevant capital expenditure asset classes by $16.91 million on a pro rata basis.

Labour cost escalation

824. In response to the Draft Decision ATCO has not accepted the Authority's required amendment to reduce capital expenditure by $1.80 million for labour cost escalation and proposes a two per cent real labour cost escalation (above CPI), as per its initial proposal.

825. In response to the Draft Decision ATCO submitted that it has allocated $6.4 million for labour cost escalation for capital expenditure. In response to an Authority information request ATCO explained that the $6.4 million contained $1.6 million for direct labour cost escalation and $4.9 million for indirect capitalised labour cost escalation.[315]

826. The Authority has considered the Labour cost escalation factor in the operating expenditure section in paragraphs 331 – 346. The Authority concluded in paragraphs 340 to 343 that ATCO's proposal is not compliant with rule 74 of the NGR. The Authority considers that a reasonable labour cost escalation factor for ATCO for the fourth access arrangement period would be 1.34 per cent.

827. Table 65 summarises the Authority's derivation of its approved real labour cost escalation rate.

Table 65 Authority's Final Decision Derivation of Approved Real Labour Cost Escalation Rate

Labour Cost Escalation Rate Component	Percent
Annual Average of Western Australian WPI over AA4	3.13
Plus Premium of EGWWS WPI over Western Australian WPI	0.11
Plus ATCO labour cost premium over EGWWS WPI	N/A
Equals Nominal labour cost escalation forecast per annum	3.24
Less Forecast CPI per annum (Weighted Average CPI-Eight Capital Cities)	1.90
Equals Authority Approved Labour cost escalation Rate	1.34

828. The Authority notes that as it has rejected ATCO's proposed labour cost escalation factor of 2 per cent, it has had to adjust the forecast sustaining and growth capital expenditure to reflect its approved labour cost escalation factor of 1.34 per cent. The Authority notes that ATCO has applied $6.4 million for labour cost escalation, which is an allocation of 2 per cent. Therefore, the Authority calculates that ATCO has applied its labour cost escalation on $320 million of sustaining and growth capital expenditure. The Authority has applied a ratio of 77 per cent, which is the Authority's approved amount of sustaining and growth capital expenditure against ATCO's revised amount in its response to the Draft Decision on the $320 million. The Authority has then applied its approved labour cost escalation factor of 1.34 per cent to $245.56 million. The Authority has reduced the relevant asset classes by $1.60 million, which is the difference between ATCO's proposed rate of 2 per cent and the Authority's approved labour cost escalation factor of 1.34 per cent.

[315] ATCO gas Australia, *Response to ERA94*, 1 June 2015.

Conclusion

829. The Authority considers that $16.91 million of indirect capitalised overheads and $1.60 million of labour escalation does not meet rules 74 and 79(1) of the NGR. The Authority's required reduction of $18.51 million for overheads and labour cost escalation by asset class is shown in Table 66.

Table 66 Authority's Final Decision Required Reductions for Capitalised Indirect Overheads and Labour Cost Escalation by Asset Class

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
High pressure mains - steel	(0.01)	(0.43)	(0.54)	(0.05)	(0.05)	(0.14)	(1.30)
High pressure mains - PE	(0.03)	(0.10)	-	-	(0.00)	(0.05)	(0.16)
Medium pressure mains	-	-	-	-	-	-	-
Medium/low pressure mains	(0.36)	(2.06)	(0.95)	(0.78)	(1.30)	(1.63)	(7.06)
Low pressure mains	-	-	-	-	-	-	-
Regulators	(0.03)	(0.24)	(0.05)	(0.04)	(0.07)	(0.12)	(0.51)
Secondary gate stations	(0.00)	-	(0.02)	(0.25)	(0.20)	(0.38)	(0.90)
Buildings	-	-	-	-	-	-	-
Meter and services pipes	(0.43)	(2.42)	(1.08)	(0.97)	(1.63)	(2.09)	(8.58)
Equipment and vehicles	-	-	-	-	-	-	-
Vehicles	-	-	-	-	-	-	-
Information technology	-	-	-	-	-	-	-
Full retail contestability	-	-	-	-	-	-	-
Land	-	-	-	-	-	-	-
Equity Raising Costs	-	-	-	-	-	-	-
Authority's required reductions for Overheads and Labour Cost Escalation	**(0.86)**	**(5.26)**	**(2.63)**	**(2.10)**	**(3.26)**	**(4.41)**	**(18.51)**

Source: ERA, GDS Tariff Model, September 2015.

Equity Raising Costs

830. ATCO proposed the inclusion of equity raising costs in its revenue modelling for the fourth access arrangement period, but did not make any provision for this in its projected RAB.

831. In its Draft Decision the Authority allowed the inclusion of equity raising costs in ATCO's capital base, but advised that its calculations as per the assumptions in the Rate of Return guidelines determined that no equity raising costs were required. The Authority also noted that in its calculations, equity raising costs are treated as a depreciating asset, whereas this is not the case in ATCO's modelling.

832. In its response to the Draft Decision, ATCO accepted capitalising equity raising costs but contended that the Authority's modelling of equity raising costs was not consistent

with the Rate of Return Guidelines. ATCO proposed that the estimation of equity raising costs should be based on the following assumptions:

- retained earnings of 30 per cent of after-tax profits will be available to increase equity at zero cost;
- dividends will be paid at the benchmark payout ratio of 70 per cent of after-tax profits, consistent with the payout ratio used in the estimation of gamma;
- 25 per cent of dividends paid out will be treated as being reinvested through dividend reinvestment plans, with an equity raising cost allowance of 1 per cent; and
- any further required equity is raised at the Seasoned Equity Offering cost of 3 per cent.

833. The Authority notes that its modelling of equity raising costs was consistent with the Rate of Return Guidelines in its tariff model. However, the text of the Draft Decision incorrectly noted that 25 per cent of all dividends would be reinvested at zero cost instead of one per cent. In this Final Decision, the Authority has modelled equity raising costs consistent with the Rate of Return Guidelines.

834. Based on these modelling assumptions, the Authority has estimated ATCO's cost for equity raising over the fourth access arrangement period to be $1.06 million.

Verification of Capital Expenditure

835. Following its response to the Draft Decision, ATCO provided its actual capital expenditure for the 2014 calendar year in externally reviewed regulatory financial statements for 2014 on 23 February 2015. ATCO stated that this information is directly relevant for the access arrangement review process and should be taken into account when considering the expenditure incurred and forecast for the fourth access arrangement period.

836. The Authority considers that for the purposes of determining the best forecast for July to December 2014 as per rule 74(2) of the NGR, the best forecast would be the actuals for this period. The Authority has substituted ATCO's estimated figures for the July to December 2014 period to actual expenditure as per ATCO's regulatory accounts. The Authority has deferred the difference between the actual expenditure and approved forecast expenditure for that six month period, in the sum of $3.44 million, to 2015 as shown in Table 68.

Final Decision

837. The Authority's Final Decision is to not approve ATCO's proposed capital expenditure for the fourth access arrangement period as submitted.

838. The Authority concludes that:

- $446.51 million (75 per cent of ATCO's proposed capital expenditure) complies with the criteria set out in rule 79 of the NGR, and can be considered conforming capital expenditure for the purposes of rule 78; and
- $145.71 million (25 per cent of ATCO's proposed capital expenditure) does not comply with the criteria set out in rule 79 of the NGR, and cannot be considered conforming capital expenditure for the purposes of rule 78.

839. Table 67 shows ATCO's proposed capital expenditure forecast, and the Authority's required amendments for the fourth access arrangement period by cost driver.

Table 67 Authority's Final Decision Approved Capital Expenditure Forecast by Cost Driver (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
ATCO Proposed Capital Expenditure Forecast	43.17	104.88	114.55	115.77	110.28	103.57	592.22
Sustaining reductions	-	-	(12.12)	(22.51)	(20.97)	(17.46)	(73.06)
Growth reductions	-	(6.92)	(14.75)	(14.69)	(12.52)	(6.32)	(55.19)
Overhead reductions	(0.86)	(5.16)	(2.43)	(1.77)	(2.83)	(3.87)	(16.91)
Labour cost escalation reductions	-	(0.10)	(0.20)	(0.32)	(0.42)	(0.55)	(1.60)
2014 actual expenditure adjustment	(3.44)	3.44	-	-	-	-	-
Equity raising costs	-	-	-	-	0.32	0.74	1.06
Total reductions	(4.30)	(8.74)	(29.50)	(39.30)	(36.43)	(27.44)	(145.71)
Authority Approved Capital Expenditure Forecast	**38.87**	**96.15**	**85.05**	**76.48**	**73.85**	**76.13**	**446.51**

Source: ERA, GDS Tariff Model, September 2015.

840. Table 68 shows the Authority's required amendments for capital expenditure to be included in the projected capital base by asset class.

Table 68 Authority's Final Decision Approved Capital Expenditure Forecast by Asset Class (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
High pressure mains - steel	0.58	5.49	15.29	1.77	1.07	2.15	26.34
High pressure mains - PE	1.19	1.15	-	-	0.07	0.75	3.15
Medium pressure mains	-	-	-	-	-	-	-
Medium/low pressure mains	12.49	27.52	26.99	25.38	25.46	24.90	142.74
Low pressure mains	-	-	-	-	-	-	-
Regulators	1.40	2.66	1.46	1.43	1.44	1.88	10.27
Secondary gate stations	0.01	0.00	0.55	7.95	3.94	5.85	18.29
Buildings	0.19	12.02	0.62	0.42	0.02	0.02	13.30
Meter and services pipes	16.44	30.96	30.64	31.42	32.01	31.94	173.42
Equipment and vehicles	0.12	1.60	1.39	1.23	0.97	0.97	6.27
Vehicles	1.65	2.53	0.76	1.33	4.37	4.27	14.91
Information technology including Telemetry	4.82	7.37	6.78	5.19	4.19	2.67	31.01
Full retail contestability	-	-	-	-	-	-	-
Land	-	4.85	0.55	0.35	-	-	5.75
Equity raising costs	-	-	-	-	0.32	0.74	1.06
Authority Approved Capital Expenditure Forecast	**38.87**	**96.15**	**85.05**	**76.48**	**73.85**	**76.13**	**446.51**

Source: ERA, GDS Tariff Model, September 2015.

Required Amendment 5

The value of conforming capital expenditure for 2014 to 2019 access arrangement period must be amended to reflect the values shown in Table 68 of this Final Decision.

Assessment of Depreciation

841. In its initial proposal ATCO proposed to change its depreciation methodology from a CCA approach, which has been used for the GDS access arrangements to date to a HCA approach. Under HCA, the historic cost values are not indexed year to year for inflation. ATCO recognised that a change to HCA would lead to a short term increase in tariffs and therefore proposed to phase in the HCA method using a transition approach over a number of access arrangements.

842. ATCO's initial forecast for depreciation was $127.31 million in nominal dollars. ATCO's forecast depreciation removes a double counting of inflation. ATCO's transition approach applies straight-line depreciation to the CCA value of the opening capital base for existing assets before 1 July 2014 and removes an amount relating

to the inflationary gain. ATCO then applies straight-line depreciation to the HCA value of the forecast capital expenditure.

843. In the Draft Decision the Authority required ATCO to continue using the CCA approach and amend its depreciation amount to $231.87 million in nominal dollars for the fourth access arrangement period.[316] The Authority decided that the CCA approach is consistent with the applicable criteria under rule 89(1) of the NGR, and complies with the NGL.[317]

844. In the Draft Decision the Authority considered that the inflationary gain that arises should be treated as a separate item in the revenue building block, rather than deducting it from the depreciation value as it relates to the return on assets rather than nominal depreciation.

845. In its response to the Draft Decision ATCO did not accept the Authority's required amendment to adopt the CCA approach for depreciation. ATCO remains of the view that the HCA approach is the preferred depreciation approach and has resubmitted its transition method so that the change in methodology occurs over more than one access arrangement period. ATCO maintains its view that the double count for inflation should be removed from depreciation and that the ERA's approach of making an inflationary adjustment to total revenue does not comply with rule 76 of the NGR. However, ATCO states that if transparency is desired the removal of inflation from the depreciation building block can be expressly acknowledged and shown.

846. ATCO's revised proposed forecast depreciation is $127.68 million in nominal dollars.

847. The Authority has considered ATCO's proposed transition method in the Depreciation section of this Final Decision. The Authority does not approve ATCO's proposed HCA transition approach. The Authority requires that ATCO uses a CCA approach. The Authority's considerations on ATCO's proposed depreciation methodology are discussed in paragraphs 2010 to 2076.

848. Table 69 sets out the Authority's required nominal depreciation amounts by asset class for the fourth access arrangement period, derived using the CCA approach.

316 ERA, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System,* 14 October 2014, p. 127.

317 ERA, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 127.

Table 69 Authority's Final Decision Approved Straight Line CCA Depreciation (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019	Total Forecast AA4
High pressure mains - steel	1.51	3.08	3.21	3.48	3.57	3.65	18.51
High pressure mains - PE	-	0.02	0.04	0.04	0.04	0.04	0.19
Medium pressure mains	2.75	5.60	5.71	5.82	5.93	6.04	31.85
Medium/low pressure mains	3.27	6.87	7.48	8.11	8.72	9.36	43.81
Low pressure mains	0.66	1.34	1.36	1.39	1.42	1.44	7.61
Regulators	0.36	0.77	0.85	0.91	0.96	1.02	4.87
Secondary gate stations	0.11	0.23	0.24	0.26	0.48	0.60	1.91
Buildings	0.20	0.45	0.77	0.80	0.83	0.84	3.89
Meter and services pipes	6.18	13.28	14.83	16.42	18.10	19.86	88.66
Equipment and vehicles	0.71	1.47	1.66	1.61	1.77	1.91	9.13
Vehicles	-	0.34	0.88	1.06	1.37	2.36	6.00
Information technology	0.85	3.93	5.22	6.14	6.52	6.65	29.31
Full retail contestability	-	-	-	-	-	-	-
Land	-	-	-	-	-	-	-
Equity raising costs	-	-	-	-	-	0.01	0.01
Authority Approved Straight Line CCA Depreciation.	**16.61**	**37.37**	**42.26**	**46.02**	**49.70**	**53.78**	**245.74**

Source: ERA, GDS Tariff Model, September 2015.

849. The Authority accepts ATCO's proposal to deduct the inflationary gain from the nominal depreciation as is done in the Australian Energy Regulator's Post Tax Revenue Model approach as shown in Table 70.

Table 70 Authority's Final Decision Approved Regulatory Depreciation (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019	Total
Regulatory Depreciation	**7.02**	**17.66**	**21.00**	**23.47**	**26.04**	**29.09**	**124.28**
Straight line CCA depreciation	16.61	37.37	42.26	46.02	49.70	53.78	245.74
Less: Inflationary Gain	(9.58)	(19.71)	(21.26)	(22.55)	(23.66)	(24.69)	(121.46)

Source: ERA, GDS Tariff Model, September 2015.

Assessment of General Method Applied

850. ATCO's initial proposal calculated a closing capital base of $1,551.93 million in nominal dollars using a roll-forward method, applied in a manner consistent with the method contemplated in the NGR.

851. In the Draft Decision the Authority reviewed the calculation methods applied by ATCO in determining the proposed capital base values including the measure of inflation applied. The Authority revised ATCO's opening capital base consistent with rule 74 of the NGR. The Authority also required ATCO to amend its forecast capital expenditure and depreciation.

852. Table 71 shows the Authority's required amended values in real dollars as at 30 June 2014 – for the value of the capital base for the fourth access arrangement period.

Table 71 Authority's Final Decision Approved Projected Capital Base (AA4)

Real $ million at 30 June 2014	July to Dec 2014	2015	2016	2017	2018	2019
Opening Capital Base	1,005.40	1,027.83	1,087.64	1,132.38	1,165.77	1,193.96
Capital Expenditure	38.87	96.15	85.05	76.48	73.85	76.13
Depreciation	16.45	36.33	40.31	43.09	45.66	48.49
Authority Approved Closing Capital Base	**1,027.83**	**1,087.64**	**1,132.38**	**1,165.77**	**1,193.96**	**1,221.59**

Source: ERA, GDS Tariff Model, September 2015.

853. Table 72 subsequently shows the Authority's required amended values in nominal dollar terms.

Table 72 Authority's Final Decision Approved Projected Capital Base (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019
Opening Capital Base (start of period)	1,005.40	1,037.63	1,118.87	1,187.02	1,245.25	1,299.59
Inflation	9.58	19.71	21.26	22.55	23.66	24.69
Opening Capital Base (end of period)	1,014.99	1,057.34	1,140.13	1,209.58	1,268.90	1,324.28
Plus: Capital Expenditure	39.24	98.91	89.15	81.69	80.38	84.44
Less: Straight line CCA Depreciation	16.61	37.37	42.26	46.02	49.70	53.78
Authority Approved Closing Capital Base	**1,037.63**	**1,118.87**	**1,187.02**	**1,245.25**	**1,299.59**	**1,354.93**

Source: ERA, GDS Tariff Model, September 2015.

Required Amendment 6

The projected capital base in the proposed access arrangement must be amended to reflect the values in Table 72 of this Final Decision.

Rate of Return

854. This section considers ATCO's revised proposal with regard to estimating the rate of return. ATCO did not accept the approach set out in the Draft Decision.[318]

855. In response to ATCO's revised proposal, the Authority has amended its approach to estimating the return on debt and the return on equity.[319]

856. First, the Authority will continue to estimate the rate of return based on a debt proportion for the benchmark efficient entity of 60 per cent.

857. Second, with regard to the estimate of the return on equity, the Authority has determined to:

- retain the Sharpe Lintner Capital Asset Pricing Model (**CAPM**) as the primary method for estimating the return on equity;
- utilise information from other relevant models – including the Black CAPM and the Dividend Growth Model (**DGM**) – to establish the value of parameters in the Sharpe Lintner CAPM;
- estimate the risk free rate parameter for input to the Sharpe Lintner CAPM from Commonwealth Government Securities with a 5 year term to maturity;
- estimate a range for the 5 year forward looking market risk premium (**MRP**) based on historic excess return data and the DGM, in recognition that it fluctuates in response to prevailing conditions;
- draw on a range of forward looking information to establish the point value of the MRP;
- estimate the beta parameter based on a sample of Australian firms with similar characteristics to the benchmark efficient entity.

858. Third, with regard to the estimate of the return on debt, the Authority has determined to:

- continue to estimate the cost of debt as the sum of the risk free rate, relevant debt risk premium, and relevant debt raising and hedging transactions costs;
- estimate the risk free rate from the bank bill swap rate with the same term as the regulatory period, that is, 5 years;
- adopt a hybrid trailing average approach to estimating the return on debt, with the risk free rate estimated once, just prior to the regulatory period, and the Debt Risk Premium (**DRP**) estimated using an equally weighted 10 year trailing average;
- estimate the DRP based on a BBB band credit rating, for a term of 10 years, using the Authority's enhanced bond yield approach that includes international bonds issued by domestic entities;

---

318 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014.

319 The Authority accepted a submission from ATCO during the consultation period, on 22 December 2014, on ATCO's response to the Draft Decision, which has been considered for this Final Decision. The Authority did not accept ATCO's late submissions of 4 March 2015 and13 May 2015, which enclosed additional material relating to the rate of return, given the potential to further delay the Final Decision.

  - for estimates of the DRP prior to 2 April 2015, the Authority will utilise the Reserve Bank of Australia's credit spread data for the BBB band;
- annually update the estimate of the DRP.

859. The resulting nominal vanilla rate of return for the purpose of this Final Decision – for the current 2015 calendar year – is **6.02 per cent**, comprised of:[320]

- gearing of 60 per cent;
- a nominal (grossed up) return on equity of 7.28 per cent;
  - a five year risk free rate of 1.96 per cent;
  - beta of 0.7;
  - a five year forward looking MRP of 7.6 per cent;
- a nominal cost of debt of 5.172 per cent;
  - a five year swap rate of 2.431 per cent;
  - a 10 year trailing average DRP of 2.502 per cent;
  - debt raising and hedging costs of 0.24 per cent.

860. The reasons for these positions and outcomes are set out in what follows.

Regulatory Requirements

861. Rule 87 in the NGR sets out the requirements for the rate of return.

862. The overarching objective for the Authority's consideration of the rate of return proposed by ATCO is provided by rule 87(3) of the NGR:

> The allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services

863. Rule 87 includes a number of sub-rules which refer to matters the regulator is to have 'regard' to, when determining the allowed rate of return, including:

> 87. Rate of return
>
> …
>
> (5) In determining the allowed rate of return, regard must be had to:
>
> (a) relevant estimation methods, financial models, market data and other evidence;
>
> (b) the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and
>
> (c) any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

---

320 The return on debt is annually updated. The 2015 calendar year estimate for the rate of return reported here applies from 1 January to 31 December 2015. The rate of return from the start of the fourth access arrangement period (1 July 2014), through to 31 December 2014, is based on the estimate for the 2014-15 financial year, which was 5.85 per cent. The rate of return will be updated again for the 2016 calendar year, reflected the annual update to the debt risk premium under the hybrid trailing average approach.

…

(7) In estimating the return on equity under subrule (6), regard must be had to the prevailing conditions in the market for equity funds.

…

(11) In estimating the return on debt under subrule (8), regard must be had to the following factors:

(a) the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective ;

(b) the interrelationship between the return on equity and the return on debt;

(c) the incentives that the return on debt may provide in relation to capital expenditure over the access arrangement period, including as to the timing of any capital expenditure; and

(d) any impacts (including in relation to the costs of servicing debt across access arrangement periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one access arrangement period to the next.

864. In addition, rule 87 of the NGR sets out a number of additional requirements for the allowed rate of return, including that:

- it is to be determined such that it achieves the allowed rate of return objective (NGR 87(2));
- subject to the rate of return objective (NGR 87(2)), the allowed rate of return for a regulatory year is to be:
  - a weighted average of the return on equity for the access arrangement period in which the regulatory year occurs and the return on debt for that regulatory year (new NGR 87(4)(a));
  - determined on a nominal vanilla rate of return that is consistent with the estimate of the value of imputation credits (new NGR 87(4)(b));
- results in a return on debt for a regulatory year which contributes to the achievement of the allowed rate of return objective (NGR 87(8)) which is either the same in each year of the access arrangement period or which varies in each year through the application of an automatic formula (NGR 87(9) and NGR 87(12));
- incorporates a return on debt that would be required by debt investors over a relevant time period (whether shortly before the access arrangement decision, or on average over an historical period, or some combination of the two approaches) (NGR 87(10)).

ATCO's Proposed Revisions

Approach to estimating the rate of return

865. ATCO considered that following the approach in the Rate of Return Guidelines would not result in an overall rate of return that meets the requirements of rule 87 of the NGR. ATCO considers that the approach would not meet the allowed rate of return

objective, the National Gas Objective or deliver the requirements of the Revenue and Pricing Principles.[321]

Gearing

866. ATCO proposed gearing of 60 per cent debt, consistent with the requirement set out in the Rate of Return Guidelines. This is unchanged from the arrangements in the third access arrangement for the GDS.

Risk free rate

867. ATCO submitted that the risk free rate estimate should be based on Commonwealth Government Securities with a yield to maturity of 10 years, based on an 'on the day', averaging period that is close to the timing of the Final Decision.

Return on equity

868. ATCO did not adopt the approach to estimating the return on equity that was set out in the Rate of Return Guidelines.

869. ATCO submitted that the approach in the Guidelines for the return on equity did not consider all relevant methods, models, data and other evidence and instead relies only on the Sharpe Lintner CAPM.[322] In applying the chosen model, the Guidelines do not use the best estimate of the relevant parameters. The Guidelines also do not provide effective consideration of the estimate of the return on equity and debt against the ARORO, the NGO or the RPP.

870. ATCO and its consultant SFG Consulting consider that it was the Australian Energy Market Commission's (**AEMC**) clear intention, in amending NGR 87, to alter the practice of regulators relying exclusively on the Sharpe Lintner CAPM for setting the return on equity. In this context, ATCO quoted the AEMC's consideration that no one method can be relied on in isolation.[323]

871. ATCO in its proposal departed from the Rate of Return Guidelines.[324] ATCO submitted that it had:

> …taken into account a large amount of information relevant in estimating the return on equity. This information includes estimates from other relevant models, independent expert valuation reports, Wright approach, evidence considered by other Australian regulators, relationship between book to market stock returns and the term of the risk free rate. [325]

872. ATCO proposed to estimate the return on equity for the benchmark efficient entity as a simple average of estimates from the four models it considers relevant:

---

321 ATCO Gas Australia, *Access Arrangement Information*: 1 July 2014 – 31 December 2019, 3 April 2014, p. 230.

322 ATCO Gas Australia, *Access Arrangement Information*: 1 July 2014 – 31 December 2019, 3 April 2014, p. 230.

323 ATCO Gas Australia, *Access Arrangement Information*: 1 July 2014 – 31 December 2019, 3 April 2014, p. 229.

324 ATCO Gas Australia, *Access Arrangement Information*: 1 July 2014 – 31 December 2019, 3 April 2014, p. 230.

325 ATCO Gas Australia, *Access Arrangement Information*: 1 July 2014 – 31 December 2019, 3 April 2014, p. 237.

- the required return of the average firm - 11.2 per cent;
- the Sharpe Lintner CAPM – 9.9 per cent;
- the Fama-French model – 10.8 per cent;
- the DGM estimate for the benchmark efficient entity – 10.9 per cent.

873. On this basis, ATCO proposed a return on equity of 10.7 per cent.

Return on debt

874. ATCO did not adopt the approach to estimating the return on debt using the Authority's bond yield approach that was set out in the Rate of Return Guidelines.

875. ATCO submitted that the approach set out in the Guidelines does not result in an estimate of a return on debt that achieves the ARORO or complies with the NGR.

876. Instead, ATCO:

- adopted a 10 year term for the risk free rate (see above);
- accepted that the benchmark efficient entity's credit rating sits within the BBB band, as established in the Rate of Return Guidelines;
- did not accept the use of the Authority's bond yield approach for the purpose of estimating the debt risk premium (**DRP**) – seeking instead to adopt the most recent Reserve Bank of Australia's estimate for the BBB band, suggested that they are transparent, well documented and repeatable; and
- submitted that the cost of debt should be determined once and the estimate then applied to the entire regulatory period of five years without any annual updating (the so-called 'on the day' approach, which is consistent with the previous third access arrangement provisions).

877. The indicative on the day estimate for the return of debt was 7.09 per cent.

Averaging period for market based parameters

878. ATCO considered that the adoption of a 20 day period or a 40 day period is immaterial to the outcome for the rate of return.[326]

879. ATCO proposed to lodge a separate and confidential request with the Authority, prior to the Final Decision, setting out the proposed averaging period in respect of the calculation of the return on debt and the parameters used to populate the relevant cost of equity models. ATCO expected that this date would remain confidential until the Authority delivers its Final Decision, consistent with prior practice.[327]

---

326 ATCO Gas Australia, *Access Arrangement Information* 1 July 2014 – 31 December 2019, 17 March 2014, p. 232.

327 ATCO Gas Australia, *Access Arrangement Information*: 1 July 2014 – 31 December 2019, 3 April 2014, p. 232.

Debt and equity raising costs

880. ATCO proposed the inclusion of equity raising costs in its revenue modelling for the fourth access arrangement period, suggesting that this would reflect the realistic behaviour of a benchmark firm in funding its investment program.[328] However, no provision for equity raising costs was required given the expected changes in its projected RAB.

881. ATCO proposed to incorporate an allowance of 0.125 per cent into the cost of debt, which is consistent with the Rate of Return Guidelines. ATCO also proposed to incorporate a hedging allowance of 0.025 per cent into the cost of debt estimate. This allowance acknowledges the need to hedge exposure to movements of the risk free rate and is consistent with the Guidelines.[329]

Proposed rate of return

882. In summary, ATCO proposed a rate of return for the benchmark efficient entity of an indicative 8.53 per cent (as at 18 November 2013), based on:

- gearing of 60 per cent;
- an estimated return on equity of 10.7 per cent;
- an estimated cost of debt of 7.09 per cent;
- debt and hedging costs of 0.125 per cent, in line with the Guidelines.

Draft Decision

883. The Authority did not agree with ATCO's proposal in the Draft Decision.

Gearing

884. The Authority accepted ATCO's proposed gearing of 60 per cent debt, as it is consistent with assumptions in the Guidelines.

Risk free rate

885. The Authority's views on this matter – including extensive reference to theoretical support for aligning the term of the risk free rate with that of the regulatory period – were set out in detail in the Rate of Return Guidelines.[330]

886. The Authority therefore did not accept ATCO's proposal to use a 10 year term for the risk free rate, requiring instead that ATCO adopt a 5 year term risk free rate for both the return on equity and the return on debt.

---

328 ATCO Gas Australia, *Access Arrangement Information*: 1 July 2014 – 31 December 2019, 3 April 2014, p. 259.

329 ATCO Gas Australia, *Access Arrangement Information*: 1 July 2014 – 31 December 2019, 3 April 2014, p. 256.

330 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 2, p. 29.

Return on equity

887. The Authority applied the method set out in the Rate of Return Guidelines to determine the return on equity.

888. The Authority rejected ATCO's proposal to use a range of models to estimate the return on equity, determining instead that only the Sharpe Lintner CAPM is relevant for determining the return on equity.

889. The input parameters for the CAPM were:

- the 5 year risk free rate, proxied by the return on 5 year Commonwealth Government Securities (which contrasts with ATCO's proposed 10 year term);
- an estimated market risk premium (MRP) of 5.5 per cent, determined using forward looking indicators from within the Authority's estimated range, identified in the Guidelines, of 5 to 7.5 per cent;
- an estimate of beta of 0.7, based on the benchmark sample of Australian energy utilities.

Return on debt

890. With regard to the return on debt, the Authority did not accept ATCO's proposal. The Authority retained key elements of the approach set out in the Guidelines. The Authority:

- continued to estimate the cost of debt as the sum of the risk free rate, relevant annual debt risk premium (**DRP**), debt raising costs and hedging costs;
- estimated the risk free rate through the proxy of the return on 5 year Commonwealth Government Securities, consistent with the term of the regulatory period, once, at the start of the regulatory period (implying the 'on the day' approach for the risk free rate);
- retained the BBB band credit rating for the benchmark efficient entity;
- continued to annually update the estimate of the DRP, just prior to the start of each regulatory year.

891. However, the Authority also amended its approach set out in the Rate of Return Guidelines. The Authority in its Draft Decision made changes to its preferred method in terms of:

- adopting a 10 year term for the DRP – the Draft Decision acknowledged that the DRP component of the cost of debt needed to be consistent with the average term *at issuance*, which is around 10 years;
- estimating the annual DRP through an revised version of the Authority's 'bond yield approach', which develops an estimate based on an extended benchmark sample that encompasses (BBB band) corporate bonds issued by Australian non-financial entities both domestically *and* internationally;

- estimating the DRP estimate 'on the day' – just prior to the regulatory period – over a short 40 day averaging period (within 100 to 300 bp 'guiderails');[331] and
- adopted a new approach for adjusting revenue for the annual update, by applying the four updated cost of debt estimates – to occur for years 2 to 5 of AA4 – at the start of the next regulatory period through a present value neutral 'true up' adjustment to the AA5 revenue.

ATCO's Response to the Draft Decision

892. ATCO in its response did not accept the Authority's Draft Decision with regard to the rate of return.

893. ATCO considers that the Authority's estimate of the rate of return is too low to promote efficient investment. ATCO submits that the return on equity is significantly below that allowed for other gas distribution businesses in Australia – by more than 2 percentage points – as well as below that available to ATCO in its other regulated utility businesses within the ATCO Group.

894. ATCO contends this results in an inability to attract capital, which not only puts levels of service at risk, but also would result in a constant challenge to maintain compliance with its Gas Distribution Licence or regulatory obligations, while reducing the likelihood that services would be provided to future customers at all. ATCO considers that it is difficult to imagine circumstances that would result in an investor choosing to invest in ATCO to receive a return that is more than two percentage points lower than that available in any other Australian gas distribution business.[332]

Gearing

895. ATCO accepted the gearing ratio of 60 per cent set out in the Guidelines, so it did not take issue with this part of the Authority's Draft Decision.

Averaging period

896. ATCO maintains that the adoption of a 20 day or a 40 day averaging period is immaterial in outcome. ATCO considers that the benchmark efficient entity will incur additional costs from financial institutions and the market with the longer averaging period. It therefore continued to propose a 20 day averaging period.[333]

---

331 ATCO's consultant CEG noted (ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Appendix 9.2, p. 70) that Table 48 in the Draft Decision (Economic Regulation Authority, Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 14 October 2014, p. 199) indicated that the DRP estimates were based on 40 trading days, whilst other parts of the Draft Decision indicated that these estimates were in based on 7 trading days. The Authority confirms here that Table 48 was in fact incorrectly titled and that the estimates were based on 7 trading days as indicated in the remainder of the document.

332 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 177.

333 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 181.

Risk free rate

897. ATCO considers that the Authority has erred in setting the term of the risk free rate to 5 years as:[334]

- the term differs from commercial practice, which is to use the yield on 10 year government bonds;
- it misinterprets the NPV=0 principle, in particular incorrectly assuming that the end of period market value of the regulated asset is known with certainty from the beginning of the regulatory period.

898. ATCO contends that the Authority has used 'two different estimates of the risk-free rate in the two places the parameter appears in the CAPM equation' shown in (1):[335]

$$E(R_i) = R_F + \beta_i \left[\mathrm{E}(\mathrm{R}_M) - R_F \right] \quad (1)$$

Where

$E(R_i)$ is the return on asset i;

R_F is the risk free rate of return;

β_i is equity beta; and

$E(R_i)$ is the market return.

899. ATCO submit that the ERA 'adopts a MRP relative to the yield on a 10 year government bond in the second part of the equation and a 5 year term in the first part of the equation', contravening the Tribunal's GasNet decision.[336]

900. ATCO proposes that where the risk free rate is required as an input into the return on equity, CGS with a yield to maturity of ten years should be used.

901. ATCO argued that the key errors in the Authority's approach for setting the term of the risk-free rate to 5 years are as follows.[337]

Commercial practice

902. ATCO submits that the Authority's estimate is significantly different to that estimated commercially. ATCO postulates that commercial practice is to estimate the risk-free rate using the yield on 10-year government bonds. In the current market conditions, ATCO argued that the Authority's regulatory estimate of the risk-free rate (based on 5-year government bonds) is a material 0.63 percentage points below the commercial estimate.

---

334 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 184.

335 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 184.

336 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 184.

337 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 180.

903. ATCO submitted that it is accepted standard commercial practice for investors to assess the required return in accordance with the long term risk free rate. ATCO noted that the Authority maintained its view that it will set the allowed rate of return based on (generally lower) shorter term risk free rates. ATCO considered that this shows that there is a clear misalignment between the behaviour of investors and the Authority. ATCO was of the view that this misalignment creates a risk that the allowed return on regulated assets will be set below the rate that investors expect to receive on comparable assets in a commercial setting.[338]

NPV = 0

904. ATCO submitted that the Authority has erred in its interpretation of the NPV=0 principle. ATCO considered that by insisting the NPV=0 principle requires the use of a 5-year risk-free rate, the Authority must consider either of the following two assumptions, and ATCO argued that neither of these assumptions is supportable.[339]

- Its conclusion does not require that the market value of the regulated asset at the end of the regulated period is known with certainty from the beginning of the regulatory period; or
- The end-of-period market value of the regulated asset actually is known with certainty from the beginning of the regulatory period.

905. First, ATCO submitted that it is appropriate to estimate prices such that the present value of expected cash flows is equal to the asset value. However, ATCO argued that it is not necessary for the term of the risk free rate to equal the term of the regulatory period to achieve the NPV=0 principle. ATCO was of the view that the NPV=0 principle says that the term of the risk free rate should be appropriate for the cash flows that are being considered by investors.[340]

906. Second, ATCO submitted that the Authority's analysis assumed that the end of period market value of the assets in question is certain. ATCO argued that if this was the case, and the market value of the regulated assets was known with certainty from the outset, investors would be able to value the assets with reference to the cash flows over the regulatory period. There would be no need to consider any cash flows beyond the regulatory period if the end-of-period market value of the assets was known with certainty. ATCO considered that, in practice, this is not the case. ATCO was of the view that the end of period market value of assets is not known with certainty, as actual market conditions over the regulatory period are unknown. As such, ATCO considered that due to the risk associated with the market value at the end of the regulatory period, the cost of capital should reflect expectations for all future cash flows over the life of the asset.[341]

---

338 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 185.

339 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 185.

340 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 186.

341 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 186.

Inconsistency

907. ATCO argued that the Authority uses two different estimates of the risk-free rate in the two places the parameter appears in the CAPM equation (see paragraph 898 above). The Authority adopts a MRP relative to the yield on a 10 year government bond in the second part of the equation and a 5-year term in the first part of the equation. ATCO considered that this runs counter to the Tribunal's GasNet decision.[342]

908. In addition, ATCO submitted that a further issue of consistency arises due to the Authority's application of a 5 year term for equity holders and a 10 year term for debt holders. ATCO argued that as these are the same investors buying different types of securities (debt or equity) in the same firm it does not follow that the investments would be evaluated over different time horizons.[343]

Best estimate

909. ATCO proposed that where the risk free rate is required as an input into the return on equity, CGS with a yield to maturity of 10 years should be used. ATCO argued that the adoption of a 10 year term is also consistent with the practice of a number of Australian regulators. Based on this evidence and the expert evidence from SFG regarding the misapplication by the Authority of the NPV=0 principle, ATCO submitted the risk free rate estimate should be 3.58 per cent, using the 20 day averaging period to 9 September 2014.[344]

Return on equity

910. ATCO considers that the Authority's approach to estimating the return on equity ignores relevant methodology, data and previous empirical research. In consequence, it considers that the evaluation of the cost of equity in the Draft Decision is not the best estimate, and is in some cases unreasonable.

911. ATCO submits that the Authority's estimate of the return on equity is more than two percentage points lower than that allowed for other gas distribution businesses in Australia and is significantly lower than the amount historically earned by the GDS. ATCO contends this will prevent it attracting investors to facilitate the management of its service levels.[345]

912. ATCO submits that the Authority's decision to rely solely on the Sharpe Lintner CAPM to the exclusion of all other industry dividend discount models is imprudent, given the differences in the output between the Authority's model and some of the other available methodologies. This is especially the case as some of the other available models were developed specifically to address flaws in the Sharpe Lintner CAPM. ATCO contends that the Authority's omission of models such as the Fama-French

---

342 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 186.

343 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 186.

344 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 187.

345 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 177.

Model (**FFM**), the DGM and the Black CAPM on the basis of their empirical motivation is unfounded and argues that both the Black CAPM and the FFM have been found to perform better than the Sharpe Lintner CAPM.

913. ATCO also submits that the return on equity estimate in the Draft Decision is inconsistent with the ARORO, NGR and the Revenue and Pricing Principles (**RPP**)[346] and that delivering an outcome that is in accordance with the rate of return guidelines is not necessary under the NGR. [347]

914. ATCO considers that the Authority has erred in its conclusion that the SFG dividend discount model leads to an upward bias in the estimate of the required return on equity. ATCO advises that reference to the AER's Guideline makes it clear that the Authority has misinterpreted this point.

915. ATCO states that:

> AGA proposes the cost of equity be estimated after consideration of four separate cost of equity estimates, which rely upon different equations and empirical support. This approach considers all relevant estimation methods, financial models and market data in a single step, ensuring all evidence is considered in the context of its own strengths and weaknesses. This approach also has the effect of eliminating restrictions on the ability of evidence to influence the return on equity estimate.

916. The return on equity proposed by ATCO is based on a weighted average of four estimates being:

- the Sharpe Lintner CAPM – 9.80 per cent;
- the Black CAPM – 10.41 per cent;
- the FFM – 10.64 per cent
- the DGM – 10.76 per cent.

917. These four models differ from those nominated in ATCO's initial proposal, in that the 'return on the market for an average firm with a beta of 1' has now been replaced by the Black CAPM.

918. In addition, ATCO has moved from a simple average of four models to a more complex weighting. Consistent with the views of its consultant SFG, ATCO now proposes the following weightings:

- 25 per cent weight is applied to the dividend discount model; and
- a total of 75 per cent weight is applied to the three asset-pricing models; split as follows:
  - 37.5 per cent weight is applied to the FFM; and
  - 37.5 per cent to the CAPM, of which half (18.75 per cent) is based on the Sharpe Lintner CAPM and half on the Black CAPM (18.75 per cent).[348]

---

346 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 176.

347 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 180.

348 The two forms of the CAPM differ only in terms of the intercept that is used (since the same values of beta and the required return on the market are used for both models).

919. ATCO applies these weights to the return on equity estimates to arrive at an overall proposed return on equity of 10.51 per cent.

The Sharpe Lintner CAPM

A relevance of the Sharpe Lintner CAPM in determining a return on equity

920. ATCO submits that the Authority's reliance on the Sharpe Lintner CAPM as its sole model suggests that the required quality and accuracy of its parameter inputs must be exceptional.[349] However, ATCO says that in its application of the Sharpe Lintner CAPM model, the Authority commits significant errors in its estimation of the input parameters used.

921. ATCO also submits that the Sharpe Lintner CAPM is relevant and should be considered in the estimation of the rate of return and that the Sharpe Lintner CAPM has strengths and weaknesses and is affected by estimates of input parameters. ATCO notes that the Sharpe Lintner CAPM is acknowledged to have poor empirical performance, does not reflect changes in market conditions, and fails to achieve rates of return that would be consistent with the outcomes of efficient, effectively competitive markets.[350]

Risk free rate

922. As noted above, ATCO considers that the estimate of the risk free rate for input to the Sharpe Lintner CAPM should be based on Commonwealth Government Securities with a term of 10 years.

923. ATCO submits that a risk free rate derived from the yield on CGS with a term to maturity of 10 years would be closer to 3.58 per cent.[351]

Market Risk Premium

924. ATCO submits that the Authority departs from the approach outlined in its Rate of Return Guidelines for the estimation of the MRP.

925. In particular, ATCO considers that the use of the four forward indicator variables to select a point from within the 5 per cent to 7.5 per cent range was not detailed in the Guidelines. It is of the view that the Authority has incorrectly and illogically used indicator variables relative to their historical ranges to select a point estimate from within its current range for the MRP.

926. ATCO argues that any consideration of indicator variables relative to their history can only be used to inform the estimate of the MRP relative to its history and that the leading indicators approach can be used to infer information about the MRP over the same historical period. ATCO argues that the Authority's approach uses one subset of evidence to determine that the current MRP lies between 5 per cent and 7.5 per

---

349 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 183.

350 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 199.

351 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 199.

cent. The Authority then compares another subset of evidence (the four forward looking variables) to their historical ranges. Such a method may determine that the current MRP is below or above some historical point in time. However, it does not provide any evidence to determine which point in the Authority's estimate of the current range should be selected.[352]

927. With respect to the range for the MRP, ATCO submits that the Authority's studies are outdated and should be adjusted based on the assumptions relating to gamma.[353]

928. In relation to the historical data used, ATCO submits that the Authority does not present an estimate of the Ibbotson or Wright approach in the Draft Decision. As both the Ibbotson and Wright approaches are relevant to the estimation of the MRP, the Authority should use both approaches to process the historical return data. In addition, ATCO claims that there are inaccuracies in the Brailsford historical estimates that should be corrected.[354]

929. ATCO submits that the Authority's interpretation of some of the estimates in the sample results in a downward bias in the MRP estimate. These issues relate to the Authority not using the most contemporaneous data and incorrectly interpreting that all DGM estimates have been presented as being with-imputation. Correctly interpreted, the Authority's sample results in an estimate of the required return on the market of at least 11.70 per cent and an estimate of the MRP of at least 8.75 per cent.[355]

930. ATCO states that the Authority uses two different estimates of the risk-free rate in the two places the parameter appears in the CAPM equation (that is, $r_e = r_f + B(r_m-r_f)$) in its response to the Draft Decision on the risk free rate. The Authority adopts a MRP relative to the yield on a 10 year government bond in the second part of the equation and a 5 year term in the first part of the equation. This runs counter to the Tribunal's GasNet decision.[356]

931. ATCO submits that the Authority's current MRP results in a return on equity that falls outside the range of the estimates in the Grant Samuel valuation report. This is based on ATCO's view that the current resulting return on equity estimate of 8.45 per cent should receive more weight because it applies to near term cash flows and that an estimate of the Authority return on equity should be adjusted downward for the effect of excluding imputation credits.[357]

---

352 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 188.

353 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 188.

354 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 191.

355 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 191.

356 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 184.

357 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 197.

932. Based on SFG's advice, ATCO submits that the estimate of the required return on the market should be 11.19 per cent, as estimated through the weighted average.[358]

Equity beta

933. ATCO submits that the Authority's Draft Decision in respect of equity beta is subject to the following key errors: (i) the Authority incorrectly takes the view that the very small set of domestic comparators is able, by itself, to produce a reliable estimate of equity beta; and (ii) the Authority fails to have regard to international comparators, which is relevant to the estimation of equity beta.[359]

Methodological issues

934. ATCO submits that the Authority's range represents the point estimate from domestic comparators and one end of the 95 per cent confidence interval from its bootstrap analysis. ATCO argues that it is not clear how to interpret a range that combines a point estimate at one end with a statistical upper bound at the other.

935. ATCO submits that the Authority's equity beta estimates vary across methodological choices and over time, and that the Authority's beta estimates comprise an implausible variation in the systematic risk of the firms sampled. ATCO then argues that as the variation in the Authority's beta estimates do not plausibly reflect the variation in the true systematic risk of comparator firms, it is unlikely that the Authority's estimates would reliably reflect the level of systematic risk in the comparator firms.

936. ATCO also submits that the Authority noted that its use of Friday to Friday return is consistent with that suggested by Henry and commonplace throughout academic literature. However, ATCO argues that there is no conceptual or statistical reason to prefer one day of the week to any other and there is no uniform standard day of the week that is generally used in academic literature. ATCO is of the view that this issue is compounded by the fact the Authority's sample is so small that variation in beta estimates from day to day does not cancel out. ATCO considers that in a larger sample this variation would tend to cancel out.[360]

Use of international comparators

937. ATCO notes that the Authority used foreign comparators for the purposes of estimating the equity beta in rail businesses due to the lack of comparators in the domestic market. ATCO argues that it is not clear how the Authority can determine that the presence of only 6 comparators for the rail networks cannot produce a reliable estimate of equity beta and therefore international data is required to produce a robust estimate. However, the Authority concludes that for the purpose of

---

358 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 197.

359 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 192.

360 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 193.

estimating equity beta for ATCO, the four currently listed comparators do produce reliable estimates for beta.[361]

938. In addition, ATCO considers that the Authority has been inconsistent in its consideration of the relevance of international data for different parameters. According to ATCO, the Authority considers that it is appropriate to consider international data for the cross check of regulatory precedent of the return on equity and have included international bonds in the sample from which the DRP estimate is derived. However, the Authority is still of the opinion that international comparators are not relevant to the estimation of equity beta. ATCO argued that it is not clear how the Authority has arrived at the conclusion that international data can be relevant for some parameters but not for others.[362]

Best estimate

939. ATCO proposes that where the equity beta is required as an input, an estimate of 0.82 be applied. This estimate of equity beta of 0.82 was drawn from the SFG (2014) study which was based on the sample of 9 Australian and 56 US listed stocks. ATCO argued that this estimate overcomes the reliability issues caused by the Authority's small sample size. ATCO submits that the Australian-listed firms are consistent with those relied upon by the Authority while the US-listed firms have been selected after careful analysis for industry classifications, the proportion of assets regulated and liquidity. ATCO also considers that as information from an Australian-listed firm will be more relevant than information from a U.S.-listed firm, Australian observations have received twice the weight of those from the US.[363]

940. In summary, ATCO submits that its estimate of 0.82 for the equity beta is a better estimate than the estimate produced in the Authority's Draft Decision.[364]

The Fama French three-factor model

941. In its response to the Draft decision, ATCO submits that the FFM is relevant, theoretically sound and is commonly used by market practitioners as well as in academic research. Therefore, ATCO contends that the FFM should be considered in setting the return on equity.

942. As part of its response to the Draft Decision, ATCO submitted a report prepared by SFG in May 2014 for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid and SA Power Networks. In SFG's report, empirical estimates of the cost of equity capital using the Fama-French model are presented. SFG performed its analysis using a sample of nine Australian-listed stocks and 56 US-listed stocks.[365]

---

361 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 194.

362 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 195.

363 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 194.

364 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 194.

365 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 33.

943. In its report, SFG argues that:[366]

> The results of Fama and French (1993) led to a substantial body of literature devoted to theoretical reasons for their empirical result. Those theoretical explanations are based upon the asset pricing theories already developed in the 1970s – the intertemporal CAPM and the arbitrage pricing theory.

and that:

> To conclude that the Fama-French model is without theoretical foundation is incorrect. It is not appropriate to dismiss the theoretical underpinnings of the model merely because the empirical result was observed first.

944. SFG also argues that instead of outright rejection of a model on the basis of poor quality research that it had previously been used to conduct, models should be considered on the basis of their reliability and on the robustness of the best estimates that they have been used to produce. [367]

945. On the basis of SFG's (2014) study, ATCO submits the following estimates for inputs utilised in the FFM:

- Market beta of 0.77
- Ex-imputation MRP of 6.53 per cent
- Risk premium in relation to the size factor of -0.19 per cent
- Risk premium in relation to the book-to-market of 1.15 per cent
- Risk free rate and required return on the market as specified in the Sharpe Lintner CAPM model, which is 3.58 per cent. [368]

946. ATCO submits that the estimate of a return on equity using the FFM is 10.64 per cent.

SGF's Fama-French model (2014)

947. ATCO used SFG's estimate of the return on equity using the Fama-French three factor model as the basis for its response to the Authority's Draft Decision on the issue. This report was originally prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks. Key issues from this SFG study can be summarised as below.

948. SFG argues that the use of the Fama-French model is supported by empirical evidence, has theoretical support and is extensively used to estimate normal returns on investment. SFG argues that it supports the use of the Fama-French model as one of many approaches to estimating the cost of equity for the benchmark firm,

---

366 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 45.

367 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 24.

368 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, pp. 200-201.

alongside the Sharpe-Lintner CAPM, the Black CAPM and the dividend discount model.[369]

Theory

949. SFG argues that theoretical explanations for the Fama French three-factor model are based upon the asset pricing theories already developed in the 1970s – the intertemporal CAPM and the arbitrage pricing theory. SFG considers that concluding that the Fama-French model is without theoretical foundation is incorrect and that it is not appropriate to dismiss the theoretical underpinnings of the model merely because the empirical result was observed first.[370]

Computations

950. SFG agrees that, in the Fama-French model, there is uncertainty over the magnitude of risk exposures (*s* and *h*) of the firm to the size and value factors (SMB and HML), as well as the appropriate level for the SMB and HML factors in terms of return per unit of risk. SFG contends this uncertainty exists in estimating the cost of equity in the Sharpe Lintner CAPM, where *s* and *h* are set to zero.[371] SFG argues that setting *s* and *h* are set to zero 'simply shifts the cost of equity estimate to the Sharpe Lintner CAPM estimate', but 'does not improve the precision of the estimate'.[372]

Implications for asset pricing models

951. SFG considers that if the Fama-French model is not given any consideration, the estimated cost of equity will be understated. SFG argues that if the Authority were to rely solely upon the Sharpe-Lintner CAPM, populated with a regression-based estimate of beta, the Authority would adopt a second-best solution, because it would ignore the empirical evidence that the HML factor proxies for risk.[373]

SFG's estimates (2014)

952. SFG performs the analysis on a sample of nine Australian-listed stocks, and 56 U.S.-listed stocks.[374]

953. The sample of Australian-listed stocks is disaggregated into six portfolios, consistent with the technique of Fama and French (1993). There is a split according to size

369 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 2.

370 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 2.

371 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 2.

372 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 2.

373 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 3.

374 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 33.

(small and big) and a split according to the book-to-market ratio (high, medium and low).[375]

954. SFG presents that, for the two markets, SMB and HML have been estimated as the historical annual average using all information available. For Australian-listed firms, a dataset of 29 years and two months ending in February 2014 is used. The mean value for SMB is −0.43 per cent (with a standard error of 3.17 per cent) and the mean value for HML is 9.97 per cent (with a standard error of 3.42 per cent). For U.S.-listed firms, a dataset of 86 years ending in 2012 is used. The mean value for SMB is 3.58 per cent (with a standard error of 1.53 per cent) and the mean value for HML is 4.81 per cent (with a standard error of 1.49 per cent). The risk premiums for SMB and HML, for both Australia and the U.S., do not include any compensation for imputation credits.[376]

955. SFG also presents a material, positive risk premium associated with the book-to-market factor. For the Australian-listed firms, this is estimated at 2.99 per cent, and for the U.S.-listed firms this is estimated at 0.56 per cent, placing equal weight on outcomes from analysis of individual firms and an equal-weighted index. The overall risk premium estimate associated with the Fama-French model is 6.10 per cent for Australian-listed firms, and 5.98 per cent for U.S.-listed firms.[377]

956. Three different sets of outcomes are presented in the SFG report: (i) the average outcomes from analysis of individual firms; (ii) estimates from equal-weighted indices; and (iii) results which place equal weight on outcomes from the individual firm means and index analysis.[378]

957. In addition, SFG considers that size factor and book-to-market factor are given 24 per cent weight on Australian-listed firms and 76 per cent weight on U.S.-listed firms in estimating compensation for exposure to the market factor. SFG considers that the basis for these percentages is that double the weight is placed on an Australian observation compared to a U.S. observation.[379]

958. SFG concludes: (i) The risk-fee rate of 4.12 per cent; (ii) Compensation for exposure to the market factor of 4.74 per cent; (iii) Compensation for exposure to the size factor of –0.19 per cent; and (iv) Compensation for exposure to the book-to-market factor of 1.15 per cent.[380]

---

375 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 34.

376 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 37.

377 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 37.

378 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 36.

379 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 42.

380 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 42.

959. On the basis of the above estimates, SFG concludes that a return on equity is 9.82 per cent.[381] Taking into account the value of imputation credits of 0.25, SFG considers that the return on equity of 10.87 per cent is appropriate.[382] SFG also notes that if the value of imputation credit of 0.50 is adopted, then the return on equity is 11.63 per cent.[383]

The Black CAPM

960. In its response to the Draft Decision, ATCO advises that there is a significant body of academic literature, as well as extensive regulatory use of the Black CAPM in the USA to support the assertion that the Black CAPM's empirical performance is superior to that of the Sharpe Lintner CAPM.[384]

961. ATCO submits that although the Black CAPM has the same theoretical basis as the Sharpe Lintner CAPM, the Black CAPM requires the estimation of one additional parameter, the zero beta premium. ATCO advised that at the time of its original proposal for the fourth access arrangement period, no precise estimates were available for the zero-beta premium for the Australian market. Since this time, however, ATCO has located a NERA (2013) study that provides evidence that there is no statistically significant relationship between beta (as estimated by Australian regulators) and subsequent returns. ATCO submits that this implies a flat CAPM line whereby all firms have the same expected return as the market regardless of their beta estimates.[385]

962. On the basis of a study conducted for ATCO by SFG in 2014, ATCO argues that the return on equity estimated using the Black CAPM model is 10.41 per cent.

963. SFG considers that the Black CAPM does not rely upon the assumption that all investors can borrow at the risk-free rate of interest. Rather, the Black CAPM relies on the assumption that investors are able to short sell risky assets. While in reality investors do not have infinite power to short sell every risky asset, they can short sell to some degree. SFG asserts that this alternative assumption leads directly to the equation which states that the expected return on a risky asset is equal to the return on a zero beta asset R_z plus a premium for bearing systematic risk $\left[\beta_i\left(E(R_M)-R_z\right)\right]$.

964. The zero beta premium refers to the difference between the return on a zero beta asset and the risk-free rate $(R_z - R_F)$.[386]

---

381 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 43.

382 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 43.

383 SFG Consulting (2014) *The Fama French Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 42.

384 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 199.

385 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 200.

386 SFG Consulting (2014) *Cost of equity in the Black Capital Asset Pricing Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 3.

965. SFG argues that the empirical evidence regarding the Sharpe Lintner CAPM suggests that the intercept term in the CAPM should lie above the risk-free rate of interest, and that the return per unit of risk will be less than the market risk premium. As the intercept increases and the return per unit of risk falls, SFG argues that the expected return on stocks with low beta estimates goes up, and the expected return on stocks with high beta estimates goes down. SFG submitted that the empirical evidence is consistent with the Black CAPM, with an input for R_z which is above R_F.

966. In order to estimate a return for a zero beta portfolio R_z. SFG followed two steps.[387]

- First, a portfolio must be formed. SFG argued that rather than analyse returns on individual stocks, returns on portfolios of stocks are analysed to minimise the "noise" in historical stock returns. In this context, noise is the difference between realised returns and expected returns. SFG submitted that the portfolios are formed so that each portfolio has similar industry, size and book-to-market characteristics in order to minimise noise. The objective is to maximise the difference in beta estimates across portfolios, but to minimise the difference of other characteristics likely to affect stock returns.
- Second, a regression of portfolio returns every four weeks on two independent variables is conducted: (i) *beta* × *market returns* and (ii) *(1 – beta)*. SFG submitted that the coefficient on the second independent variable *(1 – beta)* is an estimate of the zero beta return. To estimate the zero beta premium, the average four-weekly risk-free rate, measured as the yield to maturity on 10-year government bonds is subtracted from the zero beta return over the sample period.

967. The SFG (2014) study for ATCO indicated that the estimate of the return on the zero beta portfolio is 0.6880 per cent over four weeks. This represents an annualised return of 9.36 per cent. Over the sample period, the average yield to maturity on 10-year government bonds was 0.449 per cent, which is equivalent to 6.02 per cent per year. The average market return was 0.900 per cent, or 12.40 per cent per year.

968. SFG concluded that the estimated return on the zero beta asset lies between the normal estimate of the risk-free rate of interest and the average market return. The zero beta premium (the difference between the zero beta return and the estimate of the risk-free rate) is estimated at 0.239 per cent over four weeks, or 3.34 per cent per year.[388]

---

387 SFG Consulting (2014) *Cost of equity in the Black Capital Asset Pricing Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, pp. 21-2.

388 SFG Consulting (2014) *Cost of equity in the Black Capital Asset Pricing Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 27.

969. SFG found that the Black CAPM model yielded an estimate of 10.62 per cent for the 20 day trading period until 12 February 2014 for the return on equity when the following parameters were used:[389]

- MRP = 7.21%
- equity beta = 0.82
- 10 year risk free rate = 4.12%

$$r_e = (4.12\% + 3.34\%) + 0.82 \times \left[(4.12\% + 7.21\%) - (4.12\% + 3.34\%)\right] = 10.62\%$$

970. The Authority notes that, in SFG's report prepared for ATCO in response to the Authority's Draft Decision in November 2014, with an updated risk free rate of 3.58 per cent and the zero-beta premium of 3.34 per cent, the required return on equity using the Black CAPM is 10.41 per cent.[390]

The Dividend Growth Model

971. In its response to the Draft Decision, ATCO submitted that it was inconsistent for the Authority to use the DGM model for the estimation of a range for a parameter to be used in the Sharpe Lintner CAPM model (the MRP), but not to consider this model for the estimation of the cost of equity for the overall market for a benchmark firm.[391]

972. ATCO submitted that the DGM estimates are relevant information for the purposes of estimating the required return on equity because of the variables included in the model. ATCO's estimate for the required return on equity for the benchmark comparable firm is 10.76 per cent using the DGM based on SFG (2014) study.[392]

973. SFG's (2014) study was conducted in May 2014 in response to the AER's Rate of Return Guidelines. In this study, individual analyst forecasts of earnings per share, dividends per share and price targets over the 11.6 year period from 1 June 2002 to 20 February 2014 from the Institutional Brokers' Estimate System ("IBES") were collected for Australian-listed firms.[393]

974. SFG's estimate of the required return on the market is 10.32 per cent, excluding any benefit from imputation credits. In addition, the risk-free rate of 4.12 per cent is the annualised yield to maturity on 10-year government bonds, averaged over 20 trading days ending on 12 February 2014. As such, SFG argued that excluding any

---

389 SFG Consulting (2014) *Cost of equity in the Black Capital Asset Pricing Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 37.

390 SFG Consulting (2014) *The required return on equity: Response to ATCO Gas Draft Decision*, a report for ATCO Gas Australia, p. 71.

391 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 201.

392 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 201.

393 SFG Consulting (2014) *Alternative version of the dividend discount model and the implied cost of equity,* a report prepared for Jemena Gas Networks, ActewAGL, APA, Ergon, Transend, Networks NSW, Transend and TransGrid, p. 49.

consideration of imputation benefits, the dividend discount model analysis implies a market risk premium of 6.20 per cent.[394]

975. In the same study, SFG argued that a listed energy network has a risk premium that is 0.94 times the risk premium for the market. Excluding any benefit of imputation credits, SFG concluded that this implies a risk premium of 5.85 per cent (that is, 0.94 × 0.0620 = 5.85 per cent). SFG argued that adding the risk-free rate to this premium implies a cost of equity of 9.97 per cent, excluding imputation benefits. SFG also submitted that if the value of imputation credits is estimated at 0.50 or 0.25, the return input in the post-tax revenue model needs to be 12.10 per cent or 11.04 per cent, respectively.[395]

Return on debt

976. ATCO did not accept the approach set out in the Authority's Draft Decision to determine the return on debt. ATCO submits that:[396]

> The approach outlined by the ERA does not result in an estimate of a return on debt that achieves the ARORO or complies with the NGR.[397] This is because it:
>
> - Is not consistent with an implementable efficient debt management strategy
> - Is based on a debt management strategy that cannot be replicated and consequently does not provide an estimate of the benchmark efficient entity's cost of debt at all
> - Unnecessarily constrains the estimate of the DRP and restricts the ability of the benchmark efficient firm to recover the efficient cost of debt
> - Introduces additional requirements for an annual update that has no other effect than to increase the risk faced by the business with no additional compensation
> - Is not based on the best available data, this results in an estimate that does not provide an opportunity to recover the full efficient costs of debt
> - Does not provide the best estimate of the benchmark efficient entity's efficient cost of debt.
>
> For these reasons AGA does not consider the ERA's approach in the Draft Decision reflects the requirements of rule 87 of the NGR, nor does it contribute to the achievement of the NGO or RPP.[398]

977. ATCO instead set out a new approach, which revised its approach with regard to the return on debt as compared to its initial proposal. ATCO now proposes a 'hybrid' trailing average approach to the cost of debt:

- combining a 10 year trailing average of the 10 year DRP; with a

---

394 SFG Consulting (2014) *Alternative version of the dividend discount model and the implied cost of equity,* a report prepared for Jemena Gas Networks, ActewAGL, APA, Ergon, Transend, Networks NSW, Transend and TransGrid, p. 59.

395 SFG Consulting (2014) *Alternative version of the dividend discount model and the implied cost of equity,* a report prepared for Jemena Gas Networks, ActewAGL, APA, Ergon, Transend, Networks NSW, Transend and TransGrid, pp. 59-60.

396 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2.

397 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2.

398 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2.

- 5 year 'swap contract overlay' to reset the base rate of interest.

978. The DRP for each of the 10 years would be measured as the spread to swap for a 10 year term. The 10 year term is consistent with the revised term for the DRP adopted in the Authority's Draft Decision. ATCO proposes using the Reserve Bank of Australia (**RBA**) estimates – extrapolated to give a 'true' 10 year term – to estimate the 10 year DRP.

979. The trailing average estimate of the DRP would then equally weight the past 10 years' annual estimates of the DRP.

980. The resulting10 year trailing average is proposed to be updated annually. In each year of the regulatory period, the most recent annual estimate of the DRP would be added into the ten year trailing average, while the estimate from what then becomes 11 years ago is dropped from the trailing average.

981. ATCO assume use of the 'swap contract overlay' for the benchmark efficient firm; or in other words, that the firm undertakes swaps for the base rate as an efficient debt management strategy. The implication for the regulated return on debt is that the base rate of interest is determined by 5 year bank bill swap rates, once, at the beginning of the regulatory period (that is, similar to the previous 'on the day ' approach, but just for the risk free rate component).

982. ATCO propose to add a margin for hedging and administration costs.

983. ATCO's consultant CEG summarises this hybrid approach as follows:

> …if the benchmark efficient entity is assumed to have entered into hedging contracts using swaps to reset its base rate of interest every five years, its trailing average cost of debt could be altered in a manner that gives rise to a 'hybrid' cost of debt. This is a hybrid of a trailing average debt risk premium (DRP) and a prevailing base rate of interest that its debt related costs would equal [2]:

$$Costs = Swap_{0,5} + (TACorporate\ Yield_{10} - TASwap_{10}) + Transaction\ Costs \quad (2)$$

Where

$Swap_{0,5}$ is the 5 year swap rate prevailing at the beginning of the regulatory period;

$TACorporate\ Yield_{10}$ is the trailing average of 10 year corporate debt yields;

$TASwap_{10}$ is the trailing average of 10 year swap rates; and

$Transaction\ Costs$ is the transaction costs of the strategy – including the transaction costs associated with the relevant swap contracts.

984. No transitional arrangements are proposed.

New Issuance Premium

985. ATCO made a submission subsequent to lodging its revised proposal, proposing that a new issue premium be added to the cost of debt.[399]

986. ATCO submits that when a network business raises debt to fund expenditure, it issues new bonds to bond holders in the primary market. ATCO argues that the proposed sources of debt data used by the ERA to measure the cost of debt are observations from the secondary debt market. On the basis of a report by CEG, ATCO argues that the new issue premium measures the difference between the price at which a network business can roll over its debt portfolio and prices from secondary markets where the debt is resold. ATCO submits that the current estimate of the new issue premium is 0.27 per cent.[400]

987. In its report, CEG noted that distinct methods have been employed to arrive at an estimate of the new issue premium.[401] The first method is to compare the yield on a bond at issuance with a benchmark estimate of the secondary market yields for similar bonds on the same day. The second method is to estimate the change in a bond's yield in the immediate week(s) after it is issued taking into consideration general movements in interest rates that might explain some part of that change. In this method, if yields (adjusted for general movements in interest rates) tend to fall after issuance then this is evidence that a new issue premium exists.

988. CEG submits that the second method to estimate the new issue premium is a more robust method because this method does not require the identification of a benchmark secondary market yield series that closely matches the characteristics of each newly issued bond.[402]

989. Under CEG's approach of estimating the new issue premium, a sample of newly issued bonds is developed and named as the unrestricted sample. Bonds will be included in this sample if the following criteria are met: (i) bonds that report an issue price; (ii) bonds rated between BBB- and A+ by S&P; (iii) bonds were issued by an Australian domiciled entity; (iv) bonds were issues in AUD; USD; EUR or GBP; and (v) bonds had a BVAL yield available from Bloomberg on one or more of the dates: 2, 4, 6, 8, 10, 12, 14 or 16 weeks after the issue date.[403]

990. CEG noted that, for any given measurement period, an unrestricted sample includes from 325 to 355 bonds for which the new issue premium can be calculated. The mean new issue premium in this sample is 5 bp. The 12 week new issue premium measured relative to movements in swap curves is 16 bp.[404]

---

399 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014.

400 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, p. 2.

401 Competition Economists Group, 2014, *The new issue premium*, A report prepared for Citipower, Jemena, Powercor Australia, SA Power Networks, AusNet Services and United Energy, October 2014, p. 3.

402 Competition Economists Group, 2014, *The new issue premium*, A report prepared for Citipower, Jemena, Powercor Australia, SA Power Networks, AusNet Services and United Energy, October 2014, p. 3.

403 Competition Economists Group, 2014, *The new issue premium*, A report prepared for Citipower, Jemena, Powercor Australia, SA Power Networks, AusNet Services and United Energy, October 2014, p. 4.

404 Competition Economists Group, 2014, *The new issue premium*, A report prepared for Citipower, Jemena, Powercor Australia, SA Power Networks, AusNet Services and United Energy, October 2014, p. 5.

991. CEG also considers a restricted sample of broad BBB (BBB- to BBB+) bonds with a maturity of between 5 and 15 years. CEG notes that the restricted dataset is adopted as CEG's core dataset. The mean of the new issue premium of the core data set is 21 bp. The 12 week new issue premium measured relative to movements in swap curves is 31 bp.[405]

992. CEG argues that estimates of the new issue premium at longer measurement periods, where they are statistically significant, are likely to be more robust than estimates at shorter measurement periods. In addition, CEG considered that the new issue premiums on the core sample can reasonably be represented as: (i) 21 bp measured against changes in fair value yields, being the simple average of the new issue premium estimates from 8 weeks to 16 weeks; and (ii) 32 bp measured against changes in swap yields, being the simple average of the new issue premium estimates from 8 weeks to 16 weeks.[406]

993. CEG then concluded that, having regard to the full range of new issue premium estimates, the best estimate of the new issue premium based on the core sample to be 27 bp. This is based on a simple average of all new issue premium estimates with lags of between 8 and 16 weeks. CEG argued that it regards this estimate of 27 bp as the best estimate of the new issue premium for the purposes of adding this to a Bloomberg or RBA fair value curve.[407]

Rate of return

994. ATCO's resulting rate of return proposal set out in its response to the Draft Decision is 7.64 per cent, comprised of:

- gearing of 60 per cent; in combination with
- a return on equity of 10.51 per cent;
- a return on debt of 5.73 per cent.

Submissions

995. The Authority received submissions from the following parties in response to its Draft Decision on the WACC:

- Alinta Energy (**Alinta**)
- Dampier to Bunbury pipeline, (**DBP**)
- Alcock Brown-Neaves Group (**ABN**)
- Wesfarmers Kleenheat Gas (**Kleenheat**)
- The Chamber of Minerals and Energy of Western Australia (**CME**)
- The Chamber of Commerce and Industry WA (**CCIWA**)
- Energy Networks Association (**ENA**)

---

405 Competition Economists Group, 2014, *The new issue premium*, A report prepared for Citipower, Jemena, Powercor Australia, SA Power Networks, AusNet Services and United Energy, October 2014, p. 6.

406 Competition Economists Group, 2014, *The new issue premium*, A report prepared for Citipower, Jemena, Powercor Australia, SA Power Networks, AusNet Services and United Energy, October 2014, p. 53.

407 Competition Economists Group, 2014, *The new issue premium*, A report prepared for Citipower, Jemena, Powercor Australia, SA Power Networks, AusNet Services and United Energy, October 2014, p. 7.

- ATCO Gas Australia (**ATCO**)

996. Alinta considers that ATCO may be discouraged from investing on the basis of the debt risk management strategy proposed by the Authority, because an ex-post update of the DRP would create price volatility at the beginning of each access period.

997. Kleenheat, ABN, CME, CCIWA, ENA, DBP and ATCO expressed concerns that a reduction in the rate of return may also discourage potential investors as the allowance is significantly lower than that approved by the AER. This may also impede investment in other assets such as gas transmission and electricity infrastructure.

998. The ENA considers that given the recent volatility in the cost of finance, the Authority's approach to determining the debt risk premium is arbitrary and inconsistent with the rate of return objective. ENA also disagreed with the Authority's approach for calculating the cost of equity, suggesting that not enough consideration had been given to all of the relevant evidence. The ENA also submitted that the equity beta assumption adopted by the Authority is too low in light of relevant evidence.

999. The ENA and DBP both submitted that the Authority's proposed MRP of 5.5 per cent is too low, and is contrary to the Rate of Return Guidelines where the forward looking MRP using the DGM falls within the range of 6.0 per cent and 7.5 per cent.

1000. DBP considered that the Authority should give further consideration to a range of empirical tests in order to ensure that its final decision is consistent with the Rate of Return Guidelines and with rule 87 of the NGR:

- a model adequacy test comparing the return on debt and the return on equity suggests that firms with low betas similar to the benchmark efficient entity's range have earned 8.278 per cent more on average than the risk free rate over the past four decades;
- consideration of the elasticity of the return on equity to the return on debt, which DBP contends should be around 6, implies a return on equity of 11.65 per cent given the Draft Decision's return on debt of 5.22 per cent; and
- DBP therefore concludes that sole reliance on the SL-CAPM to determine the rate of return on equity has resulted in a rate of return that is too low.

1001. ATCO submitted that the Authority should allow for a new issuance premium of 0.27 per cent in its cost of debt calculations, as this would be reflective of the costs of a benchmark efficient entity and would satisfy the requirements of ARORO.

1002. ATCO considers that the Authority is inconsistent in its application of the perpetual term for the estimation of the rate of return for rail businesses but not for gas businesses.

1003. ATCO, GGT and DBP made submissions to the Authority in response to its Return on debt Discussion Paper, released 4 March, 2015.

1004. ATCO's submissions focussed on the following:

- ATCO submitted that a transition to the hybrid trailing average approach is not required by the NGR and fails to meet the allowed rate of return objective (ARORO), revenue and pricing principles and National Gas Objective.

- It is incorrect to give zero weight to the efficient costs associated with past investment
- The Authority's estimate of the hedging costs associated with the hybrid trailing average is incorrect

1005. GGT submitted that the on the day approach to estimating the cost of debt is the most efficient approach, and provides superior signals for investment compared to a trailing average or hybrid trailing average approach.

1006. DBP agreed with ATCO that a transition to the hybrid trailing average approach was not necessary.

1007. DBP suggested that the Authority's calculations were not transparent enough to be replicable using the described time series of forecasts.

1008. DBP also submitted that the Authority did not conduct adequate testing of the annual update model that it now proposes to use for ATCO's return on debt calculations. DBP suggests that the tests undertaken by the Authority were related to the predictive power of various models used to determine the risk free rate, and not the predictive power of different models of the debt risk premium or the total cost of debt.

1009. DBP agreed that both of the hybrid trailing average approaches suggested by ATCO and the Authority are preferable to the current approach. DBP also agrees with the Authority's PTRM approach to weighting the cost of debt and suggest that this should be applied regardless of which trailing average approach is adopted by the Authority.

Considerations of the Authority

1010. The Authority notes ATCO's view that the approach to estimating the return on equity, set out in the Draft Decision, would not result in an overall rate of return that meets the requirements of rule 87 of the NGR, the National Gas Objective or deliver the requirements of the Revenue and Pricing Principles. As these views relate to the construction of the estimate, the key points are addressed in relevant sections in what follows.

1011. The Authority's considerations with regard to ATCO's response to the Draft Decision are set out in what follows, with regard to:

- the estimate of the risk free rate;
- the estimate of inflation;
- the return on equity;
- the return on debt.

Risk free rate

1012. The Authority adopted a 5-year term for the risk free rate in the Draft Decision, and applied that in its estimate of the return on equity.

1013. The Authority considers that a 5-year term for the risk free rate is consistent with the 'present value principle', and with investors' horizons with regard to the regulated assets, given the 5-year regulatory period (see discussion below under the heading 'The present value condition').

1014. A 5-year term also underpins the estimate of the risk free rate included in the return on debt, although the Authority now estimates the base rate for the return on debt as the 5-year swap rate.

Averaging period

1015. In the Draft Decision, the Authority determined that the averaging period should be a 40 day period, consistent with the position set out in the Guidelines.[408]

1016. However, the Authority subsequently accepted a proposal from ATCO for a 20 day averaging period ending 2 April 2015.[409,410]

1017. The average of the observed 20 days of the 5-year Commonwealth Government Securities (**CGS**) risk-free rate as at 2 April 2015 was 1.96 per cent. This provides a point estimate for the risk free rate for the return on equity.

1018. The average of the observed 20 days of the 5-year BBSW risk-free rate as at 2 April 2015 was 2.431 per cent. This provides a point estimate for the risk free rate for the return on debt.

1019. The issue of the averaging period for the debt risk premium is dealt with the section in the return on debt below.

The present value condition

1020. As noted above, ATCO submits that the Authority has erred in its interpretation of the NPV=0 principle. In particular, ATCO's consultant SFG considers that the key point is crystallised as follows:[411]

> a) If the market value[412] of the asset at the end of the regulatory period is known with certainty right from the start of the regulatory period, setting the term of the risk-free rate equal to the term of the regulatory period will be consistent with the NPV=0 principle – because the asset can be valued with reference to cash flows over the regulatory period only; and
>
> b) If the market value of the asset at the end of the regulatory period is not known with certainty right from the start of the regulatory period, setting the term of the risk-free rate equal to the term of the regulatory period will not be consistent with the NPV=0 principle

---

408 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 151.

409 Economic Regulation Authority RE: ATCO Gas Australia's Nomination of the Averaging Period to Calculate Market Based Parameters of the Rate of Return, 19 February 2015.

410 The Authority notes that DBP in its response to the Authority's Discussion Paper on estimating the return on debt (Dampier Bunbury Pipeline, *Estimating the Return on Debt: Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 7) suggests that a longer averaging period – up to 60 days – could be adopted with little loss of predictive power. The Authority acknowledges this point.

411 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 48.

412 To be clear, we reiterate that it is the end-of-period market value of the asset that must be known with certainty, not the end of- period RAB. The RAB is not a value, it is an input into a regulatory formula that determines the allowed price. Lally (2013 QCA) is very clear about this point in his worked example where the RAB is obviously known from the outset and he shows that a certain end-of-period market value is required before the term can be set to the length of the regulatory period.

– because the asset would be valued with reference to cash flows extending beyond the end of the regulatory period.

1021. However, the Authority considers that ATCO's contention – that the *market value* of the business at the end of the regulatory period must be known with certainty – is a separate issue to the certainty of the Regulated Asset Base (**RAB**). Lally summarises why such a conflation is misleading, as follows:

> …this proposition assumes that the resetting process at the end of each regulatory cycle (typically five years) must be such as to equate the market value of the firm's equity with its regulatory book value at that time, and this is not possible because share prices of regulated businesses are influenced by factors beyond the regulatory period. However the QTC seem to be conflating the share price of a regulated business with the share price of the company that carries out the regulated activities, and only the latter exists. For example, suppose a company undertakes some regulated business and this is its only existing activity but it also possesses some growth options, i.e., potential opportunities to engage in NPV positive projects outside the regulated business at some future point. Its share price will reflect the value of these opportunities and will therefore change as the market's perception of those options changes. However, this has no bearing on the appropriate risk free rate for the regulated activities that it undertakes.[413]

1022. With regard to the RAB, its certainty would only be applicable in the theoretical context where the only source of risk relates to changes in the risk free rate, which is the case in the analysis by Lally in his 2007 article.[414,415] Lally had already dealt with the presence of an additional risk premium in his 2004 article, finding that even in the presence of a risk premium, it is appropriate to set the term of the risk free base equal to the regulatory period.[416] The Authority covered this ground in depth in the Guidelines.[417]

1023. That said, except under highly stylised circumstances, the Authority acknowledges that the value of *any* asset at the end of the investment horizon cannot be known with full certainty. Risk premia generally apply.

1024. In the case of debt instruments, credit risk factors impact the certainty of full and timely payment of the ending market value (for example the principal).

1025. Similarly, here the credit rating, and hence the debt risk premium, accounts for credit risk over the average term of finance issuance that stems from factors such as

---

413 [Lally's footnote] The market value of the regulated business may also differ from the RAB if the market's perception of expected costs (inclusive of any efficiency gains) differs from the costs allowed by the regulator.

414 The examples outlined in Lally's 2007 paper set out the NPV = 0 conditions (M Lally, Regulation and the Term of the Risk Free Rate: Implications for Corporate Debt, *Accounting and Research Journal,* Vol. 20, No.1, 2007). For the Authority's consideration of this paper, see Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 2, pp. 20 – 23.

415 That said, the Authority noted in the Guidelines that the RAB is not re-valued periodically, implying a very low risk for the full return of the value of the RAB at the end of the regulatory period – generally investors know its value for regulatory purposes with a large degree of certainty (Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 89).

416 Lally M. 2004, "Regulation and the Choice of the Risk Free Rate", *Accounting Research Journal*, Volume 17, No. 1, 2004, p. 19.

417 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 2, pp. 18 - 26.

declaration of redundant assets, changing depreciation schedules, disallowance of forecast capital expenditure from being included in the asset base and disruptive technologies.

1026. With regard to equity, an investor can diversify such risks away and to the extent they cannot, they are compensated through the equity risk premium via the weighting (equity beta) the premium is given.

1027. From a regulated revenue perspective both debt and equity have similar characteristics to investment in a 5 year vanilla bullet bond.[418] The features of a bond such as the coupon rate, term to maturity and face value to be repaid upon maturity are captured in the bond indenture. The determination outlines the regulated cost of capital applicable to the RAB over the next 5 years, and the associated dollar value of the RAB at the outset of that period.

1028. Like the coupon rate for a vanilla bond, the cost of capital factors in credit risk which in turn, captures risks that can affect the value of the RAB. Like the face value of the bond at the end of 5 years the RAB is subject to economic and financial market conditions that prevail and influence regulatory outcomes up until that time.

1029. Assuming the bond is not issued at a discount or premium to the face value, the coupon rate is equivalent to the yield to maturity at issue. The yield to maturity has a risky and risk free component, which is priced as the 'credit spread' and base rate respectively. The credit spread in the regulatory context is represented as the debt risk premium. The calculation of this reflects a 10 year exposure to credit risk as outlined in paragraph 1534.

1030. Further expanding on this example, the base rate reflects the yield on the swap curve for the Australian dollar which reflects the risk free rate of return and a swap spread to Commonwealth Government Securities at a given tenor. The term for the base rate must be matched to the length of exposure to changes in the base rate.

1031. For example, from a longer term perspective, the 5 year risk free rate in the regulated return for a 10 year investment in the RAB is analogous to the 3 month base rate in a 1 year floating rate debt instrument. For such an instrument a 3 month base rate, such as the 3 month bank bill swap rate, is used as a reference to reset the 'risk free' component or 'base rate' of the coupon rate every quarter.[419] The yield to maturity of the base rate reflects a 3 month tenor, *not a 1 year tenor,* due to exposure to changes in the base rate within the 1 year term being limited to 3 months at a time by virtue of quarterly resets in the base rate to match the prevailing rate.

1032. By the same reasoning a 10 year debt instrument with 5 yearly resets would use an index with a 5 year yield to maturity as the interest rate risk exposure is limited to 5 years at a time, on account of the base rate being reset every 5 years to match the prevailing market yield. Similarly, equity holders' exposure to base risk is limited to five years at a time due to the 5 yearly regulatory reset.

---

[418] Vanilla is reference to a bond that is 'plain' from the perspective of having no optionality or other non-standard debt features. Bullet bonds receive full repayment of principal at expiry. That is the principal is not amortized over the term of the bond. This example assumes a coupon paying bond.

[419] Ignoring interest rate swap spreads to Commonwealth Government Securities for illustration sake.

1033. Lally makes exactly this point in the worked example rebutting SFG's claims in the 2013 paper (which is cited by SFG in the quote at paragraph 1020 above):[420,421]

> The scenario examined here is conceptually identical to that of a floating rate bond, and the same recursive valuation process applies. For such bonds, the interest rate used at each reset point must be for a term matching the reset frequency (Jarrow and Turnbull, section 13.2.4).

1034. The Authority therefore considers the appropriate term for the risk free rate and base rate in the current regulatory setting – where the rate of return is reset every 5 years concomitant with market conditions – is 5 years, in order to ensure NPV = 0.

Commercial practice

1035. While the Authority acknowledges that equity analysts use a long dated tenor for the risk free rate in discounting, it notes that the circumstances under which regulated equity returns are earned differ to non-regulated returns.

1036. First, equity analysts generally are seeking to value the firm and therefore seek a discount rate to perpetuity.

1037. Second, the Authority is undertaking a different exercise when establishing the rate of return for the benchmark efficient entity.[422] Regulated equity returns are afforded a degree of protection against interest rate risk over the medium term due the 5 yearly resets of the base rate, as discussed above. Therefore, the value of the firm in perpetuity using the long risk free rate in the discounting factor can be discounted back, from the end of the 5 year regulatory period to the present value, using a discount factor incorporating the 5 year risk free rate.[423]

1038. Additionally, the Authority notes that the MRP has been adjusted since the Draft Decision so that the MRP is calculated using a 5 year risk free rate instead of a 10 year rate. The longer exposure of equity to risk is thus incorporated in the MRP, instead of the risk free rate. This is discussed in detail in paragraph 1229 below.

---

420 M. Lally, Response to submissions on the risk free rate and the MRP, 22 October 2013, p. 48.

421 Lally's numerical example refers to 'assets costing $100m' (M. Lally, *Response to submissions on the risk free rate and the MRP*, 22 October 2013, p. 46). This is a RAB value, not a market value.

422 Lally endorses exactly this view when he responds to similar arguments for the QCA in the context of the risk free rate (see M. Lally, Response to submissions on the risk free rate and the MRP, 22 October 2013, p. 24 and also paragraph 1350 below for the relevant quote).

423 This point bears on ATCO's consultant SFG's contention that the Authority is somehow setting a rate of return which –when taken to perpetuity – is different to that used by commercial analysts in valuing a firm (see ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 44). However, provided that equity analysts have similar expectations to the regulator for costs etc, then the current five year return would be consistent with expectations for the discount rate to perpetuity in five year's time, delivering a long run discount rate for the purpose of valuing the firm. Therefore, the Authority considers that the two approaches (the Authority's five year term and the perpetuity term of equity analysts) are entirely consistent. On this basis, the Authority does not agree that there are adverse implications for allocative efficiency in using a five year term; the increased volatility that results is a reflection of fluctuations in prevailing market conditions. In this context, the Authority finds SFG's contention that it should consider a single long term average rate of return, in order to reduce volatility, perplexing (ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 45). This approach would not account for prevailing conditions, and thus would not promote efficient investment. On the other hand, the Authority considers that its approach is entirely consistent with the requirements of the NGR with regard to efficient financing costs, regard for prevailing conditions in the market and the promotion of efficient investment.

Inconsistency

1039. The Authority's estimates of the upper and lower bound for the MRP have been estimated based on a 5 year risk free rate to ensure consistency within the Sharpe Lintner CAPM equation. The same risk free rate estimate in paragraph 1017 has been used in the Wright approach which forms the upper bound of the MRP range (see paragraph 1095) while an MRP estimate based on a proxy for the 5 year risk free rate has been used in the Ibbotson approach which forms the lower bound of the MRP range (see paragraph 1229).

1040. The overall cost of each source of financing is determined with reference to each of their respective markets using the appropriate respective terms. The cost of debt employs a 10 year term while the return on equity employs estimates based on 128 years of data. The risk free component of debt is afforded a hedge against interest rate movements by virtue of a 5 yearly 'base rate' reset meaning interest rate risk exposure is limited to 5 years at a time and should be compensated accordingly. The risk free component of equity is paired with an MRP based on a 5 year rate. The Authority is therefore of the view that this approach does not result in any inconsistency between the cost of debt and equity.

Best estimate

1041. For the reasons outlined above, the Authority does not accept ATCO's proposal that the best estimate for the risk free rate should be based on a 10 year term. The Authority remains of the view that the best estimate should be based on a 5 year term.

1042. The average of the observed yields on 5-year CGS over 20 trading days to 2 April 2015 was 1.96 per cent. This provides the point estimate for the risk free rate for this Final Decision.

Inflation

1043. The expected rate of inflation for the coming 5 year regulatory period is estimated using the procedure outlined in the Rate of Return Guidelines over the averaging period nominated by ATCO.[424]

1044. However, the Authority has accepted ATCO's proposal for a 20 day averaging period for the purpose of estimating the rate of return market parameters, such as the risk free rate. Therefore, a 20 trading day average as opposed to a 40 day trading average is used in the Final Decision to ensure consistency.

1045. The resulting estimate of inflation over the course of the regulatory period for this Final Decision is 1.90 per cent.

Return on equity

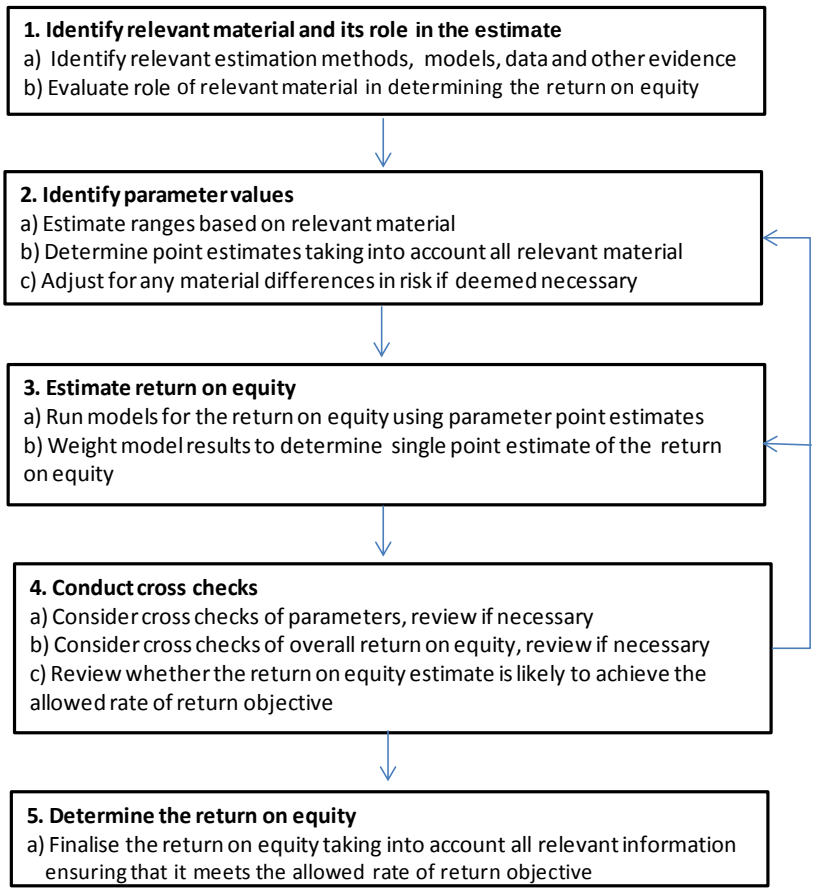
1046. In line with the requirements of NGR 87(5), the Authority considers that it evaluated the relevance of a broad range of material for estimating the return on equity in the

[424] Economic Regulation Authority, *Rate of Return Guidelines*, 16 December 2013, pp. 32-33.

Rate of Return Guidelines, covering relevant estimation methods, financial models, market data and other evidence.[425]

1047. The Rate of Return Guidelines set out that the Authority will utilise a five step approach for estimating the return on equity.[426] The five steps are summarised in Figure 8.

Figure 8 Proposed approach to estimating the return on equity[427]



Source: Economic Regulation Authority, *Rate of Return Guidelines*, 16 December 2013, p. 23.

---

425 Australian Energy Market Commission, *Rule Determination: National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, www.aemc.gov.au, 29 November 2013, p. 36.

426 Economic Regulation Authority, *Rate of Return Guidelines: Meeting the requirements of the National Gas Rules*, 16 December 2013, p. 22.

427 The Authority considers that the term:

- 'approach' refers to the overall framework or method for estimating the return on equity, which combines the relevant estimation methods, financial models, market data and other evidence;
- 'estimation material' refers to any of the relevant estimation methods, financial models, market data and other evidence that contribute the 'approach'; and
- 'estimation method' relates primarily to the estimation of the parameters of financial models, or to the technique employed within that model to deliver an output.

1048. Through this approach, the Authority has assessed a wide range of material, and identified relevant models for the return on equity, as well as a range of other relevant information. For this Final Decision, the Authority has given weight to relevant material, according to its merits at the current time, seeking to achieve fully the requirements of the allowed rate of return objective.[428]

1049. The Authority in the Rate of Return Guidelines determined that only a subset of the evaluated material could be considered relevant in the Australian context, so as to best achieve the allowed rate of return objective. The Authority is of the view that:

> Rate of return estimate materials – the estimation methods, financial models, market data and other evidence – would need to be broadly consistent with the requirements of the NGL, the NGO, the NGR and the allowed rate of return objective to be considered relevant. Some estimation materials may perform better on some requirements and less well on others, and yet may still be considered relevant. Accordingly, the assessment is whether, on balance, estimation materials are consistent with the requirements of the NGL, the NGO, the NGR and the allowed rate of return objective.
>
> Nevertheless, estimation materials would need to pass a threshold of adequacy to be considered relevant. To the extent that estimation materials failed the adequacy threshold, then they would be rejected. This rejection would be consistent with the AEMC's purpose for the guidelines:[429]
>
> > In order for the guidelines to have some purpose and value at the time of the regulatory determination or access arrangement process, they must have some weight to narrow the debate.
>
> Once over the threshold for adequacy, then, as noted, any particular estimation material may meet the requirements of the NGL, the NGO, the NGR and the allowed rate of return objective to a greater or lesser degree. With this in mind, the criteria would then be used as a means to articulate the Authority's evaluation of the estimation materials, in terms of how they performed in meeting the requirements of the NGL, the NGO, the NGR and the allowed rate of return objective. In this way, the criteria are intended to assist transparency around its exercise of judgement. [430]

1050. In that context, the following analysis provides the Authority's determination for this Final Decision of the return on equity for ATCO. The Authority considers that the estimate is consistent with delivering an outcome that meets the allowed rate of return objective, as well as the NGL and NGR more broadly.[431]

---

428 The allowed rate of return objective is set out at NGR 87(3):

The allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

429 Australian Energy Market Commission, *Rule Determination, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, www.aemc.gov.au, 29 November, p. 58.

430 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 12.

431 The allowed rate of return objective is set out at NGR 87(3):

The allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

Step 1 – relevant materials

1051. The Authority evaluated the relevance of the following materials for estimating the return on equity in the Rate of Return Guidelines, in terms of their ability to contribute to the achievement of the allowed rate of return objective:[432]

- the Sharpe Lintner Capital Asset Pricing Model (**CAPM**), as well as other asset pricing models in the CAPM 'family'; and
- an extensive range of other models and approaches which seek to estimate the return on equity.

1052. The Authority concluded in the Guidelines that only the Sharpe Lintner CAPM model is relevant for informing the Authority's estimation of the prevailing return on equity for the regulated firm at the current time. The Authority considered that incorporating returns from other models would detract from the ability of the Authority to meet the allowed rate of return objective.

1053. However, the Authority determined that it would give weight to relevant outputs from the Dividend Growth Model (**DGM**) when estimating the market risk premium (**MRP**), which is an input to the Sharpe Lintner CAPM.[433]

1054. The Authority also noted the empirical evidence provided by the Black and Empirical CAPM models, pointing to potential bias in the estimates from the Sharpe Lintner CAPM, and noted that it would take this information into account when estimating the point estimate of the equity beta from within its estimated range.[434]

1055. The Authority concluded that other models and approaches are not relevant within the Australian context, at the current time, without some new developments in terms of the theoretical foundations or in the empirical evidence. Generally, there are resulting shortcomings with regard to robustness in the Australian context. On this basis, the Authority considered that these other models are not 'fit for purpose' or able to be 'implemented in accordance with best practice'.

1056. The Authority considered that its approach in the Rate of Return Guidelines with regard to the determination of relevance – in terms of best meeting the allowed rate of return objective – is consistent with the intent of the AEMC:[435,436]

> … In general the final rules give the regulator greater discretion than it has currently. The objectives and factors show the regulator what it must bear in mind when it exercises that discretion.

---

[432] Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 8.

[433] Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 78.

[434] Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 67.

[435] Australian Energy Market Commission, *Rule Determination, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, www.aemc.gov.au, 29 November 2013, p. 36.

[436] The Authority notes that relevant means 'closely connected or appropriate to the matter in hand' (Oxford dictionary) or 'bearing upon or connected with the matter in hand; to the purpose; pertinent' (Macquarie dictionary).

> The role of the objective is to indicate what the regulator should be *seeking* to achieve in the exercise of its discretion. Some stakeholders appear to have understood the objectives as imposing on the regulator a requirement and that failure to comply with this would mean the regulator is in breach of the rules. This is not the case. Although the language of an obligation is used in some objectives, it is not necessarily expected that the substance of the objective will always be fully achieved, but rather the regulator should be striving to achieve the objective as fully as possible. Where it is used in rate of return and capital expenditure incentives, the objective has primacy over other matters which the regulator is directed to consider.
>
> These other matters include factors which the regulator is directed to consider. The rules use language such as "have regard to" and "take into account" to direct the regulator to consider certain factors. Throughout this rule change process there has been discussion over the respective meanings of these phrases. The Commission's approach is that these phrases mean the same thing and nothing is implied by the use of one rather than the other. The Johnson Winter & Slattery advice attached to the Australian Pipeline Industry Association (**APIA**) submission[437] includes a useful guide to how the phrases should be interpreted. The regulator must actively turn its mind to the factors listed, but it is up to the regulator to determine how the factors should influence its decision. It may, indeed, consider all of them and decide none should influence its decision. It is not intended that the regulator's decision is solely dependent on how it applies any or all of those factors. The intention is that where the rules require the regulator to consider certain factors in conjunction with an overall objective, it should explain its decision including how it has had regard to those factors in making a decision that meets the objective.

1057. In the Draft Decision, the Authority noted that ATCO had presented only limited new information in its proposal – in relation to relevant estimation methods, financial models, market data and other evidence – that was not considered as part of the development of the Rate of Return Guidelines. Nonetheless, the Authority further considered the models for estimating the return on equity proposed by ATCO and its consultant SFG. These included the Sharpe Lintner CAPM, the Fama-French Model (**FFM**), the DGM, as well as ATCO's novel approach to incorporate the 'return on the market for a firm with a beta of 1'. ATCO weighted outcomes from the four approaches to estimate its proposed return on equity.

1058. Following review of ATCO's proposal for the Draft Decision, the Authority remained of the view that its reasons for adopting the Sharpe Lintner CAPM, with the parameters informed by outcomes from the DGM and the Black CAPM, were sound for the purpose of estimating the return on equity. The Authority considered that the

---

437 APIA, *Economic Regulation of Network Service Providers: Response to AEMC*, www.aemc.gov.au, 4 October 2012, Appendix 1, p. 11. The Authority notes that that the Johnson Winter & Slattery advice stated:

> …as long as the Regulator has taken into account the specified factors, it remains in the Regulator's discretion how those factors influence its decision. The practical application of this rule could result in the Regulator considering other estimation methods, financial models, etc. but then putting all but one to the side and continuing to estimate the cost of debt and cost of equity using its already stated preferred approach (i.e. the Sharpe Lintner CAPM)…
>
> If evidence is "irrelevant", the Regulator will not fall into error by failing to "take it into account".
>
> In practice, of course, this will require some form of value judgment by the Regulator about whether evidence put before it is relevant or not. This appears to be consistent with the very broad discretion envisaged by the AEMC in the Draft Rule Determinations.

resulting application of the Sharpe Lintner CAPM met the requirements of the NGR and the allowed rate of return objective.[438]

1059. However, ATCO in its response to the Draft Decision has again relied on a weighted estimate for the return on equity based on outputs from the Sharpe Lintner CAPM, the three factor FFM and the DGM. However, ATCO has replaced the 'return on the market for a firm with a beta of 1' with the Black CAPM.

1060. In proposing this approach, ATCO submits that its consultant SFG has established that the Authority's decision to rely solely on the Sharpe Lintner CAPM – to the exclusion of all other models for the return on equity – involves a number of errors:[439]

> It is an error of logic to decide that all industry dividend discount models are irrelevant based on the outcomes of the (very different) ERA model.
>
> The ERA has erred in its conclusion that the SFG dividend discount model leads to an upward bias in the estimate of the required return on equity – the AER's Guideline makes it clear that the ERA has interpreted this point backwards.
>
> It is an error to reject the FFM on the basis of its empirical motivation.[440] Logically, it makes no sense to maintain sole reliance on the Sharpe Lintner CAPM due to the fact alternative models were originally developed for the purpose of improving the very poor empirical performance of the CAPM.
>
> No reasonable person could give weight to the ERA study of the FFM over the published study of Brailsford, Gaunt and O'Brien, which concludes that *the three-factor model is found to be consistently superior* to the CAPM[441] in the Australian market.
>
> It is an error to disregard the Black CAPM on theoretical or empirical grounds. It is based on the same theory as the Sharpe Lintner CAPM but with less restrictive assumptions, and its performance is consistently documented as being superior to the Sharpe Lintner CAPM – so much so that it is known as 'the empirical CAPM' in US regulation cases.[442]

1061. Given that ATCO has again proposed the FFM and DGM, as well as introduced an estimate based on the Black CAPM, the Authority once again gives consideration to the ability of these models to deliver estimates that meet the requirements of the NGR, and the allowed rate of return objective, in what follows.

The Fama French three-factor model

1062. The Authority in the Draft Decision noted that the FFM has consistently been put forward by regulated businesses as a means to estimate the return on equity. However, in its previous regulatory decisions, the Authority concluded that there is no strong theoretical basis to support the inclusion of the two additional risk factors to estimate the rate of return on equity, as occurs in the FFM. This is because the FFM is dependent on empirical justification – that is, the systematic observance of

---

438 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 160.

439 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 182.

440 Appendix 9.1 SFG, *The required return on equity: Response to ATCO Gas Draft Decision,* November 2014, paragraph 292.

441 Brailsford, Gaunt and O'Brien, Size and book-to-market factors in Australia, Journal of Management, 2012, p. 279.

442 Appendix 9.1 SFG, The required return on equity: Response to ATCO Gas Draft Decision, November 2014, paragraph 296.

the FFM risk premia. Given that the FFM risk premia are not systematically observed in the Australian market, there is no reasonable basis for the FFM to be applied in Australia.

1063. The Authority's recent analysis of the FFM in the context of the Australian market for equity showed that observed empirical evidence is not consistent with the FFM (refer to Appendix 3).

1064. The Authority does not agree with SFG's comments that 'no reasonable person could possibly give any weight to the ERA "study" of the Fama- French model over the published study of Brailsford, Gaunt and O'Brien, which concludes that "the three-factor model is found to be consistently superior to the CAPM":[443]

- The Authority is of the view that there is no accepted good practice in relation to implementation of the FFM because there is no widely accepted correct method of applying the FFM. For example, in its own study in relation to the application of the FFM in Australia, using the same dataset, the Authority has demonstrated that outcomes obtained from the FFM will be significantly different when the approach to portfolio formation is different.
- Together with other evidence, presented in the paragraphs starting at 1092 below, the Authority is of the view the FFM is empirically unstable due to the fact that the model is not developed on a robust theory. The Authority does not agree that one study is superior to the other.
- The Authority considers that its own study provides an additional piece of evidence in relation to the implementation of the FFM in the Australian context. The Authority's findings are consistent with other Australian empirical studies: factors from the FFM are not consistently observed in the Australian context.

1065. The Authority's analysis considered the robustness of the estimates of the two additional risk premia (size factor and value factor) from the FFM in the Australian context. The study was conducted using a consistent dataset under various scenarios in which different proxies are used and under different approaches in which portfolios are formed.

1066. The Authority's analysis points to conflicting, variable FFM risk premia and inconsistent FFM factor coefficients, depending on the proxies and/or different portfolios adopted. It is noted that while the size factor is relatively well explained, the value factor is not. These findings are in line with other empirical studies in Australia.

1067. The Authority notes the issues raised by SFG in its 2014 report which is used by ATCO to propose the estimates of the Fama French three factor inputs. The Authority responds to the key issues raised relating to the theory, computations, and implications for the asset pricing models in SFG's report in the following sections.

1068. Overall, the Authority remains of the view that the FFM cannot contribute to the rate of return objective. A wide range of evidence, together with its own empirical analysis, suggests that the FFM is not fit for the purpose of estimating the return on equity, as:

---

[443] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.1, p. 66.

- applications of the FFM in Australia fail to produce consistent outcomes;
- the key contribution from the FFM is that the additional factors – the size (**SMB**) and value (**HML**) factors – are priced in explaining the return on equity;
- however, studies in the Australian context do not consistently report this pricing – some studies price the size factor, while others price the value factor;
- different proxies are adopted in different empirical studies, with the result that the estimates from the FFM vary significantly from study to study;
- the Authority found – in its own empirical work – that adopting different portfolio formation on the same dataset will provide different outcomes, yet portfolio formation is a key characteristics of the FFM;
- more than 300 different factors have been examined in empirical studies to date, but there is no body of theory to support which factors should be considered; and
- Fama himself now recognises that the Fama French three factor model is an empirical test, and is not based on theory, confirming the oft stated view of Australian regulators.[444]

1069. These points are further considered in what follows.

The Fama French three factor model was not developed on a theoretical foundation

1070. Network service providers have argued that the FFM was developed on the basis of the Arbitrage Pricing Theory (**APT**) (Ross, 1976) as an alternative to the CAPM. The APT predicts that the return to any risky asset is linearly related to a set of k factors. This is in contrast with the CAPM's prediction that all returns of any risk security are linearly related to a single factor; the return on the market portfolio. Under the APT, the relationship between risk and return can be expressed as (3).

$$E(R_i) = R_F + \beta_{i,1}\left(E(R_{i,1}) - R_F\right) + \beta_{i,2}\left(E(R_{i,2}) - R_F\right) + \ldots + \beta_{i,k}\left(E(R_{i,k}) - R_F\right) \quad (3)$$

Where

$E(R_i)$ is the expected return on asset i;

$\beta_{i,k}$ is the security's beta with respect to the k^{th} factor;

$E(R_{i,k})$ is the expected return on the k^{th} factor; and

R_F is the risk free rate of return.

1071. It is noted that the APT model does not specify any factors which may be included in the estimate of a return on equity. As a result, it may be argued that the APT model fails in terms of fully specifying a model. That leaves the relevant model factors open to interpretation, of which there have been many.

1072. Fama and French (1993) presented a three factor model of asset returns. Their model incorporates the predictions of the CAPM by including the return on the market

[444] E. Fama and K. French, *A Five-Factor Asset Pricing Model*, 2014, Working Paper available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2287202

portfolio as a factor. In addition to this factor, Fama and French (1993) also included two additional factors that had been found to be statistically significant in explaining the cross section of average returns. These two factors are: (i) firm size, which is measured by market capitalisation (the **SMB** factor), and (ii) the ratio of the book value of equity to the market value of equity (the **HML** factor). The Authority considers that these two factors were selected on the basis of data exploration. The selection was not guided by any economic theory.

1073. Four years after the initial publication of the FFM, Carhart incorporated another factor, making it a four-factor model. The fourth factor is intended to capture the momentum in returns. The Authority is of the view that the selection of this factor was also not supported by any economic theory.

1074. The Authority disagrees with SFG's view that the FFM was developed on the foundations of the inter-temporal CAPM and the APT. The Authority notes that in these two theories, no specific factors or attributes are presented. As further discussed in detail in the following sections, the Authority considers that neither of the two factors (the SMB and the HML) are appropriate for use in estimating the rate of return. *Firstly*, Brailsford, Gaunt and O'Brien (2012), which in SFG's view is the most recent and comprehensive estimates of the FFM using Australian data, concluded that only the HML factor is priced in Australia. This means that the size factor (SMB) is not priced in Australia. *Secondly*, in their most recent five factor model, Fama and French concluded that the HML has become redundant in explaining average returns.

1075. The Authority notes that while Brailsford, Gaunt and O'Brien concluded that only a *value factor* (HML) is priced in the Fama French three-factor model, Fama and French concluded that this factor (HML) is becoming redundant in their multi factor model. On the balance of the above evidence, the Authority maintains its view from the Draft Decision that the FFM was not developed on a theoretical foundation.

New factors included in the Fama French three factor model are found through data exploration

1076. Most multi-factor models including the FFM can be classified as parametric or empirical models. These models are not developed on the foundation of any robust economic theory. The term *empirical* refers to their development on the evidence of interrogating historical financial data for regularities and relationships. It is argued that in creating these empirical models, their authors examine the historical data directly in order to extrapolate relationships between the attributes of the data and expected returns. If the resulting relationships are found to be statistically significant within a given data set, then these attributes (or factors) are used to explain an expected return.[445]

1077. Professor Fama, a Nobel Prize winner in 2013 and one of the two authors of the FFM acknowledged that:[446]

> The three-factor model is an **empirical** asset pricing model. Standard asset pricing models work forward from assumptions about investor tastes and portfolio opportunities to predictions about how risk should be measured and the relation between risk and expected return. Empirical asset pricing models work backward. They take as given the

[445] Fama, E. (2014). "Two Pillars of Asset Pricing", *American Economic Review,* Vol. 104 (6), 1467-1485, p. 1480.

[446] Fama, E. (2014). "Two Pillars of Asset Pricing", *American Economic Review,* Vol. 104 (6), 1467-1485, p. 1480.

> patterns in average returns, and propose models to capture them. The three-factor model is designed to capture the relation between average return and size (market capitalization) and the relation between average return and price ratios like the book-to-market ratio, which were the two well-known patterns in average returns at the time of our 1993 paper. [emphasis added]

1078. Since the introduction of the FFM in 1992, Fama and French have stood for the view that their two new factors of:

(i) firm size, which is measured by market capitalisation; and

(ii) the ratio of the book value of equity to the market value of equity;

can be used to explain a cross section of an expected return for a particular asset. In the years subsequent to the publication of the Fama French model, academic researchers have presented various new factors with the claim that they are also able to explain a cross section of an expected return.

1079. The Authority notes that Fama and French have also moved away from the three-factor model. In 2014, Fama and French developed a five-factor model in which portfolios are formed on the basis of:

(i) market portfolio;

(ii) firm's size (Small Minus Big – **SMB**);

(iii) the ratio of the book value of equity to the market value of equity (High Minus Low – **HML**);

(iv) profitability (Robust Minus Weak profitability – RMW); and

(v) investment (Conservative Minus Aggressive investment – **CMA**).

1080. Fama and French concluded that their new five-factor model provides better descriptions of average returns than their three-factor model. They also found that a market to book factor is no longer "priced" when it is included in the five factor model, although this effect may be sample specific:[447]

> The five-factor model **outperforms** the original three-factor model on all metrics and it generally outperforms other models, with one major exception. Specifically, the five-factor model and the four-factor model that excludes *HML* are similar on all measures of performance, including the *GRS* statistic. [emphasis added]

and that:

> We note above that the five-factor model never improves the description of average returns from the four-factor model that drops HML. The explanation is interesting. The average HML return is captured by the exposures of HML to other factors. Thus, in the five-factor model, **HML seems to be redundant for explaining average returns**. [emphasis added]

1081. The introduction of the Fama French five-factor model has placed the validity of the book-to-market value factor in doubt. Fama and French have argued the validity of this HML factor in explaining cross section of equity returns in the last two decades.

---

[447] E. Fama and K. French, *A Five-Factor Asset Pricing Model*, 2014, Working Paper available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2287202, p. 19.

However, they argued that the findings in their five-factor model in relation to the HML factor happen due to a sample specific issue.

1082. In their report prepared for the AER in October 2014, Professors McKenzie and Partington concluded that:[448]

> Following the work of Roll and Ross (1980), Chen (1983), Chen, Roll and Ross (1986), Burmeister, and Wall (1986), Burmeister and McElroy (1988) and McElroy and Burmeister (1988) inter alia, an alternative strand of the literature explains equilibrium returns using macroeconomic factors. These include factors such as unanticipated shock to industrial production or inflation, movements in the default premium or shifts to the slope of the term structure of interest rates.

1083. McKenzie and Partington note that there is no real overlap between the factors used in this literature and those used in Fama and French (1993, 2014 inter alia) type studies.

1084. More recently, Harvey et al (2014) presented a useful review of the available literature seeking to explain asset returns. Papers focussing on small groups of stocks, or employing data collected over short periods of time were omitted from the study. This review found 312 papers suggesting a total of 315 different factors that might be used to explain asset returns. It is important to note that Harvey et al (2014) are quick to acknowledge that this list of factors is not exhaustive:[449]

> Our collection of 315 factors likely under-represents the factor population. First, we generally only consider top journals. Second, we are very selective in choosing only a handful of working papers. Third, and perhaps most importantly, we should be measuring the number of factors tested (which is unobservable) — that is, we do not observe the factors that were tested but failed to pass the usual significance levels and were never published.

1085. Harvey et al (2014) also stated that:[450]

> Our goal is not to catalogue every asset pricing paper ever published. We narrow the focus to papers that propose and test new factors.
>
> Since our focus is on factors that can broadly explain asset market return patterns, we omit papers that focus on a small group of stocks or for a short period of time. This will, for example, exclude a substantial amount of empirical corporate finance research that studies event-driven return movements.
>
> To include the most recent research, we search for working papers on SSRN. Working papers pose a challenge because there are thousands of them and they are not refereed. We choose a subset of papers that we suspect are in review at top journals or have been presented at top conferences or are due to be presented at top conferences. We end up using 63 working papers. In total, we focus on 312 published works and selected working papers. We catalogue 315 different factors.

1086. The key conclusion from this paper is that:[451]

---

448 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 16.

449 Harvey, C; Liu, Y. and Zhu, H. (2014), *… and the Cross-Section of Expected Returns*, Working Paper available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2249314, p. 3.

450 Harvey, C; Liu, Y. and Zhu, H. (2014), *… and the Cross-Section of Expected Returns*, Working Paper available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2249314, pp. 2-4.

451 Harvey, C; Liu, Y. and Zhu, H. (2014), *… and the Cross-Section of Expected Returns*, Working Paper available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2249314, the first page (Abstract).

> Hundreds of papers and hundreds of factors attempt to explain the cross-section of expected returns. Given **this extensive data mining**, it does not make any economic or statistical sense to use the usual significance criteria for a newly discovered factor, e.g., a t-ratio greater than 2.0. However, what hurdle should be used for current research? Our paper introduces a multiple testing framework and provides a time series of historical significance cut-offs from the first empirical tests in 1967 to today. We develop a new framework that allows for correlation among the tests as well as missing data. We also project forward 20 years assuming the rate of factor production remains similar to the experience of the last few years. The estimation of our model suggests that today a newly discovered factor needs to clear a much higher hurdle, with a t-ratio greater than 3.0. Echoing a recent disturbing conclusion in the medical literature, we argue that most claimed research findings in financial economics are likely false. [emphasis added]

1087. In addition, McKenzie and Partington (2014), Subrahmanyam (2010) documents over 50 variables that have been used to predict stock returns and concluded that:[452]

> The research at this point presents a rather unsatisfying picture of a morass of variables, and an inability of us finance researchers to understand which effects are robust and which do not survive simple variations in methodology and use of alternative controls (p. 35)

and that:

> As a central theme, I maintain that our learning about the cross-section is hampered when so many predictive variables accumulate without any understanding of the correlation structure between the variables, and our collective inability or unwillingness to adequately control for a comprehensive set of variables (p. 28).

1088. Green et al (2014) documented over 330 predictive return signals and concluded that:[453]

> given the large number of Return Predictive Signals (RPS) that have already been reported in the literature and the high degree of multidimensionality we empirically find to be present in returns, we propose that an important avenue for future research is to understand why returns are so highly dimensional, and why the most important multidimensioned RPS are priced the way they are (p. 26).

1089. On the basis of the findings from the study by Green et al (2014), McKenzie and Partington concluded that:[454]

> Green et al (2014) find that 24 of 100 readily programmed signals are multidimensionally priced (i.e. the mean coefficient estimates produced t-statics in excess of 3). The authors suggest that increasing the dimensionality of the cross-section is important **as the size and book-to-market factors are not the most statistically significant predictive signals**. This is an interesting point in the current context as recall from our earlier discussion that in order to operationalise the APT, the number of assets, *n*, must exceed the number of factors, *k.* Given that we have so few assets in the Australian context, **this presents a serious problem for operationalising a model with many factors** [emphasis added].

1090. In response to the extensive data mining in empirical studies on asset pricings, Harvey et al (2104) considered that it is appropriate to change the way in which we

---

452 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 16.

453 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 16.

454 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 17.

think about factors as being important. One possible solution is to introduce additional testable assumptions that a systematic risk factor has to satisfy before it can claim to be significant. In addition, as presented in Pukthuanthong and Roll (2014), a seven-stage protocol could be followed to identify and measure important factors. Harvey and Liu (2014) on the other hand argue that an evaluation of the economic contribution of a risk factor should be used to determine its importance.

1091. Whatever the case, it appears clear that any number of factors can be found to have explanatory power, but that these cannot be relied upon for estimating the return on equity in any meaningfully robust sense.

The estimates from the Fama French three-factor model vary significantly and produce mixed results

1092. There have been various attempts to apply the Fama French three factor model in Australia using Australian data. It is noted that the results from these studies are mixed, as presented in Table 73 below.

Table 73 Applications of the Fama French three-factor model in Australia

Authors	Years	Risk premia		FFM parameter analysis		
		HML (%)	SMB (%)	Intercept not significant	HML coefficients significant	SMB coefficients significant
Fama & French, 1998[455]	1975-1995	12.3	N/A	N/A	N/A	N/A
Halliwell et al., 1999[456]	1980-1991	14.6	6.0	23 of 25	6 of 25	18 of 25
Faff, 2001[457]	1991-1999	14.0	-9.0	20 of 24	7 of 24	11 of 24
Faff, 2004[458]	1996-1999	6.0	-6.5	19 of 24	14 of 24	18 of 24
Gaunt, 2004[459]	1993-2001	8.5	10.0	19 of 25	21 of 25	13 of 28
Ghargori, Chan & Faff, 2007[460]	1996-2004	10.4	17.2	24 of 27	20 of 27	14 of 27
O'Brien et al., 2008[461]	1982-2006	9.4	4.3	14 of 25	22 of 25	16 of 25
Kassimatis, 2008[462]	1993-2005	12.6	11.5	11 of 25	20 of 25	11 of 25
Ghargori, Lee & Veeraghavan, 2009[463]	1993-2005	N/A	N/A	2 of 12	10 of 12	5 of 12
Brailsford; Gaunt & O'Brien, 2012[464]	1982-2006	9.1	-2.6	24 of 25	15 of 25	22 of 25
Brailsford; Gaunt & O'Brien, 2012[465]	1982-2006	12	N/A	Varies depending on the approach of portfolio formation		

Source: Economic Regulation Authority's analysis

455 Fama, E. and French, K., "Value versus Growth: The International Evidence", *The Journal of Finance,* Vol. 53, No. 6 (Dec., 1998), pp. 1975-1999.

456 Halliwell, J. Heaney, R. and Sawicki, J., 'Size and book to market effects in Australian share markets: a time series analysis', *Accounting Research Journal*, 1999, vol. 12, pp. 122–137.

457 Faff, R. 'An examination of the Fama and French three-factor model using commercially available factors', *Australian Journal of Management*, 2001, vol. 26, pp. 1–17.

458 Faff, R., 'A simple test of the Fama and French model using daily data: Australian evidence', *Applied Financial Economics*, 2004, vol. 14, pp. 83–92.

459 Gaunt, 'Fama–French model: Australian evidence', *Accounting and Finance*, 2004.

460 Gharghori, P.; Chan, H. and Faff, R. 'Are the Fama–French factors proxying default risk?', *Australian Journal of Management*, December 2007, vol. 32(2), pp. 223–249.

461 O'Brien, Brailsford, and Gaunt, 'Market factors in Australia', Australasian Finance and Banking Conference, 2008.

462 Kassimatis, K. 'Size, book to market and momentum effects in the Australian stock market', *Australian Journal of Management*, June 2008, vol. 33(1), pp. 145–168.

463 Gharghori, P.; Lee, R. and Veeraraghavan, M. 'Anomalies and stock returns: Australian evidence', *Accounting and Finance*, 2009, vol. 49, pp. 555–576.

464 Brailsford, T., Gaunt, C., and O'Brien, M. (2012), 'Size and book-to-market factors in Australia", *Australian Journal of Management*, 2012, vol. 37, pp. 261-81.

465 Brailsford, T., Gaunt, C., and O'Brien, M. (2012), 'The investment value of the value premium", *Pacific-Basin Finance Journal*, 2012, vol. 20, pp. 416-37.

1093. Based on the comparison shown in Table 73, the Authority is of the view that these estimates are best characterised as an unsystematic observation of the estimates of the Fama–French risk premium. This is indicative of the inadequacy of estimates that are made on the basis of an empirical relationship without the foundation of an economic theory. This view is also confirmed when the estimates of the HML and SMB risk premia from the FFM are compared across studies for the Australian capital market, as shown in Table 73.

1094. Table 73 shows that the ranges of the HML risk premia, from 14.6 per cent to 6 per cent, and of SMB risk premia, from 17.2 per cent to -9 per cent, can be considered too large to confirm the presence of the risk factors when using the FFM in Australia. The FFM predicts that the HML and SMB coefficients estimated from the models should be statistically significantly different to zero. On this prediction, except for an estimate of 4.3 per cent for the SMB risk premium in the 2008 O'Brien et al study, other estimates are significantly different from zero at the 5 per cent level of confidence. Additionally, the FFM also predicts that the intercept from the regression, which is the proportion of the observed return that is not explained by the FFM, should not be significantly different from zero. While there are some studies where the FFM performs well, such as Ghargori, Chan and Faff (24 out of 27 portfolios have intercepts that are not statistically significant from zero), there are studies in which the FFM performs poorly, such as Ghargori, Lee and Veeraghavan (only 2 out of 12 portfolios have intercepts that are not statistically significant from zero).

1095. The Authority disagrees with SFG's view that a range of studies of variable quality produce a range of estimates and therefore should not be used as the basis for the outright rejection of the entire model and that a better approach is to consider the robustness and the reliability of the best available estimates of each model. The Authority is of the view that a consideration of various studies altogether will provide more comprehensive information in relation to the validity of the FFM. This view is supported by McKenzie and Partington in their report to the AER:[466]

> What are the objective criteria for low quality studies? Surely, SFG are not suggesting that empirical studies coming from academic colleagues such as Robert Faff, one of Australia's top finance professors, is a low quality study (Eg: Faff (2004)) just because it produces estimates that do not support the consultants view. We simply view the evidence of parameter instability from the empirical literature as symptomatic of the weakness of the model.

The Fama French three-factor model is not used by economic regulators either in Australia or overseas

1096. The FFM has not been adopted in the estimation of a return on equity by any economic regulators, either in Australia or overseas (Table 74).

[466] McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 18.

Table 74 Fundamental models adopted by Australian and international regulators in estimating a return on equity

	Australia	Germany	New Zealand	USA	Canada	UK
Regulator	**Australian Energy Regulator (AER)**	**The Federal Network Agency (FNA)**	**The Commerce Commission (CC)**	**New York State Public Utilities Commission (NYSPUC)**	**The Ontario Energy Board (OEB)**	**The Office of Gas and Electricity Markets (Ofgem)**
Primary model	CAPM	CAPM/RPM	CAPM	DDM	RPM	CAPM
Secondary model				CAPM		
Other use of DDM	*Cross-check on MRP*		*Cross-check on MRP*		*Cross-check on MRP*	*Cross check on the overall cost of equity but not for individual firms*

Notes: *CAPM: Sharpe-Lintner Capital Asset Pricing Model*

RPM: Risk Premium Model

DDM: Dividend Discount Model

Source: *Sudarsanam, Kaltenbronn, and Park (2011)*

1097. In the report prepared for the AER in October 2014, Professors McKenzie and Partington concluded that:[467]

> the main discussion of this section of our report highlights the nascent literature suggesting that the use of the Fama and French model is no longer optimal, and may indeed lead to invalid, incorrect or misleading inference. Even the originators of this model, Fama and French (2014) themselves, have contributed to this literature. It would seem unusual to adopt a model 21 years after its publication, when its weaknesses are becoming more evident and contemporary research is just beginning to understand the possible causes and potential solutions.

and that:

> We do not view the FFM as having the ability to reliably estimate the required return on equity for a benchmark regulated network service provider. **The FFM is used to estimate the average return in the cross section and the benchmark regulated network services provider is not average given its relatively low economic risk**. The evidence suggests that the estimates for Australia using the Fama and French approach are unstable and depend on both the cross section of firms selected and the sample period chosen [emphasis added].

SFG (2014) estimates of the return on equity using the Fama French three factor model

1098. The Authority notes that SFG's (2014) study is in line with the study by Brailsford, Gaunt and O'Brien (2012) in terms of portfolio formation and construction of factors. A key conclusion from the SFG 2014 study is that both factors of the FFM (being the SMB and the HML) are all priced in the Australian context. In addition, while the book-to-market factor (HML) is positively correlated with stock returns with a magnitude of 1.15 per cent, the size factor (SMB) is negatively correlated with a

[467] McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 18.

magnitude of -0.19 per cent which is in contrast with an expectation of the Fama French three factor model.

1099. The Authority is of the view that SFG's 2014 paper on the FFM is not superior to any other papers as presented in Table 73. However, SFG's 2014 paper does provide an additional piece of evidence to support the view that estimates of the risk factors from the FFM in the Australian context is mixed.

1100. The Authority notes that Brailsford, Gaunt and O'Brien have two publications in 2012 in relation to the implementation of the FFM in the Australian context. In one of these two papers, as presented in Table 73, the findings for average premiums on the various factors include SMB at – 0.22 per cent, HML at 0.76 per cent and MRP at 0.51 per cent per month.[468] However, in another paper, key conclusions are that in all five different methods of portfolio formation, there is a strong indication that the HML factor is priced in Australian stock returns whereas the SMB factor is not priced and that the SMB factor only appears to be priced when very small stocks are given a heavy weighting in portfolio returns (as presented in one of the five methods of portfolio formation).[469]

1101. The Authority notes that findings from these three selected studies (one conducted by SFG itself, the other two studies preferred by SFG) are mixed. First, it is not confirmed whether or not the size factor (SMB) is priced or not in the Australian context. Second, even though the book-to-market factor (HML) is priced, the magnitude of the premium of this factor varies significantly among these three studies (0.76 per cent or 1.0 per cent in Brailsford et al studies and 1.15 per cent in the SFG study. The difference is more than 50 per cent when the estimates of 0.76 per cent and 1.15 per cent are compared.

1102. On balance, the Authority is of the view that the above evidence, together with evidence presented in Table 73 and the Authority's own study on the FFM, confirms that the implementation of the FFM in the Australian context is unstable.

Authority's decision on the Fama French three-factor model

1103. Based on the above analyses, the Authority is of the view that the Fama French three-factor model is neither relevant nor fit for the purpose of estimating a return on equity for a regulatory decision in Australia. As a result, the Authority remains of the view that the FFM should play no role in estimating a return on equity for ATCO. This decision is based on the following considerations:

- The Fama French three-factor model was not developed on a theoretical basis.
- New factors that are now included in the new Fama French five factor model raise questions about the validity of the FFM three factor model.
- The estimates from the Fama French three factor model vary significantly and produce mixed results.
- The Fama French three factor model is not used by economic regulators either in Australia or overseas to estimate the expected return on equity.

---

468 Brailsford, T., Gaunt, C., and O'Brien, M. (2012), 'Size and book-to-market factors in Australia", *Australian Journal of Management*, 2012, vol. 37, p. 279.

469 Brailsford, T., Gaunt, C., and O'Brien, M. (2012), 'The investment value of the value premium", *Pacific-Basin Finance Journal*, 2012, vol. 20, p. 435.

Black CAPM

Assumptions under the Black CAPM

1104. The Authority notes that the assumptions underlying the Black CAPM are the same as those of the Sharpe Lintner CAPM, with one exception. One assumption underpinning the Sharpe Lintner CAPM is that investors are assumed to be able to borrow or lend freely at the risk free rate of a risk free asset. Black (1972) questioned this assumption by arguing that an investor may take unlimited long or short positions in any security, including the risk free security.

1105. In his paper, Black (1972) considered two separate scenarios:

- *First*; there is no risk free security and, as such, no borrowing or lending at the risk free rate. However investors may take long or short positions of any size in any risky asset. This version of the Black CAPM is also known as the fully restricted version.
- *Second*; investors are assumed to be able to lend but not borrow at the risk free rate, known as the partially restricted version.

1106. McKenzie and Partington (2014) considered that in the absence of the riskless asset, there is a role for the zero beta portfolio. The expected return on any asset is a linear function of the beta of the asset. In the second scenario the resulting market equilibrium is more complex, but equilibrium asset returns again depend linearly on the beta of the asset as well.[470]

1107. The Black CAPM requires that investors can short sell. SFG (2014) argued that while in reality investors do not have an unlimited ability to sell short, short-selling is a feature of the equity market. It is possible that the more realistic assumptions underlying the Black CAPM provide a better data fit.

1108. In the Rate of Return Guidelines, the Authority was of the view that the Black CAPM substituted one assumption of the Sharpe Lintner CAPM with another assumption that was arguably, unrealistic. The Authority notes that this view is consistent with both Black (1972) and Fama French (2004).

> This assumption is not realistic, since restrictions on short selling are at least as stringent as restrictions on borrowing.[471]

and that:

> The assumption that short selling is unrestricted is as unrealistic as unrestricted risk-free borrowing and lending.[472]

---

470 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, pp. 21-22.

471 Black, F., 1972, Capital Market Equilibrium with Restricted Borrowing, *Journal of Business*, 45, pp. 444-454, p. 446.

472 Fama, E.F. and K.R. French, 2004. The Capital Asset Pricing Model: Theory and Evidence, *Journal of Economic Perspectives*, Vol. 18, pp. 25-46, p. 30.

1109. In their report prepared for the AER in October 2014, Professors McKenzie and Partington concluded that:[473]

> In theory, theory and practice are the same. In practice, however, theory and practice are different. It is important to understand that the conditions under which investors can short sell in the real world are very different to the conditions assumed in the Black model. As SFG point out, investors in the real world do not have an unlimited ability to short sell. The differences go far beyond that however, and short selling is actually a very risky and expensive exercise. In order to short sell, an investor must typically borrow the stock and most stock loan agreements require the investor to post in excess of 100% of the value of the loan in cash or equivalent, they must pay a fee for lending the stock (termed the rebate rate), loans are typically on 24-hour recall, investors face the constant risk of a short squeeze, etc.. For details on the process of stock lending for short selling see Faulkner (2002) and for academic research on the costs and impact of short selling see Henry and McKenzie (2006), McKenzie, (2012), Berkman and McKenzie (2012), McKenzie and Henry (2012) Jain, Jain, McInish and McKenzie (2013).

1110. In conclusion, the Authority is of the view that it is incorrect to suggest that the Black model is based on more realistic assumptions than the Sharpe Lintner CAPM. The Authority considers that the Black model simply replaces one of the underlying assumptions of the Sharpe Lintner CAPM with another, and the validity of this new assumption has not been substantiated in either theory or practice. This view is supported by McKenzie & Partington and also by Handley.[474]

Estimates of the return on zero beta portfolio under the Black CAPM

1111. Network service providers and their consultants have argued that empirical results obtained from the Black CAPM are better at explaining historical stock returns for low beta assets than those obtained by the Sharpe Lintner CAPM. This is generally known as a "low beta bias". This bias has led to the argument that the Black CAPM is better for estimating the return on equity than the Sharpe Lintner CAPM.

1112. However in a report prepared for the AER in October 2014, Professors McKenzie and Partington disagreed with that view:[475]

> To be clear on this point, empirical results for the Black and S-L CAPM are not directly comparable as they each involve very different investment strategies. In the S-L CAPM, the investor may hold the risk free asset. In the Black CAPM however, the investor may hold the zero beta portfolio, which consists of long and short positions. It is entirely reasonable to expect that these two strategies will have different payoffs, given their different risks and costs.
>
> The fact that the S-L CAPM produces a relationship between beta and average return that is too flat (as exemplified in Figures 2, 5 and 6 in SFG, 2014e), cannot be interpreted as evidence in support of the Black CAPM, or indeed as evidence against the S-L CAPM. It does remain an outstanding issue as to why these empirical predictions differ to the theoretical predictions of the CAPM. As noted earlier, Ray, Savin and Tiwari

---

473 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 22.

474 Handley, J. "Advice on the Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 10.

475 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 23.

(2009) shows that the statistical evidence for rejecting the CAPM is weaker than previously thought when more appropriate statistical tests are used.

1113. Handley (2014) has also concluded that:[476]

> The difficulty here lay in knowing how to interpret this empirical evidence. It is important to be clear that the results of Black, Jensen and Scholes (1972) and the updated results in Fama and French (2004) are said to be consistent with rather than being a direct test of the Black-CAPM. In other words, the Black-CAPM and the low beta bias are not equivalent concepts.

And that:

> In particular there are a number of competing (but not necessarily mutually exclusive) explanations for the low beta bias. It may reflect restrictions on riskless borrowing consistent with the Black CAPM. It may reflect the impact of barriers to international investment consistent with the international CAPM of Black (1974). Black identifies a variety of types of such barriers including the possibility of expropriation of foreign holdings, direct controls on the import or export of capital, reserve requirements on bank deposits and other assets held by foreigners, restrictions on the fraction of a business that can be foreign owned and even the barriers created by the unfamiliarity that residents of one country have with other countries. It may reflect a specification error in the proxy for the market portfolio consistent with the suggestion by Roll (1977). It may reflect model misspecification consistent with the value and/or size effects of the Fama-French model. It was also initially thought that it may reflect the impact of differential personal taxes consistent with the after-tax CAPM of Brennan (1970) but this idea has since been dismissed by subsequent research. It may reflect price pressure exerted by leverage-constrained investors who tilt their portfolios towards high-beta stocks relative to low-beta stocks in seeking higher expected returns, consistent with Frazzini and Pederson (2014). It may reflect price pressure exerted by investors who seek lottery-like stocks consistent with Bali, Brown, Murray and Tang (2014).

1114. The Authority notes that estimated returns on a zero beta portfolio by NERA in 2012 were evaluated by Professors McKenzie and Partington for the AER in 2012, where they concluded that:[477]

> With regard to the robustness of the estimated zero beta return we take this to mean robustness in the sense that there is little or no variation of the estimated parameter in response to sensible alternative approaches to estimation. We conclude that, with respect **to the magnitude of the zero beta return, the estimate is not robust**. The NERA (2012) report, for example, shows estimates ranging from 6.985 percent to 10.309 percent. However, we make a more general and more important point that "the empirical zero beta portfolio" is not unique. Consequently, **there are many different zero beta returns that might be estimated and very large differences in the value of that return could be obtained** [emphasis added].

1115. The Authority notes that empirical estimates have been conducted by consultants for network service providers in Australia. Key findings from these studies are summarised as follows:

- CEG (2008) used Australian data from 1964 to 2007 and reported estimates of the zero beta premium that range between 7.21 per cent per annum and 10.31 per

[476] Handley, J. "Advice on the Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 10.

[477] McKenzie, M. and Partington, G. "Review of NERS report on the Black CAPM", a report prepared for the Australian Energy Regulator, August 2012.

cent per annum using various cross-sections of stocks traded on the ASX data formed into 10 portfolios on the basis of past estimates of beta.[478]

- NERA (2013) used Australian data from 1974 to 2012 and reports estimates of the zero beta premium that range between 8.74 per cent per annum and 13.95 per cent per annum using both individual stocks and stocks formed into portfolios on the basis of past estimates of beta.[479]
- SFG (2014) reported an estimate of the zero beta premium of 3.34 per cent per year. This study was based on 20 years of returns information from 1994 and 2013.[480]

1116. In conclusion, the Authority is of the view that the estimates of the zero beta premium are not robust and that there are many different zero beta returns which could be estimated. Therefore, the differences in the value of the estimates may vary significantly from study to study as previously presented. The issue of wide estimates of the zero beta premium is closely linked with the argument that the Black CAPM is not widely used by academics and practitioners, as discussed in detail below.

The Black CAPM is not widely used by academics or practitioners

1117. The Authority is of the view that the Black CAPM is not widely used by academics as an approach to estimating a return on equity, either in Australia or overseas. Neither is the Authority aware of any regulator in Australia or overseas who has utilised the Black CAPM to provide a direct estimate of the return on equity in its decisions. This view is supported McKenzie & Partington and Handley.

1118. In addition, Handley argued that:[481]

> The Black CAPM is not widely adopted in practice – there is one very good reason for this. The theoretical prediction which distinguishes the Black-CAPM from the Sharpe-CAPM is that the (shadow) risk free interest rate – more commonly called the zero beta rate – is unspecified except to say that it must be less than the expected return on the market portfolio. In the partially-restricted version of the model, the zero beta rate must also be above the risk free rate. From a practical point of view, this is not very useful due to the wide range of possible values that the zero beta rate may take on. The Black-CAPM therefore presents the non-trivial task of having to estimate the expected zero beta rate which the theory says could be anywhere in a very wide range as well as having to estimate an expected market risk premium relative to the expected zero beta rate.

The Authority's decision on the Black CAPM

1119. The Authority has come to the view that the Black CAPM is relevant for the purpose of estimating a return on equity for regulatory decisions in Australia. All of its underlying assumptions except for one are the same as those underlying the Sharpe Lintner CAPM. The Black model therefore satisfies the criterion of having a theoretical foundation.

---

478 CEG (September 2008) *Estimation of, and correction for, biases inherent in the Sharpe CAPM formula,* a report prepared for the Energy Networks Association Grid Australia and APIA.

479 NERA Economic Consulting (June 2013) *Estimates of the Zero-Beta Premium,* a report prepared for the Energy Networks Association, p. 16 and p. 23.

480 SFG Consulting (2014) *Cost of equity in the Black Capital Asset Pricing Model,* a report prepared for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid, and SA PowerNetworks, p. 27.

481 Handley, J. "Advice on the Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 12.

1120. The concept of zero beta portfolio, however, is not well established. Estimates of the zero beta premium are both unstable and unreliable, particularly in the Australian context. Neither is the Black CAPM widely adopted by academics or practitioners in Australia or overseas for estimating a return on equity directly. None of the estimates of a return on equity that are made using the Black CAPM are sufficiently robust. The Authority considers that it is therefore impractical to utilise the Black CAPM to determine the return on equity directly.

1121. However, the Authority will recognise the theoretical insight from the Black CAPM when estimating a return on equity with the Sharpe Lintner CAPM. The Authority will have regard to these outcomes when estimating the equity beta from within the estimated range.

The Dividend Growth Model

1122. With regard to the DGM, the Authority in the Rate of Return Guidelines considered applying the DGM for the purpose of estimating the return on equity for the individual infrastructure firm.[482] However, the Authority noted that the results are very sensitive to inputs, and hence to analyst discretion, particularly relating to growth rates. The Authority was not convinced that DGM estimates can be relied upon for individual equities, and hence for estimating the return on equity to the benchmark firm.

1123. In this context, the Authority notes that the AER investigated the possibility of using the DGM for estimating the return on equity for individual infrastructure businesses in Australia.[483] The AER found that the DGM estimates could not be relied upon as, among other things, the average estimated return on equity is consistently higher than that of the market over recent periods from 2006, even with real growth of dividends at zero; thus failing a basic 'sanity check'.

1124. Having considered these findings, the Authority remains of the view that the DGM cannot be relied upon for estimating the return on equity for the firm.

SFG's (2014) study

1125. The Authority notes that SFG's (2014) study was not considered in its Rate of Return Guidelines, released in December 2013, as it post-dated that evaluation.[484] Nor was it submitted prior to the Draft Decision.[485]

1126. The study is now considered with regard to the following key features:

- overall approach to estimating the return on equity for the market using a DGM;
- use of the model for estimating the return for the benchmark efficient entity'; and
- conversion from a 'without-imputation MRP' (or return on equity) to a 'with-imputation MRP' (or return on equity).

---

482 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 75.

483 Australian Energy Regulator, *Explanatory Statement: Rate of Return Guideline*, December 2013, p. 119.

484 SFG Consulting (2014) *Alternative versions of the dividend discount model and the implied cost of equity,* a report prepared for Jemena Gas Networks, ActewAGL, APA, Ergon, Networks NSW, Transend and TransGrid.

485 SFG utilised their 2013 DDM study (see ATCO Gas Australia, *Access Arrangement Information: 1 July 2014 – 31 December 2019*, 3 April 2014, p. 234 and ATCO Gas Australia, *Access Arrangement Information: 1 July 2014 – 31 December 2019*, 3 April 2014, Appendix 19, p. 87).

Overall approach of estimating a return on equity

1127. The Authority notes that estimates of the market cost of equity over time under SFG's approach are conducted using a simultaneous estimation technique, where an estimate of the cost of equity is developed simultaneously with an estimate of long-term growth and returns on investment. SFG is of the view that if the long-term growth assumption is held constant, then all changes in share prices and analyst forecasts are captured in changes to the estimated discount rate.

1128. SFG consider that this is unlikely to be true, on the basis that share prices are likely to fluctuate because of changes in expectations for growth in dividends outside of the explicit forecast period of two years, and because of changes in discount rates. SFG conclude that one reason why dividend discount model estimates of the cost of equity are met with distrust is that they fluctuate too much. SFG is of the view that estimates under the DGM approach fluctuate too much because of the fixed growth assumption.[486]

1129. SFG argue that the main difference between its estimation technique, and that of the AER's DGM estimates, is that SFG's growth rate estimate is contingent upon the share price, earnings per share forecast, and dividends per share forecast. SFG notes that the AER's long run growth rate estimate is independent of the share price, earnings per share forecast, and dividend per share forecast.[487] In addition, SFG argues that its estimation technique generates cost of equity estimates that are more stable over time than a technique that assumes constant growth.

1130. The Authority is of the view that the SFG's proposed approach in estimating a cost of equity is not well established and that the approach (or its deviations from the approach) has not been considered or adopted by any regulator in Australia and overseas. Further, the Authority considers that the approach is not developed on a robust theoretical basis.

1131. The Authority's view is supported by the opinions of experts, which are summarised below.

1132. In a report prepared for the AER in October 2014, Handley (2014) was of the view that:[488]

> The DGM proposed by SFG essentially adopts a brute force approach to estimating the implied cost of equity for the market. It substitutes a large number of combinations of a set of parameter estimates into an assumed valuation model – in this case, a ten-year three-stage DGM – with the objective of simultaneously determining the expected cash flows and discount rate which best fits the data, subject to certain assumed constraints.
>
> The model is interesting but the regulatory environment involving an aggregate regulatory asset base measured in the tens of billions of dollars is not an appropriate

---

486 SFG Consulting (2014) *Alternative versions of the dividend discount model and the implied cost of equity,* a report prepared for Jemena Gas Networks, ActewAGL, APA, Ergon, Networks NSW, Transend and TransGrid, p. 46.

487 SFG Consulting (2014) *Alternative versions of the dividend discount model and the implied cost of equity,* a report prepared for Jemena Gas Networks, ActewAGL, APA, Ergon, Networks NSW, Transend and TransGrid, p. 48.

488 Handley, J. "Advice on the Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 15.

> setting to trial a new model whose widespread use and acceptance is yet to be established.

1133. In addition, Professors McKenzie and Partington were of the view that:[489]

> SFG (2013f) have added another choice to the mix, jointly estimate the cost of equity, the return on equity investment and the dividend growth rate, utilising a relation between the dividend growth rate the return on equity and the reinvestment rate. Clearly this has not yet become the definitive choice. As an additional choice among many, we are unconvinced about the merits of the SFG model. A reasonable requirement, before adopting the SFG model as a preferred choice over well-established models, would be substantial agreement on its superiority in the research literature and/or extensive use in practice.

1134. McKenzie and Partington observed that application of this form of DGM could generate virtually any return on equity estimate depending on the specification of the model:

> SFG constrain the choices available by requiring that their estimates meet certain criteria. As we have pointed out before… the result is that assumptions about the long term growth rate are replaced by assumptions about how the massive set of available choices should be filtered. Since the available set of choices is limitless, the exact result we get will also be determined by how coarse a grid we apply in initial selection of the choices that we allow to enter the filtering process.

1135. The Authority therefore has strong reservations about SFG's results.

Estimating the return for the benchmark efficient entity

1136. SFG estimate the return on equity for network businesses using the DGM for each of the analysts' forecasts. SFG then subtract the risk free rate to obtain the equity risk premium (**ERP**) for each return on equity estimate. SFG then averages the resulting ERPs as a proportion of the market MRP estimated from the model (see above).

1137. This delivers an average risk premium of 0.94. This may be interpreted as the equity beta estimate in the context of the Sharpe Lintner CAPM.

1138. However, this approach:[490]

- is not an econometrically sound approach to estimating beta;
- relies on a very much smaller dataset than the Authority's beta estimates;
- uses inappropriate weightings in the beta estimation process because SFG give businesses with more analyst coverage greater weight; and
- delivers an equity beta that is implausibly high.

1139. For these reasons, the Authority rejects use of the SFG DDM estimates as being a relevant approach to estimating the return on equity for the benchmark efficient entity.

---

489 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 27.

490 Australian Energy Regulator, *Draft decision: Jemena Gas Networks (NSW) Ltd: Access arrangement 2015–20*, November 2014, Attachment 3: Rate of return, p. 3-229.

Grossing up returns for Imputation

1140. SFG (2014) argues that in approaches that use data to produce ex-imputation estimates of the required return on the market the relationship between the ex-imputation return r_{ex} and the with-imputation return r_{with} is given by the standard Officer (1994) gross-up formula (4).

$$r_{ex} = r_{with}\left[\frac{1-t}{1-t(1-\gamma)}\right] \quad (4)$$

Where t is the corporate tax rate and represents the assumed value of imputation credits γ (gamma).

1141. SFG argues that the above formula should be used to convert standard ex-imputation estimates of the MRP provided by survey respondents into regulatory estimates with-imputation.[491]

1142. However, the Authority notes that Professor Handley does not agree with SFG's view. In a report prepared for the AER in October 2014, Handley was of the view that:[492]

> The conversion formula (7) is indeed appropriate in the setting that Officer (1994) considers but is in general not correct in non-perpetuity settings.[493] In this case, it is appropriate to use theta to directly gross-up the imputation credits **associated with the dividend component of the return rather than grossing-up the entire return**.[494] For example, in relation to historic estimates of the equity premium (and historic stock returns) this is precisely the approach adopted by Brailsford, Handley and Maheswaran (2012) in their tables 2 and 3.[495] This approach should similarly be used to gross-up an ex-imputation MRP estimate from experts' estimates.

1143. The Authority notes that Professors McKenzie and Partington hold the same views as Professor Handley on the issue.[496]

1144. The Brailsford, Handley and Maheswaran approach utilises the following formula:[497]

> …we estimate the (weighted) average imputation credit yield c_t, for each year t, using the following model [5]:

---

491 SFG Consulting (2014) *Alternative versions of the dividend discount model and the implied cost of equity,* a report prepared for Jemena Gas Networks, ActewAGL, APA, Ergon, Networks NSW, Transend and TransGrid, p. 73.

492 Handley, J. "Advice on the Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 22.

493 Officer (1994) assumes a perpetuity framework whereby there is a full distribution of free cash flow and franking credits each period and returns are entirely in the form of fully franked dividends i.e. there are no capital gains. This means that γ = θ within the Officer framework.

494 It is noted that the SFG approach specifies gamma rather than theta in the conversion formula and so indirectly allows for less than full payout of credits based on the assumed distribution ratio *F* but this will not necessarily correspond to the actual payout of credits associated with the return.

495 See Brailsford T., Handley J. and Maheswaran K, Re-examination of the historical equity risk premium in Australia, *Accounting and Finance*, 48, 2008, pp. 84-85 for details.

496 McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 37.

497 Brailsford T., Handley J. and Maheswaran K, Re-examination of the historical equity risk premium in Australia, *Accounting and Finance*, 48, 2008, p. 85.

$$c_t = p_t d_t \frac{T_t}{1-T_t} \quad (5)$$

Where

d_t represents the annual dividend yield implied from the Historical Stock Price Index and the Historical Stock Accumulation Index;

p_t is the (average) proportion franked; and

T_t is the tax rate at which dividends are franked.

1145. Using theta directly – to determine the value of credits distributed with the dividend each period – ensures that the grossed-up cash flow stream is expressed on an after-company-before-personal-tax basis. By definition, the resultant implied cost of equity will also be expressed on an after-company-before-personal-tax basis.[498] The equation set out in paragraph 1144 may then be re-written as in equation (6).

$$c_t = F \; x \; d_t \left(\frac{T_t}{1-T_t} \right) x \; \theta \quad (6)$$

Where

θ is the value of distributed imputation credits consistent with the Authority's estimate of gamma;

d_t is the dividend yield in year t ;

F is the proportion of dividends which are franked; and

T_t is the corporate tax prevailing in that year.

1146. On the basis of the above considerations, the Authority has concerns regarding the estimates of a market return on equity by SFG in its 2014 study. The Authority accounts for these concerns when determining the point estimate from within the estimated range.

Authority's decision on the DGM

1147. The Authority remains of the view set out in the Rate of Return Guidelines that the DGM is relevant for the purpose of estimating the market return on equity for its regulatory decisions.

1148. However, given the estimates of a market return on equity are unstable and sensitive to analysts' inputs, the Authority maintains its view from the Draft Decision that the DGM can only be used to inform the overall return on the market. This is used to inform the estimates of the forward looking MRP.

1149. The Authority has reservations about SFG's DGM estimates of the return on the market submitted by ATCO in developing its proposed rate of return. The Authority

[498] J. Handley, *Advice on the Return on Equity*, October 2014, p. 23.

will take those reservations into account in its determination of the point estimate of the MRP.

1150. The Authority also rejects the use of SFG's estimates of the return on equity for the benchmark efficient entity.

1151. The Authority remains of the view that DGM should not be used to directly estimate the market return on equity of the benchmark efficient entity in regulatory decisions.

The Sharpe Lintner CAPM

1152. This section considers the ability of estimates of the return on equity derived from the Sharpe Lintner CAPM to meet the requirements of the NGL and NGR. Each of the three inputs to the Sharpe Lintner CAPM – the estimates of the risk free rate, equity beta, and the MRP – are considered in the following sections.

1153. The Authority notes that there is no new information presented by ATCO in its response to the Draft Decision with regard to the approach using the Sharpe Lintner CAPM. The Authority considers that all of information submitted by ATCO in response to the Authority's Draft Decision had been previously considered in the Rate of Return Guidelines and in the Draft Decision. However, for completeness, key criticisms in relation to the adoption of the Sharpe Lintner CAPM are considered in turn below.

Poor empirical evidence of the Sharpe Lintner CAPM

1154. As discussed in detail in its Rate of Return Guidelines and ATCO's Draft Decision, the Authority is of the view that the Sharpe Lintner CAPM was developed from theory, the results are robust and the model is widely adopted by practitioners and academics for determining the return on equity.

1155. The Authority also addresses criticisms in relation to the poor empirical performance of the Sharpe Lintner CAPM. The Authority remains of the view that these criticisms remain contentious, with no clear agreement among the experts (for example, with regard to the estimate of beta, exemplified in the consideration of the Black CAPM above). However, the Authority notes that an adoption of equity beta from an upper bound of the estimated range of equity beta from empirical studies represents an upward revision of the return on equity estimated from the Sharpe Lintner CAPM.

1156. The Authority notes that, in their report prepared for the AER in October 2014, Professors McKenzie and Partington concluded that:[499]

> With regard to the CAPM, its efficacy comes from the test of time. This model has been around for in excess of half a century and has become the standard workhorse model of modern finance both in theory and practice. The CAPMs place as the foundation model is justifiable in terms of its simple theoretical underpinnings and relative ease of application. The competing alternatives, which build upon the CAPM, serve to add a level of complexity to the analysis.

1157. The Authority notes that other criticisms of the Sharpe Lintner CAPM include those relating to the risk factors proposed by Fama and French. Fama and French, and some others, have argued that beta alone cannot explain the cross section of average returns of the stocks. However, the Authority notes that the cross section of stocks'

[499] McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 9.

average returns is only one dimension of interest when modelling the risk-return relationship.

1158. In addition, as discussed in McKenzie and Partington's report, the evidence against the CAPM may not be as robust as previously thought.[500]

- *First*, Ray, Savin and Tiwari (2009) conclude that the statistical evidence for rejecting the CAPM is weaker than previously thought when more appropriate statistical tests are used.
- *Second*, more importantly, Da, Guo and Jagannathan (2012) argue that the empirical evidence against the CAPM based on stock returns does not invalidate its use for estimating the cost of capital for projects in making capital budgeting decisions. Their findings support the continued use of the CAPM irrespective of one's interpretation of the empirical literature on asset pricing.

Inability to reflect changes in market conditions

1159. The Authority is not satisfied that a return on equity estimated by the Sharpe Lintner CAPM is unable to reflect changes in market conditions. The Authority notes that estimates of risk free rate, equity beta and the MRP consider relevant data available at the time the decision is made. As such, any changes in market conditions should be reflected in the data which are used in the estimates.

1160. For example, estimates of the risk free rate use recently observed yields on the Commonwealth Government bonds over the period of 20 trading days prior to the decision. Similarly, estimates of equity beta generally use a sample of stock and market returns over the most recent period of five years.

1161. Estimates of the MRP also account for prevailing conditions.

Failure to achieve rates of return that would be consistent with the outcomes of efficient, effectively competitive markets

1162. The Authority is satisfied that an equity rate of return derived from the Sharpe Lintner CAPM is consistent with the outcomes of efficient, effectively competitive markets. As noted above, the model is widely accepted, has stood the test of time, and as a result continues to be the standard asset pricing model of modern finance, in theory and practice.

1163. The Authority's process for determining the return on equity cross checks the outputs of the model against available evidence from the market (see Step 4 below). On the basis of that analysis, the Authority is satisfied that the rate of return on equity determined using the Sharpe Lintner is consistent with prevailing market outcomes and for the benchmark efficient entity.

The Authority's decision on the Sharpe Lintner CAPM

1164. The Authority does recognise that recent market conditions since the Global Financial Crisis have raised important issues with regard to the application of the Sharpe Lintner CAPM. The Authority considers that its revised approach to estimating the Sharpe Lintner CAPM – as set out in the Rate of Return Guidelines and implemented for this Final Decision – allows for much greater flexibility in the estimates of the return

[500] McKenzie, M. and Partington, G. "A Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 9.

on equity, thereby improving the overall estimates of that return. That approach, among other things, involves establishing a range for the forward looking MRP and then determining a point estimate at the time of each decision, based on the prevailing conditions in the market.

Conclusions with regard to relevant models

1165. The following conclusions have been reached in relation to the approach for estimating the return on equity in this Final Decision:

- The Sharpe Lintner CAPM will be utilised to estimate the return on equity.
- The Fama French three factor model is not relevant and as such, this model is not used for the purpose of estimating a return on equity.
- The Black CAPM is relevant for the purpose of estimating a return on equity. However, given it is not reliable and practical to estimate a robust return on equity using this model, the model will not be used directly, but only to inform the point estimate of the equity beta from within its range for input to the Sharpe Lintner CAPM.
- The DGM is a relevant model for informing the market return on equity and also the forward looking MRP.
- Other information such as historical data on equity risk premium; surveys of market risk and other equity analysts' estimates are also relevant for the purpose of estimating the MRP and the market return on equity. This other material will be used as a cross check for the return on equity.

1166. For these reasons, the Authority remains of the view that its reasons for adopting the Sharpe Lintner CAPM are sound. The Authority considers that its application of the Sharpe Lintner CAPM meets the requirements of the NGR, and the allowed rate of return objective.

- The Authority does not agree with ATCO's submission that it has not taken all of the relevant information into consideration with respect to its estimate of the return on equity. The Authority is of the view that all of the issues raised by ATCO and its consultants have been considered in this Final Decision.
- The Authority also disagrees with ATCO's assertion that the rate of return is unreasonably low, and will impede efficient investment. The Authority has conducted significant research into the rate of return and has cross checked its estimate across various sources. The Authority's estimate for the rate of return is in line with other industry estimates.
- The Authority considers that the estimated return on equity adopted in this Final Decision is commensurate with the equity costs incurred by a benchmark efficient entity with a similar degree of risk as ATCO with respect to the provision of reference services. The Authority therefore considers that the estimated rate of return meets the allowed rate of return objectives and the requirements of the NGR and NGL.

Step 2 – Estimate parameters for the relevant models

1167. The second step involves estimating parameters for relevant models. The Authority considers the Sharpe Lintner CAPM to be the only relevant model for directly estimating the return on equity for an efficient benchmark entity in the Australian context.

1168. The Authority notes that the return on equity will be estimated using the Sharpe Lintner CAPM in the following form shown in (7).

$$E_t(R_i) = R_{F,t} + \beta_i \times MRP_t \quad (7)$$

Where

$E_t(R_i)$ is the return on asset i;

$R_{F,t}$ is the risk free rate of return;

β_i is equity beta; and

MRP_t is the Authority's estimate of the forward looking market risk premium for the regulatory period.

1169. The Authority notes that the above Sharpe Lintner CAPM equation represents a well-established approach to estimating the return on equity for the benchmark efficient entity.

1170. In addition, as discussed in the Authority's Rate of Return Guidelines and the Draft Decision for ATCO's proposed Access Arrangement, the Authority was of the view that the relationship between the risk free rate and the MRP is inconclusive. This means that the risk free rate of return may be positively (or negatively) correlated with the MRP. In addition, it may also be the case when there is no relationship between a risk free rate and the MRP in Australia. For this reason the MRP must be determined for each decision as opposed to relying on predetermined ranges and point estimates, which implicitly assume a particular relationship.

1171. On balance, the following parameters are considered when the Sharpe Lintner CAPM is adopted to estimate a return on equity for a network service provider.

- risk free rate;
- equity beta; and
- MRP or the Market Return on Equity.

1172. The Authority is of the view that estimating the MRP and the market return on equity are two different processes. As such, the Authority considers that it is appropriate to consider all relevant information for each process. Doing so involves a repetition of the information/data. However, the Authority is of the view that doing so will ensure that all relevant information will be considered for the estimate of any input parameter which will be adopted in the Sharpe Lintner CAPM.

Estimates of the risk free rate

1173. The risk free rate will be based on a 5 year term to maturity, determined as the average of the observed yields of the 5-year Commonwealth Government Securities over a 20 day period just prior to start of the regulatory period. The risk free rate is at 1.96 per cent for the 20 day period ending 2 April 2015.

Estimates of the Market Risk Premium

1174. The Authority's views on the best means to estimate the forward looking MRP have evolved in recent decisions.

1175. In the Final Decision for the third Western Power Access Arrangement the Authority applied an MRP of 6 per cent in the Sharpe Lintner CAPM, based on regulatory precedent and analysis by Handley with regard to the historic average MRP.[501] The view implicit in this approach was that the MRP is mean reverting, such that the historic average provided a robust estimator for future outcomes (on average).

1176. Handley's analysis was based on Brailsford, Handley and Maheswaran (**BHM**) data.[502] At the time, the Authority did not have access to the underlying BHM data.

1177. The Authority gained access to the BHM data during the development of the Rate of Return Guidelines, enabling it to undertake statistical testing on the long run average market return on equity and MRP, in order to ascertain whether each series was stationary (in the sense of being mean reverting). Stationarity is an important property of a data set if historic averages are to be used as a predictor for outcomes likely to prevail over future periods.

1178. The results indicated the market *return on equity* was stationary.[503]

1179. However, the results produced mixed evidence on the stationarity of the MRP, with the analysis supporting a conclusion that the MRP is non-stationary.[504,505] This finding led the Authority to the important conclusion that the long run historical estimate of 6 per cent could be a poor predictor of the MRP prevailing in future regulatory periods. The Authority therefore dropped the fixed estimate of 6 per cent, instead establishing a range of possible future outcomes for the MRP, informed by information that a rational market participant would use in making investment decisions. The resultant range for the MRP was 5 to 7.5 per cent.[506]

1180. The Authority retained this range for the Draft Decision.

1181. With respect to this range, the Authority acknowledges ATCO's contention in its response to the Draft Decision that the range of 5 to 7.5 per cent established in the Rate of Return Guidelines may lead to outcomes that are too low.[507] In particular, it is clear that using a range with an inappropriately constrained upper bound could result in downward bias in the Authority's forward looking MRP estimates. The

---

501 J. Handley, *An Estimate of the Historical Equity Risk Premium for the Period 1883 to 2010*, 25 January 2011.

502 T.J. Brailsford, J.C. Handley and K. Maheswaran, The Historical Equity Risk Premium in Australia: Post-GFC and 128 Years of Data, *Accounting and Finance*, 52, 2012, pp. 237-247.

503 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 8, p. 63 and Appendix 16.

504 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 8, p. 63 and Appendix 16.

505 Further support for the non-stationarity of the MRP is given by the finding that the risk free rate is non-stationary (Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 16). As the market return on equity is comprised of the risk free rate and the MRP, if follows that then that MRP must be non-stationary, by construction.

506 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 137.

507 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, p. 190.

Authority therefore has reviewed the approach to establishing a range for the forward looking MRP for this Final Decision.

1182. Most significantly, the Authority has now concluded that it is not reasonable to constrain the MRP to a fixed range over time. The erratic behaviour of the risk free rate in Australia to date, and more particularly, its pronounced decline in the current economic environment, leads to a situation where the combination of a fixed range for the MRP and prevailing risk free rate may not result in an outcome which is consistent with the achievement of the average market return on equity over the long run.

1183. Specifically, the estimate of the upper bound for the forward looking MRP of 7.5 per cent that was based on the DGM will fluctuate in line with the risk free rate. So for example, at times when the risk free rate is low, as it currently is, the upper bound for the MRP should be higher. There will be times – such as during the GFC – when the Authority would be more likely to select a point estimate of the MRP which is close to the upper bound. The resulting required return on the market in that type of situation could possibly exceed the long run average return on equity indicated by the historical data.

1184. For this reason the Authority considers it appropriate to determine a range for the MRP at the time of each decision.

Interpreting the historic evidence

1185. The Authority agrees with ATCO's consultant SFG when it states:[508]

> There are two ways to process the historical returns data:
>
> a) The Ibbotson approach assumes that the MRP is constant overall market conditions and the required return on equity varies one-for-one with changes in the risk-free rate; and
>
> b) The Wright approach assumes that the required return on equity is more stable and the MRP varies over different market conditions.
>
> …In our view, both methods of processing the historical data provide relevant evidence in which case regard should be had to both.

1186. The Ibbotson approach is consistent with the view that *MRP* is stationary and therefore will return to some constant long run average that is a good predictor for the MRP in future. If stationarity of the MRP is borne out in reality, then the Ibbotson approach, despite being based on historical data, could be used as a reasonable 'on-the-day' prediction of the MRP over a future period. It can be combined with the on-the-day estimate of the risk free rate, which is considered the best predictor of future rates in light of the efficient market hypothesis.

1187. On the other hand, the Wright approach concludes that the MRP is not mean reverting, rather it is the long run real historical *market return on equity* that is mean reverting. With the Wright interpretation – at any point in time – the real average market return on equity may be combined with the estimate of the long run *expected* inflation rate, using the Fisher equation, to provide a best estimate of the expected nominal future average value of the return on the market. It follows then that deducting the on the day estimate of the risk free rate from that nominal estimate will

---

[508] ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 28.

provide the contemporaneous on the day forward looking estimate of the MRP. This approach implies that the MRP and risk free rate are perfectly correlated one for one.

1188. For this Final Decision, the Authority accounts for the Ibbotson approach in its process for establishing the lower bound of a range for the forward looking MRP.

1189. The use of the Ibbotson approach to inform the lower bound of the MRP bound does not mean the Authority ascribes to the view that the MRP in Australia is stationary.[509] The Authority remains of the view that evidence on mean reversion of the MRP in Australia is inconclusive as outlined in the Guidelines which conducted empirical tests on the Australian data.

1190. The Authority also notes that any empirical testing may be subject to shortcomings such as those relating to the data itself, its span or in the methods applied. Empirical evidence may provide information that assists in understanding economic and financial relationships, but should be grounded in theory. For this reason the Authority considers it reasonable that investors may give credence to historical averages of the MRP in forming their views for the future.[510] Therefore, the Authority considers that the two opposing theoretical interpretations for estimating the MRP (Ibbotson and Wright) cannot be dismissed.[511]

1191. Turning now to the estimates themselves, the Authority first evaluated the long run average market return observed from the Brailsford, Handley and Maheswaran (**BHM**) series in Rate of Return Guidelines. The BHM (2012) series spanned 128 years and so was considered the most appropriate data set for determining the long run average market return on equity and the related MRP.

1192. However, concerns have been raised relating to the quality of the BHM data. Additionally, the series covers a pre- and post-imputation credit regime and so requires adjustment from 1987 onward to ensure returns are estimated on a consistent basis over the whole series.

1193. With regard to data quality, the BHM historic series are claimed to be downwardly biased on account of an inadequate adjustment made to the dividend yields employed in the data. To address this perceived issue, in 2013 NERA produced an Australian stock market total return series that readjusted the dividend yields prior to 1957.[512]

---

509 Equally, the Authority does not accept the Wright approach as being the sole guide for the estimate. The 'Wright' view on the stationarity of the market return on equity was considered in the Guidelines. However, the Guidelines rejected the view that the MRP and risk free rate are perfectly correlated one for one. The Authority remains of the view that while being an acceptable theoretical foundation, sole reliance on the one for one correlation over anything but the very long run is not likely to be helpful in practice.

510 For example, many private sector equity analysts, such as Grant Samuel, utilise a historic estimate of the MRP when undertaking valuations.

511 For the risk free rate, the efficient market hypothesis provides a theoretical foundation, which is therefore supported by empirics.

512 NERA Economic Consulting, *The Market Risk Premium: Analysis in Response to the AER's Draft Rate of Return Guideline*, A Report for the Energy Networks Association, October 2013.

1194. For the purpose of this Final Decision, the Authority has extended the BHM and NERA series through to 2014, based on the most recent data.[513]

1195. The difference between the long run average (nominal) market return on equity based on the BHM and NERA series is 36 basis points (Table 75).

Table 75 BHM and NERA long run historic nominal and real annual average market returns for 1883 to 2014 (excluding imputation credits)

	NERA approach	BHM approach	Difference
Nominal return	12.00%	11.64%	0.36%
Real return	8.76%	8.40%	0.36%

Source: NERA (2013), Brailsford, Handley and Maheswaran (2012) and ERA Analysis

1196. Handley's advice to the AER prepared in October 2014 raised a number of concerns regarding the analysis underlying the NERA (2013) data. In particular, he highlighted a lack of consistency between NERA's source of dividend yields and those employed by Lamberton on which the BHM series was based.[514] Additionally, he highlighted that NERA had not reconciled their adjusted yields with those of Lamberton. The Authority therefore is of the view that the analysis underlying the NERA (2013) data is insufficient grounds to justify the full upward adjustment to the BHM series performed by NERA.

1197. Given the uncertainty surrounding the most appropriate adjustment to the market return series, the Authority will use an average of the two series to minimise any potential error with use of either series alone. The real returns of both series are used (Table 75), removing inflation on a consistent basis (informed by the estimates of historic inflation set out in the BHM data).[515]

Imputation Gross-Up Adjustment

1198. The real long term average market return of the BHM and NERA series is estimated as the 'gross return' investors in equity would expect to receive on the market. That is, it is reported inclusive of yields from capital gains and dividends. The series do not account for the introduction of imputation after 1987, so need to be adjusted up from that point on to account for the imputation credit yields.[516]

---

513 Daily ASX All Ordinaries (AS30) and Accumulation (ASA3) indices were sourced from Bloomberg. Annual outcomes were calculated consistent with the method set out by BHM in their 2012 study (see T.J. Brailsford, J.C. Handley and K. Maheswaran, The Historical Equity Risk Premium in Australia: Post-GFC and 128 Years of Data, *Accounting and Finance*, 52, 2012, section 2, p. 238). Bond and bill yields were extended based on the Reserve Bank of Australia statistics (90 day Bank Accepted Bills were used for 2013 and 2014 as there is no 3 month Treasury bills data for those years). Gamma was assumed at 0.4 consistent with the Authority's estimate for this Final Decision.

514 J. Handley, *Advice on the Return on Equity*, A Report prepared for the Australian Energy Regulatory, 16 October 2014, p. 19.

515 T.J. Brailsford, J.C. Handley and K. Maheswaran, , The Historical Equity Risk Premium in Australia: Post-GFC and 128 Years of Data, *Accounting and Finance*, 52, 2012, p. 241; NERA Economic Consulting, *The Market Risk Premium: Analysis in Response to the AER's Draft Rate of Return Guideline*, A Report for the Energy Networks Association, October 2013, Table 2.7, p. 28.

516 T.J. Brailsford, J.C. Handley and K. Maheswaran, The Historical Equity Risk Premium in Australia: Post-GFC and 128 Years of Data, *Accounting and Finance*, 52, 2012, Table 2, pp. 237-247.

1199. The post-tax financial model which is a requirement under NGR 87 compensates for required returns lost to taxation by providing an explicit allowance in the model cash flows for the taxes payable, which are then recovered in regulated tariffs.[517] At the same time, the reduction for the value of imputation credits is also explicitly accounted for in the cash flows, following the requirements of NGR 87A.

1200. Therefore, applying a return on equity in the post–tax model which was not 'grossed up' for imputation credits would result in under compensation for the investor. This would result because the value of imputation credits would be removed twice, first from the rate of return, and second from the revenue cash flows.

1201. It follows that the Authority needs to 'gross up' the observed post 1987 market returns in the BHM data for the estimated value of imputation credits. Applying this in the post-tax revenue model will then ensure that the investor receives an 'after company tax, after some personal tax' return.[518] The final component of the required return on equity is then received through the investor's tax return.

1202. To calculate the value of imputation credit yields in each year from 1988 (inclusive) onwards, equation (8) based on that set out by Handley (2008), accounting for theta directly, is used (see paragraph 1144 and 1145 above for the derivation of this equation):[519,520]

$$c_t = F \; x \; d_t \left(\frac{T_t}{1-T_t} \right) x \; \theta \qquad (8)$$

Where

θ is the value of distributed imputation credits consistent with the Authority's estimate of gamma;

d_t is the dividend yield in year t ;

F is the proportion of dividends which are franked; and

T_t is the corporate tax prevailing in that year.

1203. The yield is then added on to the total return in each year 1988 through to 2014. The results for both series for the period following the introduction of imputation are the same, as the NERA and BHM total return series do not differ over this period. The average yield value of imputation credits to investors from 1988 to 2014 based on these assumptions and the real return data is an estimated 0.88 per cent.

1204. The imputation credit yields for each year are then added to the real total returns for both the BHM and NERA series from 1988 on and the two series are then averaged (Table 76).

---

517 Gamma in the post-tax approach is factored in through a reduction in the compensation for company tax, reflecting the estimated cash flows received by investors from imputation credits through their personal tax.

518 J.C. Handley, *Further comments on the historical equity risk premium*, 14 April 2009, pp. 16-17.

519 T.Brailsford, J.Handley and K.Maheswaran, *Re-examination of the Historical Equity Risk Premium in Australia*, Accounting and Finance, vol. 48, 2008, p. 85. The F in equation 4 is taken to be 0.75, hence a value for theta of 0.53 corresponds to an estimate of gamma of 0.4.

520 The imputation credit regime commenced from 1 July 1987.

Table 76 Average annual imputation credit yields and grossed up arithmetic average returns (nominal, consistent with the estimate of gamma of 0.4)

	NERA	BHM	Average
Nominal returns excluding imputation yield (1883-2014)	12.00%	11.64%	11.82%
Nominal imputation credit yield (**1988**-2014)	0.88%	0.88%	0.88%
Grossed up nominal returns (1883-2014)	12.19%	11.83%	12.01%
Grossed up real returns (1883-2014)	8.94%	8.58%	8.76%
Expected inflation for AA4	1.90%	1.90%	1.90%
Grossed up nominal return commensurate with current inflation expectations	11.01%	10.64%	10.83%

Source: ERA Analysis, NERA (2013), Brailsford, Handley and Maheswaran (2012)

1205. As a final step, the grossed up expected return on equity for the market may be developed consistent with the inflation outlook for the next 5 years. The estimate of inflation for the next 5 years used in for this Final Decision is 1.90 per cent. This estimate is used to inflate the resulting average real return geometrically (based on the Fisher equation). This produces a nominal estimate for the average return on the market of 11.01 per cent for the NERA based data and 10.64 per cent for the BHM based data.

1206. The average of the two series is 10.83 per cent. The Authority considers that this estimate provides the estimate for the nominal average market return on equity that is consistent with Wright's interpretation of the historic data and the current inflation outlook.

1207. This is an important marker for the market return on equity. As the available evidence supports the hypothesis that the market return on equity is mean reverting, this historic outcome from a long span of data may be used as a cross check for the long run average of the forward looking market return on equity from each regulatory period.

1208. The Authority also notes that with the current risk free rate at 1.96 per cent, the MRP that is consistent with the Wright interpretation of the data is (10.83 – 1.96 =) 8.87 per cent.

Upper bound of the MRP range

1209. The upper bound of the MRP range in the Draft Decision was set at 7.5 per cent, based on the range for the return on the market from a range of Dividend Growth Models (**DGM**) evaluated for the Rate of Return Guidelines.

1210. As noted above, the Authority considers that this bound is not high enough given prevailing market conditions. There are two potential issues with the range for the market return on equity estimates derived from the DGM:

- first, there is a need to ensure that returns from all estimates grossed up, as to be on a consistent basis for input to the Authority's estimate; and
- second, the Authority should account for the range of outcomes based on the credible DGM estimates.

1211. With regard to the first issue, ATCO's consultant SFG states that a failure to account for imputation leads to DGM estimates that are too low:[521]

> Two examples of this relating to our own SFG (2013 DDM) study are:
>
> a) SFG (2013 DDM) report estimates of MRP for every six-month period beginning in 2002. The ERA reports the range of estimates as 4.7%-7.9%, but the lower figures clearly relate to periods from many years ago. SFG (2013 DDM) clearly reports that its most recent contemporaneous estimate is 7.6% and
>
> b) SFG (2013 DDM) clearly state that the estimates in their Table 12 are ex-imputation estimates and devote an Appendix to explaining how they would be adjusted to incorporate various assumptions about imputation credits. However, the ERA interprets all of the estimates above as being with-imputation estimates. 144. Consequently, our conclusion is that the dividend discount evidence on which the ERA relies currently supports an estimate of the required return on the market of at least 11.70% and an estimate of the MRP of at least 8.75%.

1212. The Authority has revisited the DGM estimates, gathering a range of grossed up market return on equity estimates from the more recent DGM models (Table 77).

Table 77 Recent estimates of the MRP using the DGM

Study/Author	Date	Dividend yield source	Theta	Risk free rate (%)	Implied MRP (%)
Capital Research	Feb 2012	Factset	0.5	3.8	9.7
NERA	Sep 2012	Bloomberg	0.35	3.13	8.03
CEG	Nov 2012	RBA	0.35	3.05	8.89
Lally	Mar 2013	Bloomberg	0.35	3.26	5.90 – 8.39
ERA	Aug 2013	Bloomberg	0.35 – 0.7	3.31	5.34 – 7.57
SFG	Dec 2014	Thomson Reuters I/B/E/S	0.35 - 0.7	2.95 – 3.58	7.84 – 9.58
AER	Sep 2014	Bloomberg	0.7	3.48	6.6 – 7.8
ERA	Mar 2015	Bloomberg	0.53	1.96	8.24
Estimated range of the MRP consistent with gamma of 0.4			0.55		**5.6 – 9.7**

Source Capital Research, *Forward Estimate of the Market Risk:Premium: Update*, A response to the draft distribution determination by the AER for Aurora Energy Pty Ltd, February 2012, p. 20;
NERA Economic Consulting, *The Market, Size and Value Premiums*, June 2013, p. 49;
Competition Economists Group, *Update to March 2012 Report*, November 2012, p. 31.,
M. Lally, *The Dividend Growth Model*, 4 March 2013, p. 16.
Economic Regulation Authority, Appendices to the Explanatory Statement for the Rate of Return Guidelines, 16 December 2013, pp. 125 – 127.
ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision, 22 December 2014*, Appendix 9.1 (SFG), p. 32;'
Australian Energy Regulator, *Draft decision: Jemena Gas Networks (NSW) Ltd: Access arrangement 2015–20*, Attachment 3: Rate of return, November 2014 p. 3-200;
Authority estimates.

1213. The majority of studies in Table 77 use a franking proportion of 0.75 to gross up returns. The commensurate estimate of theta for that franking proportion, which delivers a gamma of 0.4, is just under 0.55. Based on the results in Table 77, the

[521] ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 32.

Authority judges that a range for the MRP commensurate with a gamma of 0.4 is 5.6 to 9.7 per cent. The lower bound is established by the Authority's August 2013 lower bound estimate for a theta of 0.55, while the upper bound is given by Capital Research's February 2012 estimate.

1214. In addition, the Authority updated its two stage DGM estimate (Box 1) for this Final Decision, to be current as at March 2015. The model was used to develop the range for the MRP in the Rate of Return Guidelines.[522]

Box 1 The two stage DGM

The return implied by the Gordon DGM is based on a forecast dividend based on a forecast dividend growth rate to calculate a forecast dividend yield and then augments this yield with the growth forecast itself. This is shown in equation (9).

$$r_e = \left(\frac{E(D_1)}{P_0} \right) + g \qquad (9)$$

Where $E(D_1) = D_0(1+g)$ and is the last dividend per share paid.

The Authority's current estimate of the DGM is based on a simple two stage approach as outlined in equation (10).

$$P_0 = \frac{m \text{ x } E(D_0)}{(1+k)^{m/2}} + \sum_{t=1}^{N} \frac{E(D_t)}{(1+k)^{m+t-0.5}} + \frac{\frac{E(D_N)(1+g)}{k-g}}{(1+k)^{m+N-0.5}} \qquad (10)$$

Where

D_t is current price the of the equity index;

m is the fraction of the current year remaining;

t is the dividend per share expected in the current year;

$E(D_t)$ is the dividend per share expected years into the future;

k is the return on equity implied by the model;

N is the year of the furthest out dividend forecast; and

g is the long run dividend growth rate.

Monthly net dividend per share forecasts for the All Ordinaries Index were sourced from Bloomberg for the current year, the next year and the year after. The monthly closing price for the All Ordinaries index was also sourced from Bloomberg.

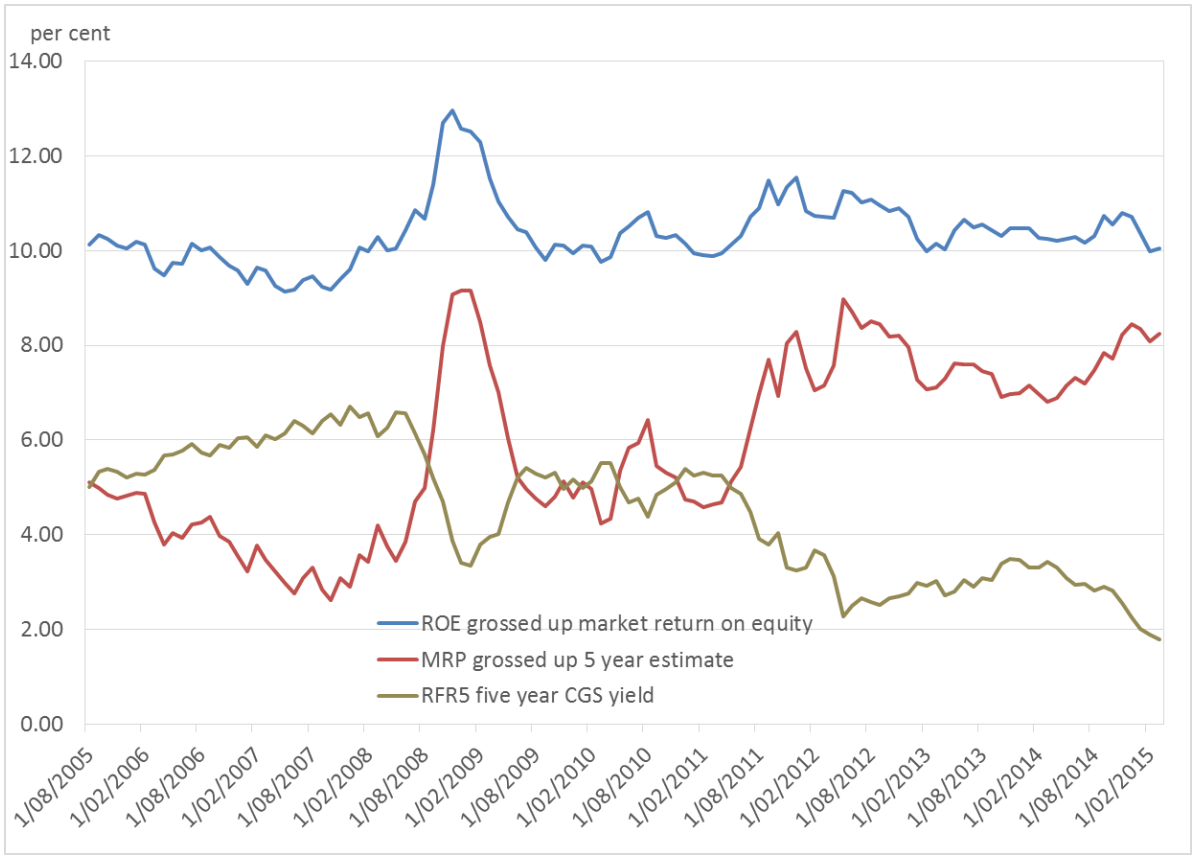
Source: Australian Energy Regulator and ERA Analysis

[522] Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 122.

1215. The assumption for the long run dividend growth rate in the updated DGM model, *g*, at 4.6 per cent, is consistent with the analysis in Lally's 2013 study.[523] This equates *g* to the estimated long run nominal GDP growth, of 5.6 per cent, less 1.0 per cent to account for new share issues and new companies. The resulting grossed up DGM estimate of the required return on the market is 10.04 per cent as at 31 March 2015.

1216. The corresponding results for *g* of 4.6 per cent – when combined with the historic consensus dividend forecasts and share prices from Bloomberg going back to 2005 – are shown in Figure 9.

Figure 9 Dividend Growth Model implied return on equity: All Ordinaries Index (monthly, grossed up)



Source: Bloomberg and ERA analysis

1217. The implied expected market return on equity (grossed up for imputation credit yields) typically fluctuates, in this case between 9 and 11 per cent, only breaking higher in periods of perceived heightened risk, such as 2008 to 2009 and 2011 to 2012. The model indicates that, from the end of 2014 through March 2015, expected returns declined somewhat.

1218. The most recent available monthly observation for 31 March 2015 at 10.04 per cent is below the middle of the 'more typical' range for the return on equity (that is, excluding the GFC type periods). It is at the 30th percentile of the observations reported in Figure 9.

[523] M. Lally, *The Dividend Growth Model*, 4 March, 2013, p. 17.

1219. Deducting the Authority's on-the-day estimate of the 5 year risk free rate, of 1.96 per cent, from the return on the market for the end of March 2015, gives a forward looking 5 year MRP of 8.24 per cent, which also may be observed in Figure 9. The MRP series suggests that the current forward looking estimate is near the top end of its typical range, exceeded only by estimates at the height of the GFC.

1220. The estimates from the DGM are sensitive to input assumptions, particularly the long run growth rate. Varying the long run growth rate, *g*, from 4.0 to 5.1 per cent leads to a range for the MRP estimate at March 2015 of 7.67 to 8.70 per cent.

1221. The Authority notes that DGM estimates are recognised to have shortcomings, including that:[524]

- analyst forecasts (which underpin some of the studies reported in Table 77 and which will be incorporated in the 'consensus' estimates from Bloomberg) have a tendency to be upwardly biased, as they are based on over-optimistic expectations for target prices and earnings;
- DGMs proxy the free cash flow to equity through the estimated dividends, however dividends may not react to changes in market conditions, for example in downturns where companies may maintain their dividend policy, which will upwardly bias returns;
- DGMs do not capture non-dividend cash flows, such as share repurchases or dividend re-investment plans.

1222. Furthermore, the DGM estimates reported here provide a single discount rate, which equates the present value of the future infinite dividend stream with the observed share price. The estimate therefore looks out beyond the 5 year period for which the Authority is seeking to estimate the MRP. If a lower nominal GDP estimate is expected than assumed – say for the two years beyond the three actual dividend growth rate forecasts incorporated in the model – then the estimates of the DGM should be lower than that reported here. The implication would be that the 5 year forward looking MRP would also be lower.

1223. The Authority notes that there is no clear agreement among experts as to the best form for the DGM, or its input assumptions. For that reason, the Authority adopts a wide range, informed by a spectrum of recent studies.

1224. Ideally, DGM return on equity estimates should be based on the most current on-the-day dividend forecasts. However, the Authority notes that the number of studies estimating return on equity using the DGM in Australia is limited and that it is not possible to update all of the various estimates available. Therefore, to allow for a broad range of information, DGM return on equity estimates since 2012 have been accounted for. The Authority is of the view that it is appropriate that the most recent estimates (since mid 2014) provide the more relevant and up-to-date information as presented in Table 77.

---

[524] See for example M. McKenzie and G. Partington, *Report to the AER, Part A: Return on equity*, October 2014, pp. 26-31.

1225. Overall, the Authority infers from the DGM MRP information before it that the market expectation is that the MRP has moved upwards in recent times due to declines in the risk free rate.

1226. Table 77 suggests that a representative range for the estimate of the grossed up MRP from the DGM, consistent with the estimate of gamma of 0.4 adopted for this Final Decision, is 5.6 to 9.7 per cent.[525]

1227. The Authority adopts this range for the DGM estimate for this Final Decision. The upper bound of the DGM range – 9.7 per cent – provides the upper bound of the Authority's overall range for the MRP. However, as indicated, the Authority considers that this estimate of 9.7 per cent is a less relevant estimate in comparison with all other estimates as presented in Table 77.

Lower bound of the MRP range

1228. As noted above, for this Final Decision, the Authority will utilise the 'Ibbotson' approach to inform its estimate for the lower bound for the range of the forward looking MRP. The Ibbotson approach uses the concept of a long run average MRP as today's best estimate of the MRP in future and combines this with an on the day risk free rate to arrive at an on the day estimate of the market return on equity.

1229. For consistency, the estimate of the long run average MRP must reflect the term of the risk free rate used in the Sharpe Lintner CAPM, which is 5 years for this Final Decision. For this purpose the Authority has made an estimate of the historic average MRP with reference to 5 year bonds, by taking an average of the historic MRP annual estimates referenced to bonds and bills.[526]

1230. The nominal 5 year MRP estimates (grossed up for imputation credit yields) were calculated on both the NERA and BHM data by subtracting relevant bond and bill yields from the nominal NERA and BHM annual grossed up returns. The average arithmetic and geometric means of the resulting four series were then calculated (Table 78). Averaging the bill and bond MRPs for both NERA and BHM produces 5 year MRP estimates that range between 5.8 and 6.6 per cent for the arithmetic means and 3.8 and 5.1 per cent for the geometric means.

1231. The Authority notes that there are mixed views as to the best estimator of historic returns. Arithmetic average returns will tend to overstate returns, whereas geometric returns will tend to understate returns.[527] An unbiased estimator is likely to lie somewhere between the two estimates. The Authority's view is that arithmetic means are preferred in most circumstances.

---

525 The lower bound of 5.6 per cent is the Authority's 2013 estimate for a gamma of 0.4. The upper bound of 9.7 per cent is the Capital Research's estimate, which is based on a 'net theta' of 0.5, which aligns with a gamma of 0.4.

526 In the BHM data, bills are around 3 months and bonds are around 10 years, thus the average term of the two estimates is approximately 5 years (see T.Brailsford, J.Handley and K.Maheswaran, *Re-examination of the Historical Equity Risk Premium in Australia*, Accounting and Finance,vol.48, 2008, pp. 81 to 83). Taking the average of the historic annual MRPs with respect to bonds and bills will give an estimate of the annual MRP that is close to a 5 year term.

527 M. McKenzie and G. Partington, *Supplementary report on the equity MRP*, 22 February 2012, p. 5.

Table 78 Estimates of bill and bond-based 5 year grossed up nominal average Market Risk Premiums

Period	BHM	NERA	Average	BHM	NERA	Average
	Arithmetic mean			Geometric mean		
1883-2014	6.6%	6.4%	6.5%	5.2%	5.0%	5.1%
1937-2014	6.2%	6.2%	6.2%	4.2%	4.3%	4.2%
1958 - 2014	6.6%	6.6%	6.6%	4.2%	4.2%	4.2%
1980 - 2014	6.3%	6.3%	6.3%	3.8%	3.8%	3.8%
1988 - 2014	5.8%	5.8%	5.8%	4.0%	4.0%	4.0%

Source: Brailsford, Handley, Maheswaran (2012) and ERA Analysis

1232. That said, the Authority in this instance is looking for a reasonable lower bound for its range. On this basis, the Authority is inclined to the arithmetic mean as a preferred estimator. A lower bound informed by the lowest arithmetic mean estimate from Table 78 would be 5.8 per cent. However, the Authority considers that this lower bound may be too high, given potential upward bias in the arithmetic estimate.

1233. The Authority therefore exercises its judgment to adjust this bound down, informed by the lower estimates of the average MRP that are provided by the geometric means (Table 78). The Authority considers that 5.5 per cent provides a reasonable lower bound, being the average of the lowest arithmetic mean of 5.8 per cent and the highest geometric mean of 5.2 per cent.

1234. The resultant estimate of 5.5 per cent implies an upward adjustment of the original lower bound for the MRP range set out in the Guidelines, which was 5 per cent. The Authority will apply the revised lower bound of 5.5 per cent to establish the overall range for the forward looking MRP for this Final Decision.

1235. For completeness, the Authority notes that the upper bound for the range of the MRP, informed by the historic estimates, would be given by the Wright estimate, which is the 10.83 per cent nominal return from Table 76, minus the current estimate of the risk free rate, which is 1.96 per cent. The resulting upper bound for the historic estimates given the inflation outlook at the current time would be 8.87 per cent, or 8.9 per cent rounded.

Range for the MRP

1236. The Authority will adopt a range for the 5 year forward looking MRP for this Final Decision of 5.5 to 9.7 per cent. The:

- lower bound of the range is informed by the Ibbotson average excess premium; and
- upper bound of the range is informed by the upper bound of recent DGM estimates.

1237. This range is wider than that informed by the historic estimates (5.5 to 8.9 per cent based on Ibbotson and Wright respectively), given that the upper bound of 9.7 per cent reflects Capital Research's 2012 DGM estimate shown in Table 77.

1238. The Authority uses forward looking indicators and its judgment to assist in determining a point estimate for the MRP from within this historic range for input to the Sharpe Lintner CAPM.

Forward looking indicators (conditioning variables)

1239. The Guidelines set out that forward looking indicators approach would be used to condition the point estimate of the MRP within the estimated range, for the five years of the access arrangement:[528]

> The Authority considers that a range of other information is relevant for determining the point estimate of the MRP… this additional information will be considered as to whether it implies a revision, upwards or downwards, to the midpoint of the MRP range.

1240. The Authority notes ATCO's consultant SFG's view that forward looking indicators should be considered 'relative to their historical distribution' to provide indication of 'where the MRP might be relative to its historical distribution'. The Authority notes that the MRP may not have a statistically robust distribution as the distribution of a non-stationary series has moments (for example the mean and variance) which change through time.[529]

1241. In light of this the Authority now considers it preferable to take a non-parametric approach, estimating an upper and lower bound at each determination and considering the position of the MRP relative to the mid-point. Mechanistic calculation and application of distributions may not be robust due to issues associated with non-stationary and unrepresentative data series. There are also qualitative issues as to how forward looking data is viewed and interpreted by market participants.

1242. The mid-point of the 5.5 to 8.9 per cent (informed by the Ibbotson and Wright approaches) is 7.2 per cent.

1243. For the Draft Decision, four forward looking indicators of market conditions for the next 5 years that are readily available and up-to-date were adopted to inform the point estimate. These were:

- dividend yields on the All Ordinaries, a financial metric;
- interest rate swap spreads on 5 year bonds, which can be viewed as a type of term structure variable;
- default spreads, another term structure variable that makes forward looking expected returns explicit; and [530]

---

528 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 216. The Authority undertook that step in the indicative example in the Guidelines in Step 4, but now considers that it is better placed in Step 2. However, the use of forward looking indicators is not a 'new development' (ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 22).

529 The Authority also disagrees with ATCO's consultant SFG when it interprets the resulting range for the MRP as what it 'could be in different market conditions' (see ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 24). The Authority considers that the range simply provides information as to the likely position of the forward looking estimate, at the current time. As noted, the Authority considers that it will need to re-estimate the range for future decisions, to reflect different market conditions prevailing at the future time.

530 The default spread was calculated as the difference between the 5 year AA Australian corporate Bloomberg fair value curve and 5 year Commonwealth Government Bond index. These series are the most liquid,

- the Australian Stock Exchange (ASX) 200 volatility index (**VIX**) which measures investors' perceptions of equity market risk.

1244. This approach is again used for the purpose of estimating current market expectations for the 5 year forward looking MRP.

Dividend yields

1245. Bloomberg's dividend yield series provide one forward looking indicator. The dividend yields are the 'consensus' of analysts' expectations for dividends for the ASX All Ordinaries.[531]

1246. The dividend yields referred to above are expressed as equation (11) below.

$$Dividend\ Yields_0 = \left(\frac{D_0}{P_0} \right) \quad (11)$$

Where

D_0 is the latest net dividend paid; and

P_0 is the latest price of the equity in question.

1247. Recent expectations for dividend yields at the end of March 2015 were 4.1 per cent, just above the longer term average of 4.1 per cent (since 1 January 2000 – see Figure 10 below).

1248. The Authority considers that dividend yields support an estimate for the forward looking 5 year MRP that is somewhat above the mid-point of its historic range.[532]

Default and Interest Rate Swap Spreads

1249. The 5 year interest rate swap spreads capture, among other things, the credit risk of financial institutions. The interest rate swap (IRS) rate is the index rate at which financial institutions borrow and lend from each other. This rate is higher than the Commonwealth Government bond (**CGS**) yield of an equivalent term with the 'spread' over the CGS capturing the credit risk of financial institutions.

1250. Figure 11 below shows that the 5 year AA default and IRS spread move in a very similar fashion which tends to confirm that they are subject to similar market risk.[533]

---

complete and up to date default spread measures available to the Authority and so are considered the most efficient reflection of market price movements.

531 The Authority notes that dividend yields contribute to the DGM estimates for the expected return on the market. Their use here is intended to provide an indication of forward earnings relative to the past, and hence provide an indication of the forward looking MRP relative to the range derived from the historic estimates.

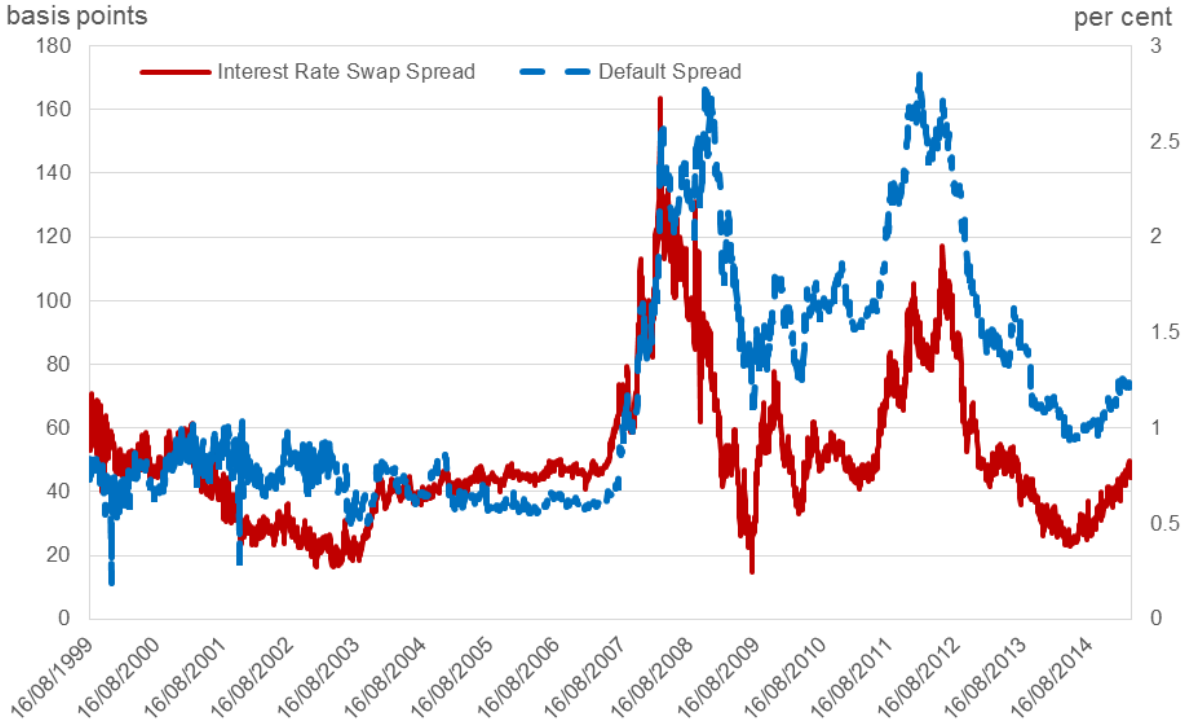
532 The current dividend yields are at the 60th percentile of the historic observations in Figure 10.

533 The Authority notes that the majority of bonds that constitute the Bloomberg AA fair value curve are those issued by financial institutions. As at 18 March 2015, 89 per cent of the constituent bonds are issued by issuers classified as financials.

Figure 10 ASX All Ordinaries analyst consensus dividend yields

Source Bloomberg EQY_DVD_YLD_12M

Figure 11 5 Year interest rate swap spread versus 5 year default spread



Source: Bloomberg and ERA Analysis

1251. The 5 year interest rate swap spread (Figure 11, LHS, basis points) appears to have returned to pre-2007 levels, but has recently begun to trend upward. The current spread, however, does not suggest that levels of risk in the financial sector are unusually high.

1252. The default spread (Figure 11, RHS, basis points) has not returned to pre-crisis levels and also has been trending upward in line with the swap spread. This suggests that in the broader corporate sector (other than financials) levels of credit risk are still perceived to be relatively high, although still below the levels associated with 2008 to 2009 and 2011 to 2012. The current estimate – at 1.22 per cent – is above the mid-point of the range of more typical' observations, which is 0.5 to 1.7 per cent.[534]

1253. The Authority considers that default spreads therefore support an MRP estimate somewhat above the mid-point of the historic range.

Stock Market Volatility Index

1254. The benefit of using stock market volatility indices is that it represents a different class of index to those discussed already. As outlined above, the IRS spreads and default spreads convey similar information while the DGM is an extension of dividend yields. Using different versions of similar indicators introduces the risk of double counting, or over-weighting measures that contain the same information. A volatility index of some variety provides a differentiated measure of risk as it is concerned with variance (uncertainty around return outcomes) as opposed to levels of return or yields. The VIX was therefore used as measure of forward looking risk for the Draft Decision.

1255. Although useful for gauging future perceptions of risk stemming from forecast variability in returns, the VIX was given very little weight. This is mainly because the series the Authority had access to had a limited history, dating back only to 2008. The latest observations of the VIX were therefore limited to being compared with the high levels of risk in 2008 and may have incorrectly indicated that volatility and risk are at historical lows.

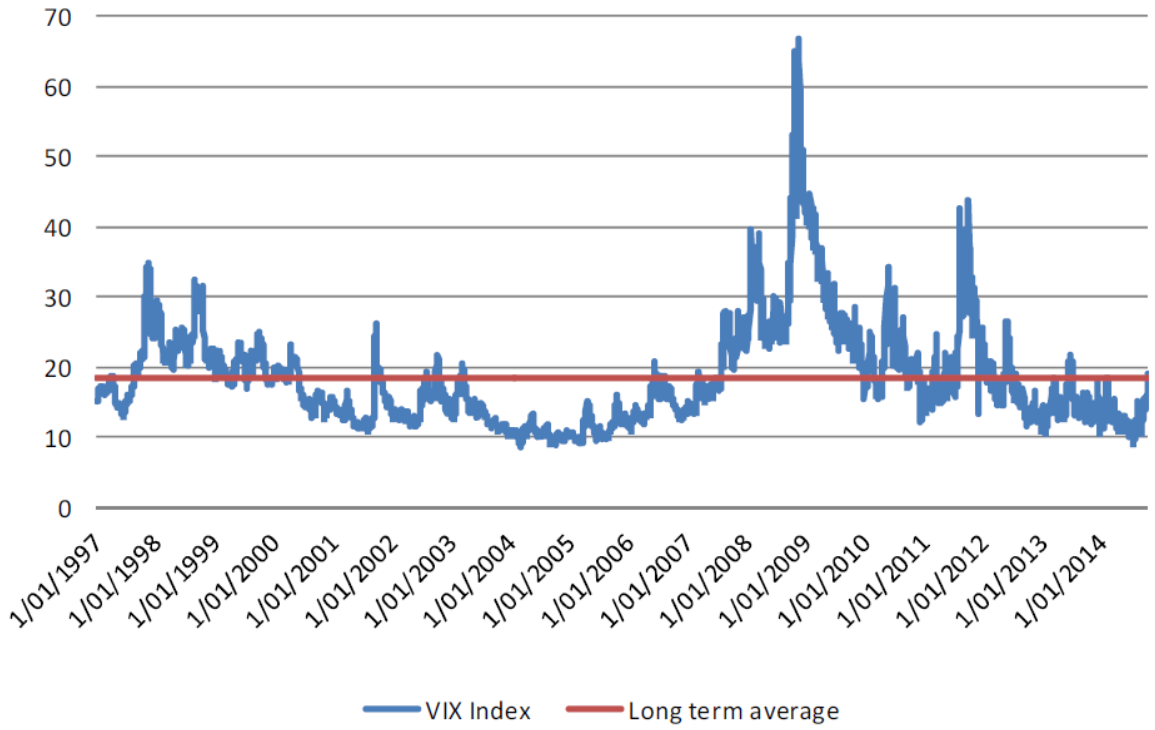
1256. The Authority notes that the AER has sourced a longer term series of the ASX 200 VIX index which allows for more meaningful historical comparison between the most recent level of the VIX and previous levels. This series is reproduced in Figure 12.[535]

---

534 The most recent estimate is at the 62nd percentile of all the observations in Figure 11.

535 Australian Energy Regulator, *Jemena Gas Networks (NSW) Ltd Access Arrangement 2015-2020: Draft Decision*, Attachment 3: Rate of Return, November 2014, p. 205. The Authority is not able to access this proprietary data as it is no longer available. The Authority has been advised by the Australian Energy Regulator that the series prior to 2008 was sourced from Bloomberg as the CITJAVIX Index, which is no longer provided by Bloomberg. The AER's chart of this data is therefore reproduced here.

Figure 12 Implied Volatility (ASX200 VIX) Over Time



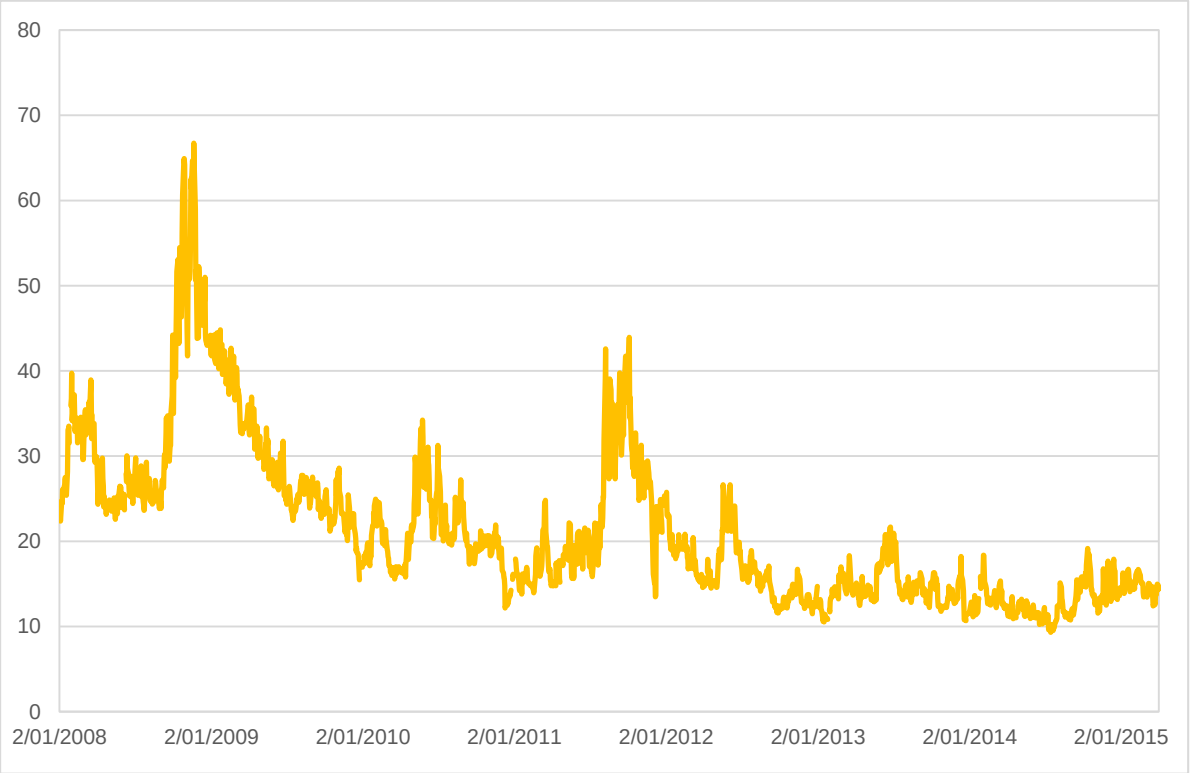
Source: Australian Energy Regulator[536]

1257. The series around 2014 reaches a level which is approximately on par with the low points observed over 2004 to 2005. More recently the series has begun to revert toward the long term average level observed. The series has been updated to 2 April 2015 in Figure 13 with data that is accessible to the Authority.[537]

536 The Authority has been advised by the Australian Energy Regulator that the series prior to 2008 was sourced from Bloomberg as the CITJAVIX Index, which is no longer provided by Bloomberg.

537 Without access to the underlying data for the full series, the Authority is unable to reproduce the exact percentile value for the most recent observation over the whole data range. However, close inspection of the combined series in Figure 12 and Figure 13 suggests that the 2 April 2015 outcome is somewhat below the 50th percentile.

Figure 13 Implied Volatility (ASX200 VIX): 2 January 2008 to 2 April 2015



Source: Bloomberg and ERA Analysis

1258. This series suggest that the VIX is below the long term median value in the observed data in Figure 12 and Figure 13. This supports the choice of an MRP that is below the mid-point of the historic MRP range.

The point estimate of the MRP

1259. The forward looking MRP for input to the Sharpe Lintner CAPM is unobservable. The Authority has therefore accounted for a range of information in order to estimate the MRP. That information includes:

- a range for the MRP that reflects historic excess returns;
  - which is combined with conditioning variables which indicate expectations for relative risk over the regulatory period – interest rate spreads, market volatility, as well as current expectations for dividend yields; and
- a range for the forward looking MRP that reflects the DGM model.

1260. In considering that information for this Final Decision, the Authority has concluded that the MRP can exhibit marked variation, depending on circumstances. Given that marked variation, the Authority considers that it should not unduly constrain the range for the MRP. The Authority therefore has re-estimated the range, widening the estimates to account for all recent relevant information. The lower bound has increased in recognition that the MRP needs to be estimated with regard to the five year risk free rate. The upper bound has increased consistent with the five year risk free rate, and also to account for the broad range from recent DGM estimates.

1261. The resulting estimated range for this Final Decision is 5.5 per cent to 9.7 per cent, which spans:

- the range of the MRP implied by the historic data, which is 5.5 per cent to 8.9 per cent;
- the range for the MRP implied by recent estimates from the DGM, which is 5.6 per cent to 9.7 per cent.

1262. With the range established, the Authority then exercises its judgment, to determine a point estimate that is consistent with prevailing conditions in equity markets as at 2 April 2015.

1263. With regard to the historic estimates, the Authority draws on a range of forward looking indicators to assist its determination of the most reasonable point estimate of the MRP from within the estimated range. On balance, the conditioning data suggest that the MRP should be around the mid-point of the historic range of 5.5 to 8.9 per cent (with the mid-point being 7.2 per cent):

- The VIX data indicate that the 5 year post-tax nominal MRP is somewhat below the mid-point of the historic MRP range:
- The spread data supports a forward looking estimate that is somewhat above the mid-point of the historic range.
- Dividend growth data also suggest an MRP point estimate that is somewhat above the mid-point of the range.

1264. The Authority notes that, under its approach, a forward looking MRP of 7.2 per cent (a mid-point of the historic range) is not a final estimate. The conditioning data, taken together, suggest that the forward looking MRP should be somewhat above the mid-point estimate using historical data on risk premium. The Authority therefore considers that a final estimate of the forward looking MRP based on the historic range should be higher than 7.2 per cent.

1265. In addition, the Authority notes that a forward looking MRP estimated using the DGM falls within a range of 5.6 per cent and 9.7 per cent, with the mid-point estimate of approximately 7.7 per cent. The Authority considers that it is widely accepted that a market return on equity (or the MRP) using the DGM tends to be over-estimated. In addition, at the same time, the Authority recognises that the DGM estimates need to be tempered to account for a range of issues which imply upward bias, as indicated, in the resulting estimates of the MRP.

1266. The Authority also notes that, in its submission, ATCO proposed the forward looking MRP of 7.6 per cent.

1267. On balance, taking all the above mentioned information into account, the Authority exercises its judgment to determine an estimate of the forward looking post-tax nominal MRP for this Final Decision of 7.6 per cent, as reflecting the expectations of the market as at 2 April 2015.

1268. With this estimate, the Authority has accounted for:

- the information provided by the forward looking indicators relative to their history, which suggest an MRP that is around the mid-point of the historic range;

- the implied MRP from a range of recent DGM estimates, which suggest that expected returns are between the mid-point and the upper bound of the overall range, noting;
  - that the DGM outcomes do not exactly match the 5 year outlook adopted for this Final Decision;
  - the recognised shortcomings of the DGM approaches which lead to upward bias in the estimates; and
  - differences in approach and vintage, which render some estimates more relevant than others.

1269. The Authority is satisfied that the resulting estimate meets the requirements of the NGL and NGR. In particular, the Authority is satisfied that the estimate for the MRP of 7.6 per cent reflects prevailing conditions in the market for equity funds and that it contributes to the achievement of the allowed rate of return objective, as required under NGR 87.

Estimates of equity beta

1270. Under the CAPM, the total risk of an asset is divided into systematic and non-systematic risk. Systematic risk is a function of broad macroeconomic factors (such as economic growth rates) that affect all assets and cannot be eliminated by diversification of the investor's asset portfolio.

1271. The key insight of the CAPM is that the contribution of an asset to the systematic risk of a portfolio of assets is the correct measure of the asset's risk (known as beta risk), over and above the return on a risk free asset.

1272. In contrast, non-systematic risk relates to the attributes of a particular asset. The CAPM recognises this risk can be managed by portfolio diversification. Therefore, the investor in an asset does not require compensation for this risk.

1273. In the CAPM, the equity beta value is a scaling factor applied to the market risk premium, to reflect the relative systematic risk for the return to equity of the firm in question, as compared to the systematic risk for all assets. Two types of risks are generally considered to determine a value of equity beta for a particular firm: (i) the type of business, and associated capital assets, that the firm operates; and (ii) the amount of financial leverage (gearing) employed by the firm.

1274. In the Rate of Return Guidelines, the Authority considered that empirical evidence must be used to inform its judgment for equity beta, as no prior expectation exists for the point value of equity beta of regulated gas distribution and transmission networks.[538]

1275. There is conceptual support for the equity beta of an infrastructure network benchmark efficient entity being less than 1:[539]

---

538 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules,* www.erawa.com.au , December 2013, p. 161.

539 See for example Australian Energy Regulator, *Draft Decision Jemena (NSW),* Attachment 3: Rate of return, November 2014, p. 3-235.

- business risk – which may be disaggregated into intrinsic (economic) risk and operational risk – is the primary driver of systematic risk, and this risk is low for the benchmark efficient entity relative to the market average;
- despite relatively high financial leverage, the benchmark efficient entity does not have high financial risk – rather it is the intrinsic risk of the firm which is the key driver of systematic risk.

1276. McKenzie and Partington endorse the view that the equity beta is likely to be below 1, concluding that there is:[540]

> …evidence to suggest that the theoretical beta of the benchmark firm is very low. While it is difficult to provide a point estimate of beta, based on these considerations, it is hard to think of an industry that is more insulated from the business cycle due to inelastic demand and a fixed component to their pricing structure. In this case, one would expect the beta to be among the lowest possible and this conclusion would apply equally irrespective as to whether the benchmark firm is a regulated energy network or a regulated gas transmission pipeline.

1277. The Authority notes these views and considers that the reasoning is sound.[541]

1278. Nonetheless, the conceptual analysis does not provide sufficient grounds to establish the point value of the equity beta.

1279. To inform its decision on the point value, the Authority conducted a detailed empirical estimation of the required equity beta as part of the development of the Rate of Return Guidelines.[542]

1280. The Authority notes that ATCO and its consultant SFG have not submitted any new criticism of the econometric techniques employed by the Authority, focusing instead

---

540 McKenzie, Partington, *Report to the AER: Estimation of the Equity Beta (Conceptual and Regulatory Issues) for a Gas Regulatory Process in 2012*, April 2012, p. 15.

541 The Authority notes DBP's view – reported above – that model adequacy tests suggest that application of the Sharpe Lintner CAPM is not estimating what low beta firms 'actually earn for their equity investors' (Dampier Bunbury Pipeline, DBP Submission to ATCO Draft Decision, 7 January 2015, p. 3). However, the Authority considers that the evidence provided by DBP does not accord with the well accepted theoretical underpinnings of the CAPM, in that it suggests that as beta (systematic risk) declines, the equity risk premium increases. This raises significant issues for the DBP empirical analysis, and the underlying quality of the data that is used for that analysis. The Authority is in the process of investigating these matters for the DBP access arrangement review.

Similarly, the Authority considers that the points made by the ENA also refer to the same matters (Energy Networks Association, WA ERA Draft Decision for ATCO Gas ENA Response, 12 January 2015, p. 4). In particular, the evidence on the performance of Sharpe Lintner CAPM for low beta stocks evaluated by the ENA's consultant NERA utilises the same SIRCA database which is used by DBP (see NERA Economic Consulting, Estimates of the zero-beta premium, June 2013, p. 15). Furthermore, as a related point, the Authority does not consider that the four estimates cited by ENA are robust in the Australian context.

At the current time, the Authority remains of the view that the conceptual foundation of the CAPM supports the estimates of the return on equity set out in this Final Decision.

542 Econometric analysis of beta was conducted in: Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, Chapter 12. Justification and explanation for econometric techniques was provided in Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 17, 22 and 23.

on qualitative decisions used to determine the permissible range. ATCO's consultant SFG states:[543]

> We do not suggest that the ERA has made any calculation or other errors in performing its regression analyses.

1281. Rather, ATCO and its consultant SFG take issue with the use of domestic comparators for the purpose of estimating the range for the equity beta of the benchmark efficient entity:[544]

> The key point of difference between our submissions and the position adopted by the ERA concerns the set of comparator firms. In particular:
>
> a) The ERA is of the view that the very small set of domestic comparators is able, by itself, to produce a reliable estimate of equity beta; whereas
>
> b) Our view is that the set of domestic comparators is too small to be able to produce a reliable estimate of equity beta by itself. Consequently we recommend that some regard should be had to international comparators.

1282. These same points were previously considered in the Rate of Return Guidelines and further considered in the Draft Decision.[545] However, the empirical and qualitative decisions made by the Authority are again reviewed for this Final Decision, given that ATCO and its consultant SFG have again re-made these submissions and supporting materials.

1283. First, the Authority acknowledged in the Guidelines that a high level of imprecision existed for any empirically estimated value of the equity beta.[546] The Authority considered that issues of imprecision are best addressed via the use of multiple models and statistical techniques to inform a possible range for any equity beta estimate. These issues and statistical techniques were explored at length in the Rate of Return Guidelines.[547]

1284. Second, a range of other issues were considered by the Authority, including those relating to sampling and instability.

1285. Third, the Authority considered that it was inappropriate to include overseas businesses in the comparator sample which was used to estimate the required equity

---

543 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 5.

544 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 5.

545 ATCO have resubmitted Strategic Finance Consulting, *Regression-based estimates of risk parameters for the benchmark firm,* June 2013 as part of their Access proposal. The Authority considered this report as part the Energy Networks Association submission made during the development of the Rate of Return Guidelines (see www.erawa.com.au/gas/gas-access/guidelines/rate-of-return-guidelines).

546 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 162.

547 Econometric analysis of beta was conducted in: Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules,* www.erawa.com.au , December 2013, Chapter 12. Justification and explanation for econometric techniques was provided in Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules,* www.erawa.com.au , December 2013, Appendix 17, 22 and 23.

beta of the benchmark efficient entity.[548] This was based on the consideration that while a larger sample may improve the comparator sample size, such an inclusion will be outweighed by the distortions caused due to the dissimilarity with the benchmark efficient entity.

1286. Fourth, the Authority acknowledged there was some evidence of the potential for downward bias in the estimate of the equity beta. The Authority therefore determined to adopt a point estimate of equity beta towards the upper end of its estimated range.[549]

1287. These issues are further considered in what follows.

Imprecision of the estimates

1288. The Authority in the Draft Decision drew on its own studies of the equity beta of Australian utilities, together with other relevant studies, to estimate an appropriate range for the equity beta of the benchmark efficient entity.[550]

1289. In recent times, the number of comparable businesses in the sample for the benchmark efficient entity has reduced, from nine firms in 2011 to six firms in 2013. However, the Authority is of the view that the robustness of the estimates continues to be supported, given the overall stability of the beta estimates.

1290. The Authority considers that the empirical studies of the Australian sample, including the Authority's studies in 2011 and 2013, and Henry's studies for the AER in 2014, 2009 and 2004, have produced similar outcomes, despite variation in the econometric techniques, portfolios of firms and time periods. The Authority notes that all possible scenarios have been explored in these studies. The studies used various econometric techniques including a standard Ordinary Least Squares (**OLS**) approach and other robustness approaches such as the Least Absolute Deviations (**LAD**); maximum likelihood robust methodology (**MM**); and Theil Sen approaches. Table 79 below presents these estimates.

1291. The most recent studies are the Authority's 2013 study reported in the Guidelines and Henry's 2014 study for the AER.

1292. With regard to the Authority's estimates, the Authority accepts SFG's observation that the 95 per cent confidence interval for the estimates based on the average of the recent data for six firms is 0.31 to 0.76.[551] The Authority considers that with this correction, the confidence intervals developed for the Rate of Return Guidelines for individual firms support a 95 per cent confidence interval range from a (rounded) 0.3 to 0.8.[552]

---

548 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 188.

549 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 197.

550 In particular, Henry's (2014) study for the AER provided a recent update of estimates (see O. Henry, *Estimating β: An update*, April 2014).

551 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 8.

552 The Authority remains of the view that confidence intervals calculated using this bootstrap approach are more accurate than the traditional approach, which assume a parametric form regarding the regression

Table 79 Australian estimates of equity beta

Study	Period	Average of individual firms	Fixed portfolios	Varying portfolios
Henry 2014	1992-2013	0.37-0.56	0.38 – 0.71	0.39-0.53
Grant Samuel 2014	2009-2014	0.42-0.64		
ERA 2013	2002-2013	0.48-0.52	0.39-0.59	
SFG2 013	2002-2013	0.60		0.55
ERA 2012	2002-2011	0.44-0.60		
Henry 2009	2002-2008	0.45-0.71	0.35-0.94	0.41-0.78
ACG 2009	1990-2008	0.50-0.58		0.69-0.91
Henry 2008	2002-2008	0.35-0.67	0.31-0.77	
ACG 2002	2000-2002	0.61-0.69		

Source: The AER's Draft Decision for ActweAGL Distribution Determination, Table 3-55, page 3-262.

1293. On the basis of the above empirical studies the Authority in the Guidelines considered that a range of equity beta of 0.4 to 0.7 was appropriate for an Australian network service provider. The Authority also noted that an equity beta of 0.5 is supported by these studies as the central likely point estimate. On this basis, the Authority chose an equity beta range based on the 0.5 central estimate as the lower bound, with the upper bound at 0.7. In effect, the Authority determined to truncate the range at the lower bound coincident with the central estimate.

1294. SFG has criticised this outcome, stating:[553]

> A range that combines a point estimate at one end with a statistical upper bound at the other cannot be sensibly interpreted. A similar issue has been dealt with in the Gamma Case, where the Tribunal ruled that the AER had erred in proposing to average an upper bound estimate with a point estimate. The Tribunal described that point as follows:
>
> > the AER averaged 'apples and oranges'; that is, the AER was in error to average an upper bound for theta derived from a tax statistics study with a point estimate provided by a dividend drop-off study.[554]
>
> In this case the ERA does not seek to average a point estimate with an upper bound, but to combine a point estimate for one end of its range and an upper bound for the other. In our view, this is inconsistent and produces a range that has no meaningful interpretation.

1295. The Authority notes SFG's points.

---

coefficients. Confidence intervals calculated using the bootstrap approach are directly comparable across regression estimators, whereas they are not under the traditional approach (see Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 190).

553 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 8.

554 [SFG's footnote] Application by Energex Limited (No 2) [2010] ACompT 7, paragraph 83.

1296. With regard to Henry's 2014 study, the Authority has reconsidered for this Final Decision, in light of the above, Henry's conclusion that:[555]

> …the majority of the evidence presented in this report, across all estimators, firms and portfolios, and all sample periods considered, suggests that the point estimate for β lies in the range 0.3 to 0.8. Given the differences in sample periods and sizes underlying the various individual estimates provided in Tables 2, 14 and 16 using individual assets and fixed weight portfolios it is difficult to pin down a value for the beta of a typical firm, however within the range 0.3 to 0.8 the average of the OLS estimates for the individual firms reported in Table 2 is 0.5223 while the median estimate is 0.3285.

1297. In response to the above points, the Authority considers that it is reasonable to widen its range for equity beta from 0.5 to 0.7, to be 0.3 to 0.8. This accounts for:

- the (here corrected) evidence for the 95 per cent confidence interval from the 2013 ERA study, which is 0.3 to 0.8;
- Henry's view – based on his 2014 work – that equity beta is likely to be in the range of 0.3 to 0.8; and
- SFG's comments with regard to the range.

1298. Consistent with the above, the Authority considers that the central point estimate would be around 0.5 (the 50th percentile estimate from the Authority's 2013 study is 0.52).

1299. These estimates are rounded to one significant figure in recognition of the imprecision of the estimates.

1300. The Authority remains of the view that the available Australian studies are fit for the purpose for estimating an equity beta range for the benchmark efficient entity.

Stability of the estimates

1301. The Authority rejects SFG's criticism regarding the sensitivity of individual equity beta estimates to the methodological choices of regression technique and sampling period. The Authority previously addressed these issues at length in the Rate of Return Guidelines.[556]

1302. SFG has ignored this in its analysis, simply restating its previous evidence with regard to HDF (drawn from the on the Authority's old 2011 study), with the implication that this refutes the Authority's determined equity beta range.[557]

1303. SFG also considers it 'implausible' that equity beta estimates could change over a two year period.[558] However, the rolling beta estimates produced by the Authority in the Guidelines demonstrate that, for individual firms, the relative sensitivity to

---

555 O. Henry, *Estimating β: An update*, April 2014, p. 63.

556 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guideline*, December 2013, Section 12.2.5, Section 12.2.8.

557 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 8.

558 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 9.

systematic risk can vary quite dramatically.[559] The Authority has no reason to believe that this does not reflect a re-rating by the market of the respective firms, in terms of risk relative to the market. The Authority notes that the significant variation occurs during the Global Financial Crisis, a period where excessive leverage was marked down, followed by a period in which firms significantly reduced leverage and investors chose to chase the 'safe yields' offered by infrastructure firms.

1304. Furthermore, the Authority notes that the form of regulatory control (whether price cap as per the existing arrangement, or some form of revenue cap, such as the revenue yield approach proposed by ATCO[560]) is not independent of beta. The form of control will affect the allocation of risk between the regulated firm and its customer, for example, energy demand risk. The link to beta is reflected in the extent to which the (systematic) demand risk impacts on the regulated firm's revenue.

1305. The Authority has determined to reject ATCO's proposal to impose a revenue yield price control, which would transfer the revenue risk from ATCO to its customers (see paragraph 2325). For that reason, it has not considered a concomitant (downwards) adjustment to the beta in this Final Decision on these grounds.

1306. The Authority also rejects SFG's contentions with regard to sampling interval stability. The Authority considered the validity of weekly (Friday) versus monthly estimates in the Guidelines, noting:[561]

> The Authority is of the view that weekly data is preferred to monthly data. It is noted that estimates of equity beta using monthly data create a smaller sample which is likely to result in a reduced statistical efficiency of the estimates. In addition, the Authority notes that estimates using monthly data are also vulnerable to the "day-of the- week effect". This means that if prices are dependent on the day-of-the-week, then this effect is required to be controlled to ensure that returns are observed on the same weekday (Monday, Tuesday, Wednesday, Thursday, Friday). This effect cannot be controlled when the monthly data is used because a calendar month can end on any day of the week.
>
> In his advice to the AER in 2008, Henry discussed the issue of daily versus monthly estimates.[562] He then concluded that weekly data is an appropriate trade off between noisy daily data and lack of degrees of freedom (due to smaller samples) using monthly data. In addition, the Authority notes that the average of the estimates based on daily data that CEG has presented appears to be comparable to the average of the estimates based on weekly data closing Friday.[563] The Authority therefore concludes that weekly intervals are appropriate for equity beta estimation.

1307. The Authority rejects the view that these issues undermine the validity of the estimates.

---

559 Only HDG falls outside the estimated range.

560 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, p. 246.

561 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guideline*, December 2013, p. 189.

562 O. Henry, *Econometric advice and beta estimation*, November 2008.

563 Competition Economists Group, *Regression estimates of equity beta*, September 2013, Figure 3.

Use of international comparators

1308. The Authority considers ATCO's proposal to include US energy firms in the sample of Australian energy firms to estimate equity beta for an Australian benchmark efficient entity is not appropriate.

1309. The US based firms do not operate within Australia, so they do not match the Authority's definition of a benchmark efficient entity, which is based on:[564]

> An efficient 'pure-play' regulated gas network business operating within Australia without parental ownership, with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

1310. The Authority notes that the Sharpe Lintner CAPM adopted in the Authority's decision is a domestic version of CAPM, in which other inputs such as the risk free rate, MRP and market return on equity are derived from the Australian domestic environment. The Authority is of the view that it is desirable that any estimate of equity beta be based on Australian data, if at all possible. As noted above, the Authority considers that robust domestic estimates are available and fit for purpose for this Final Decision.[565]

1311. While the Authority agrees that an increase in the number of firms in the sample may increase the reliability of the estimates of equity beta in an econometric sense, the Authority does not agree with ATCO that including the US network providers in the Australian sample will improve the accuracy of the estimates.

1312. Specifically, the estimates of equity beta in the SFG (2014) study are measured with respect to the market portfolio of the US, which is the S&P1500. These estimates are not a measurement of the firm's systematic risk relative to the Australian domestic market portfolio, which is required under the definition of the Sharpe Lintner CAPM used by the Authority. The Authority agrees that a beta for any market portfolio is always equal to 1 regardless of the country. However, this does not change the Authority's view that including US energy firms in the Australian sample for the purpose of estimating an equity beta as in the SFG 2014 study is a second best solution. The Authority remains of the view that the Australian sample is a more reasonable comparator set than that provided by US energy firms.

1313. The Authority notes that Handley also agrees with this view.[566]

> The difficulty here is that domestic betas and international betas are not strictly comparable and so we have a classic case of comparing apples and oranges. In

---

564 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 36.

565 The Authority notes ATCO's consultant SFG's contention that the Authority has adopted overseas comparators for its rail decision (see ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 15). However, the Authority considers its relaxation of its approach in that instance is justified, as there was only *one* domestic rail comparator (Aurizon) (see Economic Regulation Authority, *Review of the method for estimating the Weighted Average Cost of Capital for the Regulated Railway Networks – Revised Draft Decision*, 28 November 2014, p. 107). The Authority therefore sought other comparators both domestically (ports, logistics) and internationally. As noted in that Decision, 'Authority does not consider that this should create a general precedent for other determinations, where adequate domestic data is available' (Economic Regulation Authority, *Review of the method for estimating the Weighted Average Cost of Capital for the Regulated Railway Networks – Revised Draft Decision*, 28 November 2014, p. 133). The Authority considers that adequate domestic data is available for this Final Decision, given the span of studies and results.

566 Handley, J. "Advice on the Return on Equity", a report prepared for the Australian Energy Regulator, October 2014, p. 23.

> general, domestic betas and international betas measure different things and are not comparable due to potential differences in the covariance structure and level of systematic risk in the respective markets. This is purely a definitional difference.

1314. The Authority does not believe that SFG has satisfactorily demonstrated or provided evidence that the suggested sample of 56 US energy firms included in the sample together with Australian firms are sufficiently comparable to an Australian benchmark efficient entity.

1315. The Authority notes that a sample of Australian comparators was carefully selected by Professor Henry for the AER in 2008. The Authority considers that these comparators are all Australian firms and as such these comparators have operated in the same the domestic economy with similar geography, business cycles, regulatory environment and various other factors. The Authority does not suggest that these nine comparators included in the sample have exactly had the same level of systematic risk in comparison with an Australian benchmark efficient firm for regulatory purposes. However, the Authority considers that these selected firms can reasonably be used as the comparators.

1316. The Authority notes that a number of US comparator businesses are vertically integrated. Some US firms used in the SFG sample also operate in energy generation, wholesale and retail of energy, as well as other activities distinct from energy distribution and transmission such as telecommunications, real estate development and manufacturing activities.[567] The Authority considers that these activities are very different from the benchmark efficient entity, which is a pure play regulated energy network business (operating within Australia). The Authority notes that SFG itself recognised that international energy network firms are less comparable to the benchmark efficient entity than Australian energy network firms. However, it also considered the comparator set of Australian energy network firms was too small and produced unreliable equity beta estimates. The Authority is of the view that SFG's concern is not substantiated as previously discussed.

Bias of the estimates

1317. The Authority also noted in the Rate of Return Guidelines that relevant empirical evidence supports a view that there is some downward bias in equity beta estimates that are less than 1, and upward bias in equity beta estimates that are greater than 1.

1318. Therefore, the Authority was inclined to assume a point estimate for the equity beta that is towards the top end of the estimated range, at 0.7, so as to account for potential bias in the estimate.

1319. With respect to the Black CAPM, the Authority rejects SFG's assertion that this implies an equity beta of 1, based on the analysis conducted by NERA.[568]

---

567 The Australian Energy Regulator, *Draft Decision – ActewAGL distribution determination 2015-16 to 2018-19*, Attachment 3: Rate of Return, Table 3-38, p. 246, November 2014.

568 NERA, *Estimates of the Zero-Beta Premium*, June 2013.

1320. First, the Authority rejected the use of the Black CAPM in the Rate of Return Guidelines, on the basis that its empirical performance was unreliable.[569] Second, the Authority noted in the Rate of Return Guidelines that:[570]

> … the Authority intends to account for empirical evidence relating to potential bias in the estimates of the equity beta that are used in applying the Sharpe Linter CAPM. The Authority considers that such an approach would account for much of the evidence supporting the use of the Empirical and Black CAPM models.

1321. Second, the Authority recognises the theoretical principles underpinning the Black CAPM, and the implications for firms with an equity beta below 1.0. Various studies have argued that the Black CAPM may predict a higher return on equity than the Sharpe Lintner CAPM, implying a low asset beta bias.

1322. However, following an extensive literature review, the Authority's view is that this bias is not well established in either the theoretical and empirical studies. In addition, the applications of the Sharpe Lintner CAPM and Black CAPM are two different processes in which any input for each model is required to be estimated in its own right. For example, in order to estimate a return on equity using the Sharpe Lintner CAPM, the estimates of its inputs including a risk free rate, the MRP and equity beta, are required. Similarly, the estimates of the zero beta (excess) return and beta for the zero-beta portfolio are required under the Black CAPM.

1323. The implication is that estimates of a return on equity either using Sharpe Lintner CAPM or Black CAPM are best implemented in their own right. However, the Black CAPM outcomes are not robust in the Australian context.

1324. The Authority considers therefore that the Black CAPM is only useful to the extent that it suggests a downward bias in the return on equity generated by the Sharp Linter CAPM for firms with an equity beta less than 1. The Authority is of the view that it is difficult to quantify the extent of any downward bias.

1325. Nevertheless, to acknowledge the potential bias inherent in the theory of the Sharpe Lintner CAPM, the Authority considers it may be appropriate to adopt an equity beta in the Sharpe Lintner CAPM which is somewhat higher than the best estimate of 0.5, towards the upper end of the estimated range of 0.3 and 0.8.[571]

1326. With respect to the previous access arrangement for the ATCO distribution network adopting an equity beta of 0.8, the Authority considers that this was primarily a consequence of a number of empirical studies available and the statistical properties of the equity beta estimates that existed at the time of the previous access arrangement. For example, Henry's study in 2009 was the most relevant study on the estimate of equity beta at that time. In addition, only two econometric techniques –OLS and the LAD techniques – were used at the time.

1327. The Authority considers that the majority of the most recent empirical evidence considered in the Rate of Return Guidelines demonstrates that the equity beta range

---

569 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 8.

570 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 8, p. 67.

571 The Authority considers that the bias does not arise in the theory of the CAPM, but rather is an empirical claim.

of between 0.3 and 0.8 is appropriate. The Authority's study suggest that this is consistent with a 95 per cent confidence interval.

1328. The Authority now considers that a value of 0.8, which is at the top end of this estimated range, would be excessive for a gas distribution network such as the GDS, with its highly diversified demand base.

1329. Furthermore, the Authority notes that SFG considers only the individual firm estimates, ignoring the fact the Authority has consistently utilised averages across all of the benchmark sample of firms to inform individual firm beta estimates. In particular, the Authority's 2011 analysis determined an individual firm average range of 0.44-0.60, while the updated 2013 analysis determined an individual average range of 0.49-0.52.[572]

1330. Moreover, the Authority has consistently reiterated that as a consequence of the statistical imprecision inherent in equity beta estimation, a range of values and regression techniques are necessary in order to inform the permissible range of equity beta values. This acts to mitigate the impact an individual firm's equity beta estimate can have on the determined equity beta estimate. The Authority considers that issues of statistical imprecision are best addressed via the use of multiple models and regression techniques to inform the possible range of equity beta estimates.

Conclusions with regard to equity beta

1331. Based on the above considerations, the Authority is of the view that available Australian estimates of equity beta are reliable and that the estimates from these studies should be used to determine an appropriate equity beta for a network service provider.

1332. The Authority considers that including US energy firms in the Australian sample for the purpose of estimating equity beta is inappropriate, given that the SFG (2014) study on a larger comparator set of US and Australian energy network firms is unlikely to increase the reliability of the equity beta estimates. The Authority considers that increasing the sample size may not be helpful if that larger comparator set is less representative of a true value of equity beta for a network service provider.

1333. The Authority considers that available estimates of equity beta in Australia including Henry's studies and the Authority's own analyses, as presented in Table 79 above, indicate a best empirical equity beta estimate of approximately 0.5. The Authority also widened its estimated range to 0.3 and 0.8, to be consistent with its 95 per cent confidence interval, and also the opinion of Henry.

1334. The Authority remains of the view that it is appropriate to account for all considerations in its determination of the equity beta point estimate. In particular, it will continue to account for the theoretical implications from the Black CAPM, and the potential for the use of the Sharpe Lintner CAPM to underestimate returns.

1335. The exact uplift to address this issue is difficult to determine.

1336. The Authority is mindful that the most likely estimate is around 0.5 for Australian regulated gas businesses. For that reason, the Authority considered adopting a lower

---

[572] Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules,* www.erawa.com.au , December 2013, Table 22, p. 171.

uplift so as to account for Henry's 2014 study and its recent literature review. However, the Authority recognised that it had not previously published this view, so has elected not to make any change at this time. That said, the Authority is of the view that the available evidence may provide support for a lower value for beta than the 0.7 estimate included for the Draft Decision.

1337. At this point, the Authority has decided to retain its estimate from the Rate of Return Guidelines and Draft Decision, of 0.7. This estimate represents a significant concession to the notion of beta bias.

Step 3 - Estimate the return on equity

1338. Utilising the Sharpe Lintner CAPM, informed by the point estimates for the parameters identified above, the Authority calculates that the estimated return on equity for a regulatory decision consistent with the 2 April 2015 averaging period date is:

Estimated return on equity = 1.96 per cent + 0.7*(7.6 per cent) = 7.28 per cent

1339. The implied return on the market for the average firm with a beta of 1 is 9.56 per cent. The resulting equity risk premium for the benchmark efficient entity is 5.32 per cent.

Step 4 Conduct cross checks

1340. The Authority set out in the Rate of Return Guidelines that it would consider a range of other material as a test for reasonableness of the estimate derived in Step 3.[573]

Other evidence on the risk free rate

1341. The estimate of the risk free rate is the 20 day average of the 5 year yield on Commonwealth Government Securities (**CGS**). Similarly, the base rate for the return on debt is estimated from the 20 day average of the 5 year interest rate swap. As these estimates are observed from the market, the Authority considers that they are robust.

1342. The Authority notes that at 1.96 per cent, the CGS estimate is lower than the average of 5-year rates over recent decades, reflecting a concerted downward trend. However, the Authority has evidence as to the prospect for significantly higher rates over the next five years. The Authority considers that the prevailing 5 year CGS estimate is the best predictor for the next five years. On this basis, the Authority considers that 1.96 per cent is the best estimate for use in the Sharpe Lintner CAPM.

Other evidence on the market risk premium and the implied market return on equity

1343. For this Final Decision, the Authority has taken account of forward looking information to inform its estimate of the point MRP, including (refer to paragraphs – above):

- a range for the MRP that reflects historic excess returns;
- forward looking conditioning variables – measures of risk based on interest rate spreads and market volatility, as well as current expectations for dividend yields; and

[573] Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 29 – Other relevant material.

- a range for the forward looking MRP that reflects the DGM model.

1344. The Guidelines noted that a range of other material is considered relevant which may provide a cross check for the estimate of the MRP and the resulting estimate of the return on equity:

- views of valuation experts and surveys;
- decisions of other regulators; and
- the relationship between the return on equity and the return on debt.

1345. A threshold issue in any comparison involves ensuring that estimates are on a consistent 'apples with apples' basis. Key issues in this context involve:

- the term of the estimates; and
- the treatment of imputation.

Term of the estimates

1346. As noted above, the Authority is of the view that the term over which the rate of return expectations should be assessed is 5 years, so as to match the regulatory period. This is consistent with the Authority's intention to account for the 'present value' principle.

1347. The 5 year forward looking horizon contrasts with that of independent analysts. Independent analysts tend to adopt a longer horizon for their discount rates because they are typically valuing assets on the basis of the cash flows to perpetuity. In Australian financial markets, 10 year government bonds are among the most common 'long maturity' bonds, and thus traditionally have been used as a proxy for the long term return on debt to perpetuity. Similarly, analysts estimate the equity premia component over a longer term horizon, involving 10 years or more.[574]

1348. A 10 year view tends to 'smooth' out the large, but infrequent spikes in expected risk premia that are more evident in shorter investment horizons. The implication is that risk premia under a 5 year approach are generally lower than the 10 year average, for much of the time. However, the 5 year estimates are more volatile than the 10 year estimates, as they are more sensitive to fluctuations in prevailing market conditions. Over time, the average of the many 5 year observations should converge toward the average risk premium observed under a longer perpetuity approach.

1349. The Authority's 5 year estimates therefore are not directly comparable to the long run estimates commonly developed by independent analysts.

1350. Lally endorses exactly this view when he responds to similar arguments for the QCA in the context of the risk free rate:[575]

> This line of argument presumes that the QCA is engaged in the same exercise as the valuers and therefore ought to be using the same parameter values. However the two exercises are fundamentally different, and this readily explains the difference in rates. The QCA resets the risk-free rate every few years (typically five years) and therefore need only be concerned with the prevailing risk-free rate for the next five years. By contrast these valuers are conducting DCFs for businesses with infinite-life cash flows

[574] The DGM, for example, estimates the discount rate that equates the future stream of cash flows to the current share price.

[575] M. Lally, Response to submissions on the risk free rate and the MRP, 22 October 2013, p. 24.

> and therefore would be interested in the prevailing term structure of risk-free rates for terms out to infinity. Since observed rates exist only out to ten years, these valuers would have to speculate upon the rest of the term structure, and then invoke an average rate if they used only one rate (as they do). Since the term structure is currently markedly upward sloping, the term structure beyond the five year term invoked by the QCA will be in excess of this regulatory rate and therefore the average rate invoked by the valuers over the entire term structure would be in excess of the five-year rate invoked by the QCA.

1351. Seeking comparability, the Authority in the Draft Decision developed a rolling forward looking estimate of the 5 year return on equity for the market, derived using the sum of the 40 day averages of the 5 year government bond rate and the contemporaneous 5 year forward looking estimate of the MRP following the Authority's approach.[576] It then took an average of this forward looking 5 year return on equity series for the 1993 – 2014 period, which was 10.9 per cent. This average estimate was then used for the purpose of comparing the Authority's estimates for the return on the market with that of independent analyst estimates.

1352. ATCO's consultant SFG, however, takes issue with the Authority's interpretation, suggesting that:

> Even if one accepted that the ERA would eventually revert to using a 10.9% estimate for the required return on the market, its current estimate for the next five years is 8.45%. Consequently, its long-horizon estimate would be a weighted-average of its current (historically low) estimate and its expected future estimates over some period of transition back to its long-term estimate of 10.9%. The current estimate would receive disproportionately higher weight because it applies to near-term cash flows.

1353. However, SFG's criticism misses the point. The Authority's 5 year estimate does not 'transition back' to 10.9 per cent, nor is 10.9 per cent the estimate which the Authority 'would eventually revert to'. For example, the next 5 year forward looking estimate could be marked by a significantly above average risk free rate and expectation for the MRP (giving a return on equity for the market well above 10.9 per cent), which would be entirely consistent with the average. The point is that the long run is made up of the sequence of 5 year estimates, which may be above or below the average from one regulatory period to the next.

1354. The Authority notes that the 10.9 per cent estimate developed in the Draft Decision is similar in concept to the Wright estimate of the return on the market to perpetuity. To estimate the return on equity for the market to perpetuity, the Authority would apply an estimate of inflation consistent with the mid-point of the Reserve Bank of Australia's target range, which is 2.5 per cent, to its estimate of the long run real market return on equity, grossed up, which is 8.76 per cent.[577] The resulting nominal estimate of the return on equity for the market is 11.48 per cent (grossed up – Table 80).

---

576 The rolling forward looking five year estimate of the MRP was derived by applying a weighted average from four 'normalised' forward looking indicators to the Authority's range in the Draft Decision for the MRP (5 – 7.5 per cent) (see Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, pp. 174 – 176).

577 This is exactly the approach adopted by the Authority in its rail WACC decisions, where the estimate has a term to perpetuity (see Economic Regulation Authority, *Review of the method for estimating the Weighted Average Cost of Capital for the Regulated Railway Networks: Revised Draft Decision*, 28 November 2014, p. 93).

Table 80 Average annual imputation credit yields and grossed up arithmetic average returns (nominal, consistent with the estimate of gamma of 0.4)

	NERA	BHM	Average
Nominal returns excluding imputation yield (1883-2014)	12.00%	11.64%	11.82%
Nominal imputation credit yield (1988-2014)	0.91%	0.91%	0.90%
Grossed up nominal returns (1883-2014)	12.19%	11.83%	12.01%
Grossed up real returns (1883-2014)	8.94%	8.58%	8.76%
Expected inflation to perpetuity	2.50%	2.50%	2.50%
Grossed up forward looking return on the market to perpetuity	11.67%	11.30%	11.48%

Source: ERA Analysis, NERA (2013), Brailsford, Handley and Maheswaran (2012)

1355. With a long enough span of data however, the average of the 5 year estimates will approach the long run average.

1356. Therefore, the Authority remains of the view that its 5 year forward looking estimate is not directly comparable to the perpetuity estimates developed by independent analysts for valuing firms. It is more appropriate to compare the long term average estimate of the return on equity – such as the Wright estimate underpinning the Authority's estimate – with those of independent analysts.

Adjustments for imputation credits

1357. A further consideration when comparing estimates relates to the treatment of imputation credits.

1358. Longer term average return on equity estimates which include data before 1987 – such as the long term 128 year average historic estimates of Brailsford et al (see paragraph 1185) will tend to overstate the average *observed* 'market' return on equity under the current imputation credit regime (that is, the return observed in the market arising from dividends and capital gains).

1359. This is because many investors in the post 1987 period receive a proportion of their required return on equity through imputation credits; yet this return is not observed in the market. The return through imputation credits therefore accounts for a proportion of the overall return on equity, all other things being equal. Hence the pre 1987 observed return on equity is not comparable to the post 1987 *observed* return; the latter will be lower due to part of the required return coming from imputation credits which cannot be observed in the market.

1360. It is therefore important to 'gross up' any post 1987 observed market return to account for the impact of imputation credits, if the full return on equity is to be accounted for.

1361. The amount of the gross up will depend on the assumptions relating to the impact of imputation credits in the Australian capital market. The assumptions adopted in grossing up the historic estimates for this Final Decision are consistent with those used when estimating the gamma term.

1362. As noted by Handley:[578]

- The Officer model typically used to inform returns on equity in Australia under the CAPM has one before company tax and four after company tax WACCs. The four after tax company tax WACCs each differ, based on whether the interest tax shield and the value of imputation credits are included or otherwise in the definition of the corresponding after tax cash flows.
- Officer assumes the CAPM holds when returns are expressed on an 'after company but before personal tax basis'. As shown in (12):

$$X_E = X_E' + \gamma T\left(X_O - X_D\right) \quad (12)$$

Where

X_0 is the firm's operating income (free cash flow) that is ultimately distributed to X_D (that is, to debt claimants), X_E (equity claimants) and X_G (government claimant through the tax rate T);

$X_E' = (1-T)\left(X_O - X_D\right)$ is the cash dividend distributed to equity investors;

$T\left(X_O - X_D\right)$ is the amount of franking credits distributed to investors;

$\gamma T\left(X_O - X_D\right)$ is the proportion of the franking credits distributed to investors.

- X_E is the 'grossed up' value of the returns to investors which includes the value of franking credits. It is consistent with the value on an 'after company before personal tax basis'. On the other hand, X_E' is consistent with the value on an 'after company after some personal tax' basis.
- The conventional approach to describing a return as 'after company tax' is somewhat misleading in an imputation setting, as company tax paid $T\left(X_O - X_D\right)$ consists of a mixture of personal tax $\gamma T\left(X_O - X_D\right)$ – being the part rebated against personal taxes – and the effective company tax $T\left(X_O - X_D\right)\left(1-\gamma\right)$ being the part that is not rebated against personal taxes.
- The Officer CAPM for the Australian imputation tax system is as shown in (13):

$$E(R_E) = R_F + \beta\left[\mathrm{E}(\mathrm{R}_M) - R_F\right] \quad (13)$$

Where

$E(R_E)$ is the expected grossed up return on equity;

R_F is the risk free rate of return;

[578] J.C. Handley, *Further comments on the historical equity risk premium*, Report for the Australian Energy Regulator, 14 April 2009, pp. 16-17.

β is the equity beta of the firm; and

$E(R_M)$ is the expected grossed up return on the market portfolio.

- Officer assumes the CAPM holds when expected returns are expressed on an 'after company before personal tax basis' that is consistent with X_E.

1363. The Authority's starting estimate of the return on equity is the vanilla $E(R_E)$, which can be derived using Officer's after tax case (iii).[579] The $E(R_E)$ is consistent with X_E, being the return observed in the market inclusive of imputation credits. As noted above, the Authority's longer term average of the estimates of $E(R_E)$ may be higher or lower than its current 5 year forward looking estimate, inclusive of imputation credits.

1364. In the post tax revenue model building block approach adopted by the Authority, the return on equity included in the rate of return weighted average cost of capital will be k_E. The PTRM then explicitly accounts for the return to investors $\gamma T\left(X_O - X_D\right)$ as an adjustment to the cash flow allowance for tax within the model.

Views of valuation experts

1365. Evidence of market analysts' views suggest that their expectations for the forward average market returns on equity are consistent with the longer term average of the forward looking return on equity underpinning the Authority's estimates.

1366. An example is the recent WACC estimate by Grant Samuel used in discounting Envestra's cash flows, which was cited by ATCO's consultant SFG Consulting:[580]

- Grant Samuel's estimate of the return on equity is informed by the Sharpe Lintner CAPM, with the risk premium and risk free rate then adjusted to have regard to a range of other evidence, including that from the Gordon Dividend Growth Model (**DGM**).[581]
- Grant Samuel's initial estimate for the *market* return on equity derived using the Sharpe Lintner CAPM is 10.2 per cent. Grant Samuel states that:[582]

  > The CAPM is probably the most widely accepted and used methodology for determining the cost of equity capital. There are more sophisticated multivariate models which utilise additional risk factors but these models have not achieved any significant degree of

---

579 J.C. Handley, *Further comments on the historical equity risk premium*, Report for the Australian Energy Regulator, 14 April 2009, pp. 16-17.

580 ATCO Gas Australia, *Access Arrangement Information: 1 July 2014 – 31 December 2019*, 3 April 2014, Appendix 19, p. 84.

581 Grant Samuel, *Envestra: Financial Services Guide and Independent Expert's Report*, 3 March 2014, Appendix 3.

582 Grant Samuel, *Envestra: Financial Services Guide and Independent Expert's Report*, 3 March 2014, Appendix 3, p. 1.

usage or acceptance in practice. However, while the theory underlying the CAPM is rigorous the practical application is subject to shortcomings and limitations and the results of applying the CAPM model should only be regarded as providing a general guide.

- This estimate is based on a long run historic MRP of 6 per cent, which is added to the prevailing 10 year risk free rate (at the time) of 4.2 per cent. Grant Samuel notes that it:[583]

  …has consistently adopted a market risk premium of 6% and believes that this continues to be a reasonable estimate. It:

  - is not statistically significantly different to the premium suggested by long term historical data;
  - is similar to that used by a wide variety of analysts and practitioners (typically in the range 5-7%); and
  - makes no explicit allowance for the impact of Australia's dividend imputation system.

- The Grant Samuel estimate is defined as a 'classical', after tax rate that is based on the estimated nominal ungeared after tax cash flows.[584] On this basis, it is defined consistent with Officer's after tax case (iv).[585] In this case, the k_E is identical to the k_E in case (iii), being the total return on equity from all sources.
- The Grant Samuel WACC CAPM estimate of 10.2 per cent ignores the impact of imputation credits.[586]
- The Authority notes SFG's comments that the resulting estimate should be grossed up. SFG contend that this gives an estimate of 11.3 per cent (using an assumed gamma of 0.25).[587] However, the Authority does not agree with this estimate, as it applies the gross up factor to the whole return of 10.2 per cent, not to the component of the return that is represented by dividends. This is a clear error.
- Appropriately configured – assuming that dividends provide around 4.5 per cent of the total 10.2 per cent yield – the grossed up return would be 10.97 per cent (utilising the Authority's estimate of gamma of 0.4).

---

583 Grant Samuel, *Envestra: Financial Services Guide and Independent Expert's Report*, 3 March 2014, Appendix 3, p. 6.

584 The Authority notes that Grant Samuel's 'classical WACC' differs from the 'nominal vanilla WACC' estimate.

The classical WACC reduces the cost of debt to account for the impact of the tax shield (that is, the cost of debt component is D/V*(1-T)*Rd), whereas the nominal vanilla WACC ignores the impact of the tax shield as this is accounted for in the cash flows. However, both approaches adopt the same estimate for the return on equity component (that is, $E/V*k_E$ using Handley's terminology).

585 J.C. Handley, *Further comments on the historical equity risk premium*, Report for the Australian Energy Regulator, 14 April 2009, pp. 16-17.

586. Grant Samuel, E*nvestra: Financial Services Guide and Independent Expert's Report*, 3 March 2014, Appendix 3, p. 9:

In Grant Samuel's view, however, the evidence gathered to date as to the value the market attributes to franking credits is insufficient to rely on for valuation purposes. More importantly, Grant Samuel does not believe that such adjustments are widely used by acquirers of assets at present… Accordingly, it is Grant Samuel's opinion, that it is not appropriate to make any adjustment.

587 ATCO Gas Australia, *Access Arrangement Information: 1 July 2014 – 31 December 2019*, 3 April 2014, Appendix 19, p. 84; ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 9.1, p. 34.

- The Grant Samuel estimate was made at a time when the 10 year risk free rate was 4.2 per cent. The prevailing rate is closer to 2.6 per cent. Adjusting the grossed up Grant Samuel for this change would yield an estimate of the grossed up market return on equity using the Sharpe Lintner CAPM of 9.4 per cent.
- Grant Samuel ultimately assess an overall equity *market* return to be in the range of 10.7 to 15.2 per cent, an estimate that is higher than its CAPM-based estimate, which is 10.2 per cent, as noted above. The higher range accounts for:
  - first, estimates from other return on equity models, such as the Gordon DGM;
  - second, for Grant Samuel's view that equity investors have re-priced risk since the global financial crisis (lifting the MRP above 6 per cent); and
  - third, that bond rates are at unsustainably low levels (which Grant Samuel therefore 'normalise' by increasing the risk free rate from the observed current value around 4 per cent to 5 per cent).[588]
- The resulting grossed up range is 11.47 to 15.97 per cent, using the Authority's assumptions on the dividend yield and on gamma, set out above.

1367. The Authority considers that a comparison estimate for the return on the market to perpetuity, such as that undertaken by Grant Samuel, is the long run average of its return on equity estimates, of around 11.48 per cent (see paragraph 1354 above). The Authority notes that this estimate is above the Grant Samuel estimate based on the Sharpe Lintner CAPM, which is less than 10 per cent.

1368. The Authority does not consider it appropriate to adjust up the risk free rate to a higher rate, as is done by Grant Samuel. Therefore, a more relevant lower bound for the Grant Samuel estimates is the Sharpe Lintner CAPM adjusted estimate of 9.4 per cent, with the range then 9.4 to 16.0 per cent (grossed up). The Authority's considers that the comparable long run average of its estimates is within the Grant Samuel range.

1369. The Grant Samuel estimates therefore give the Authority no cause to revise its estimate of the return on equity, or its current estimates for the MRP.

1370. The survey by ATCO's consultant Ernst & Young of other analysts' estimates gives results that are broadly consistent with the Grant Samuel view. Ernst & Young note that in 2012, independent market experts' market cost of equity estimates averaged 10.7 per cent. Ernst & Young also notes that independent experts typically do not assign a value to imputation credits, and that adjustment for this outcome would raise the estimate of independent brokers.[589,590] Grossed up using the Authority's assumptions, the estimate would equate to 11.47 per cent, which is close to the Grant Samuel estimate. Again, this outcome would give the Authority no cause to revise its estimate of the return on equity, or its current estimates for the MRP.

1371. On this basis, the Authority is satisfied that its current estimate, albeit based on a different term, is reasonable.

---

588 Authority estimate based on Grant Samuel data, assuming a nominal risk free rate of 5.0 per cent.

589 ATCO Gas Australia, *Access Arrangement Information: 1 July 2014 – 31 December 2019*, 3 April 2014, Appendix 35, pp. 14-15.

590 ATCO Gas Australia, *Access Arrangement Information: 1 July 2014 – 31 December 2019*, 3 April 2014, Appendix 35, p. 23.

Views of other regulators

1372. As noted in the Rate of Return Guidelines, the Authority will consider other regulators' estimates to check outcomes of its own decisions.

Australian Energy Regulator

1373. The AER's return on the market is derived using the Sharpe Lintner CAPM, with point estimates informed by a range of relevant information and models.

1374. The AER has the view that a longer term 10 year perspective is appropriate, based on the view that equity investors have long term investment horizons.[591]

1375. In line with this view, the AER adopts a different term for the risk free rate in the Sharpe Lintner CAPM. Specifically, in its recent draft Jemena decision, the AER adopted:[592]

- a term for the return on debt of 10 years, with:
- the risk free rate based on the estimated Commonwealth Government Securities (**CGS**) yield, of 3.55 per cent;
- a point estimate for the MRP of 6.5 per cent, from within an estimated range of 5.1 to 7.8 per cent;
- an equity beta of 0.7;
- giving a 8.1 per cent return on equity for the benchmark efficient entity; which is consistent with
- a resulting overall estimate of the return on the market of 10.1 per cent.

1376. The range estimate of the AER for the MRP is lower than the Authority's. The reflects the AER's judgment based on a range of information, including:

- historical excess returns – which the AER determine are in the range of 5.1 to 7.8 per cent based on the BHM data;
- the AER's DGM estimates range from 6.6 (two stage DGM) to 7.8 (three stage DGM).

1377. The lower range for the MRP also incorporates the AER's estimate of gamma (which was 0.5, which will make the MRP higher) and the use of the 10 year risk free rate (which will tend to make the MRP lower than the Authority's).

IPART

1378. IPART uses an average of a current 40 day and 10 year term for the risk free rate.

---

591 S. Pratt and R. Grabowski, *Cost of Capital: Applications and Examples*, 4th edition, 2010, pp. 118–120; A. Damodaran, 'What is the risk free rate? A search for the basic building block', December 2008, pp. 9-10. Lally, M., The risk free rate and the present value principle, 22 August 2012. cited in Australian Energy Regulator, *Rate of Return Guidelines, Explanatory Statement,* December 2013, p. 49.

592 Australian Energy Regulator, *Draft decision: Jemena Gas Networks (NSW) Ltd:Access arrangement 2015–20,* Attachment 3: Rate of return, November 2014.

1379. IPART proposes to adopt an estimate of the MRP which is informed by a range that is based on a range for historic estimates (estimated at 5.5 per cent to 6.5 per cent) and a range based on other current market data approaches – including using DGMs – which fall in the range 7.4 per cent to 8.8 per cent, giving an overall range for the MRP of 6.0 per cent to 8.7 per cent (as at February 2015). The mid-point of the assessed range – 7.2 per cent (as at February 2015) – may then be adjusted to account for strong contrary evidence.

1380. Given an estimated mid-point risk free rate as at February 2015 of 3.8 per cent, IPART's return on the market is estimated to be around 12.0 per cent.[593]

1381. The Authority considers that the IPART estimate is comparable to its own estimate, albeit based on a somewhat different method and judgements.

Other regulators decisions

1382. Other recent decisions by regulators for the MRP range from 6.0 to 6.5 per cent (Table 81).

Table 81 Other regulators recent decisions

Regulator	Decision date	Sector	MRP (%)
QCA	August 2014	General	6.5
ESCV	June 2014	Water	6.0
NTUC	April 2014	Electricity	6.0

Source Australian Energy Regulator, *Draft decision: Jemena Gas Networks (NSW) Ltd: Access arrangement 2015–20, Attachment 3: Rate of return*, p. 3-205.

Conclusions with regard to other regulators' estimates

1383. In accounting for this evidence relating to the views of other regulators, the Authority considers, first, that its estimate of the risk free rate is appropriate. It is consistent with the term of ATCO's regulatory period, which is five years. This issue was discussed extensively in the Rate of Return Guidelines. It is also consistent with the use of the Australian domestic CAPM, set out in the Rate of Return Guidelines. No material presented by ATCO, nor the views presented in the approaches of other regulators, has changed the Authority's view.

1384. Second, with regard to the MRP, the Authority considers that its estimated range – of 5.5 per cent to 9.7 per cent – is comparable to other regulators, including the AER. The Authority considers that the evidence shows that the Authority has similar metrics relating to the MRP and the return on equity as compared to other regulators, albeit when compared on a consistent longer term basis.

Consistency of the return on equity with the return on debt

1385. The estimated debt risk premium for the 2015 calendar year in this Final Decision is 2.51 per cent above swap. The margin of the 5 year swap rate to the 5 year Commonwealth Government Security (**CGS**) rate used for the return on equity is 0.467 per cent, implying a total risk premium for the return on debt above the CGS rate of 2.98 per cent.

[593] Authority analysis, based on IPART, *Fact sheet – WACC update*, August 2014.

1386. The Authority's estimate of the MRP is 7.6 per cent. With a beta of 0.7, the equity risk premium for the benchmark efficient entity in this Final Decision is therefore 5.32 per cent.

1387. The Authority considers that the resulting difference in the premiums – around 2.8 percentage points – is reasonable, given the relatively low risk nature of the benchmark efficient entity.[594]

Beta

1388. As noted above under step 3 above (paragraph 1331), the Authority considers that its range for beta derived from the Australian benchmark comparator sample is reasonable, and allows selection of a point estimate that is comparable to that for the benchmark efficient entity operating in Australia. Taking account of all relevant information relating to the Australian market, the Authority considers that the resulting point estimate will provide a better estimate than one that is informed by information from overseas markets.

1389. However, the Authority notes that the Australian Energy Regulator assembled a range of international empirical estimates for energy networks.[595] The evidence points to a wide range of empirical estimates, with estimates both below and above the Authority's point estimate. The reported estimates span a range of 0.45 to 1.3. The Authority notes there are issues with regard to relevering international estimates, which may render them unreliable, given the underlying differences in conditions in the countries of origin.[596]

---

[594] The Authority notes DBP's submission suggesting that the elasticity of the return on equity to the return on debt should be 6, based on Merton's model (Dampier Bunbury Pipeline, DBP Submission to ATCO Draft Decision, 7 January 2015, p. 3). The Authority is currently investigating these claims as part of its response to DBP's access arrangement proposal.

The Authority has concerns that the outcomes are very sensitive to the input parameters and to any associated interpretation of the evidence.

In particular, the Authority considers that the evidence assembled by SFG in its Figures 1, 2 and 3 suggests that the elasticity in the Australian context should be 7 or higher, given an average term of debt for the benchmark firm of 10 years (Dampier Bunbury Pipeline, Proposed revisions DBNGP Access Arrangement 2016-2020, 31 December 2014, Supporting Submission 12, Appendix L, pp. 15-16).

Re-running SFG's calculations with an elasticity of 7 and the return on debt used for this Final Decision gives the following. The current spot debt risk premium for 2015 used for this decision is 2.041 per cent (see paragraph 1637 below). The associated estimated cost for the benchmark firm of issuing new (10 year) debt in March 2015 was therefore 4.75 per cent (given the swap rate of 2.71 per cent for 10 year debt from the RBA's data). Applying an elasticity of 7 to that figure would give a return on equity for the benchmark firm around 11.2 per cent, with an implied MRP of 12.2 per cent (based on an 'adjusted spread' of 1.22, an equity risk premium of 7*1.22=8.54 implied by the Merton relationship, and a resulting implied MRP = 8.54/0.7 given the Authority's decision on beta in this Final Decision).

Considering input sensitivity, if the spread rose to 2.2 per cent, the implied MRP would be 13.8 per cent. The Authority notes that more than 50 per cent of monthly observations of the spread to swap of BBB band bonds have exceeded 220 basis points since January 2010, based on the Reserve Bank Data (see Reserve Bank of Australia, Aggregate measures of Australian corporate bond spreads and yields, Statistical Table F3, accessed July 2015).

The Authority considers that these numbers are unsupportable. The implied MRP of 12.2 per cent is well outside the range for the MRP considered reasonable, and used for this Final Decision. The value is also extremely sensitive to inputs such as the credit spread.

The Authority has therefore not used this cross check method in this Final Decision.

[595] Australian Energy Regulator, *Draft Decision: Jemena Gas Networks (NSW) 2015-20,* November 2014, p. 3-263.

[596] G. Partington, *Report to the AER: Return on equity (updated)*, April 2015, p. 74.

1390. In conclusion, the Authority has considered the information on equity betas for utilities operating in overseas jurisdictions. The Authority has determined that these estimates are likely to provide a less reliable estimate of beta than that derived from the domestic comparator sample. The Authority does not rely on them either for establishing the range, or for determining the point estimate of beta. Nevertheless, the Authority considers that its domestic range and point estimate of beta is not inconsistent with the reported range. The Authority therefore is satisfied that the beta estimate it has determined is robust and fit for purpose, and will therefore contribute to the achievement of the allowed rate of return objective.

Step 5 – Determine the return on equity

1391. Taking into account all of the relevant information, the Authority is of the view that an expected return on equity of 7.28 per cent is appropriate as an estimate for the forward looking 5 year return on equity for the benchmark efficient entity, as at 2 April 2015:

Estimated return on equity = 1.96 per cent + 0.7*(7.6 per cent) = 7.28 per cent

1392. This is based on the forward looking 5 year estimate from the Sharpe Lintner CAPM. The cross checks set out in Step 4 confirm that this estimate is reasonable.

1393. The Authority considers that the estimate is commensurate with the efficient equity financing costs of the benchmark efficient entity with a similar degree of risk as that which applies to the Service Provider in respect of the provision of Reference Services prevailing at this time. On this basis, the Authority considers that the estimate meets the allowed rate of return objective and the requirements of the NGR and NGL more broadly.

Return on debt

1394. ATCO in its proposed revisions adopted an 'on the day' approach consistent with that which had applied in the previous access arrangement period. Under that approach, the return of debt would be determined once at the start of the regulatory period, and the resulting estimate then applied to the entire regulatory period of five years. The approach differed from that set out in the Rate of Return Guidelines, principally in the on the day treatment of the estimate of the DRP, as compared to the Guidelines' requirement for annual updating of the estimate.

1395. In the Draft Decision, the Authority did not accept ATCO's proposed approach to estimating the return on debt. In the Draft Decision, the Authority retained key elements of the approach set out in the Guidelines. The Authority:

- continued to estimate the cost of debt as the sum of the risk free rate, relevant annual debt risk premium (**DRP**), debt raising costs and hedging costs;
- estimated the risk free rate through the proxy of the return on 5 year Commonwealth Government Securities, consistent with the term of the regulatory period, once, at the start of the regulatory period (implying the 'on the day' approach for the risk free rate);
- retained the BBB band credit rating for the benchmark efficient entity;
- continued to annually update the estimate of the DRP, just prior to the start of each regulatory year.

1396. In the process, the Authority also amended the approach it had set out in the Guidelines. The Authority in its Draft Decision:

- revised its position with regard to the term for the DRP, accepting 10 years;
- adopted an 'extended bond yield' approach for estimating the DRP, incorporating bonds issued internationally, among other changes; and
- amended the approach to adjusting revenue for the annual update, by carrying forward the annual revenue adjustments (arising from updating of the cost of debt estimates – in years 2 to 5 of the regulatory period) to the next period's revenue, through a present value neutral adjustment.

1397. In responding to the Authority's Draft Decision, ATCO now proposes a 'hybrid' trailing average approach for estimating the return on debt:

- combining a 10 year trailing average of the 10 year DRP; with a
- 5 year 'swap contract overlay' to reset the base rate of interest.

1398. ATCO's consultant CEG summarises this simple hybrid approach as follows:[597]

> …if the benchmark efficient entity is assumed to have entered into hedging contracts using swaps to reset its base rate of interest every five years, its trailing average cost of debt could be altered in a manner that gives rise to a 'hybrid' cost of debt. This is a hybrid of a trailing average debt risk premium (DRP) and a prevailing base rate of interest that its debt related costs would equal (14):

$$Costs = Swaps_{5,t=0} + \left(TACorp.Yield_{10} - TASwap_{10}\right) + Trans.Costs \qquad (14)$$

Where

$Swaps_{5,t=0}$ the 5 year swap rate prevailing at the beginning of the regulatory period

(t =0);

$TACorp.Yield_{10}$ the trailing average of 10 year corporate debt yields;

$TASwap_{10}$ the trailing average of 10 year swap rates; and

$Trans.Costs$ the transaction costs of the strategy – including the transaction costs associated with the relevant swap contracts.

1399. ATCO considers that the 5 year swap contract overlay is consistent with the Authority's approach to utilising a 5 year term for the risk free rate.[598] ATCO's

---

597 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 52.

598 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 212.

consultant also notes that interest rate swaps are typical of privately owned network service businesses, and that:[599]

> …a primary barrier to using swaps in the manner described is the potential for the attempt to lock in a large quantity of swap contracts at the beginning of the regulatory period to move the market against the business – given that swap contracts must be entered into with a value equal to 60% of the RAB. However, I note that the RAB for the Mid-West and South-West Gas Distribution System is relatively small compared to most other regulated energy businesses and much smaller relative to the largest such businesses.[600] Thus, this barrier to efficiently entering into swaps will be relatively low for the owner of the Mid-West and South- West Gas Distribution System vis-à-vis other regulated businesses. On this basis it can be assumed that entering into such contracts would be more likely to be efficient for the benchmark efficient owner of the Mid-West and South-West Gas Distribution System.

1400. Given the change in ATCO's proposed approach, the Authority produced a Discussion Paper identifying key outcomes under ATCO's proposed approach and the Authority's approach set out in the Draft Decision.[601] The Discussion Paper was required – mid-way in the Authority's Final Decision process – to allow due process for all stakeholders in terms of providing input prior to the Authority's Final Decision.

1401. In the Discussion Paper, the Authority also sought stakeholder views on the relative merits of an 'alternative' hybrid trailing average approach to that of ATCO's proposal – which the Authority considered might better meet the requirements of the NGL and NGR.[602] The alternative hybrid trailing average was identical to ATCO's, except that:

- a one off hedging cost each regulatory period could be included in operating expenditure, based on the debt proportion of the forecast closing RAB at the end of the regulatory period;
- a 10 year transition could be adopted to the hybrid trailing average approach, consistent with the QTC 'transition weights' method;
- 'PTRM weights could be adopted ex ante for the trailing average components, in order to ensure that forecast capital expenditure faces the prevailing cost of capital;[603]
- the PTRM weights could then be trued up ex post, at the next access arrangement review, in order to align the treatment of weights with the treatment of capital expenditure more broadly.

---

599 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 7.

600 ATCO's RAB is around $1 billion (ERA draft decision, Table 40). By contrast, Ausgrid's RAB is around $14 billion (Ausgrid, Regulatory Proposal: 1 July 2014 to 30 June 2019, 30 May 2014, Table 9).

601 Economic Regulation Authority, *Estimating the return on debt: Discussion Paper*, 4 March 2015.

602 Economic Regulation Authority, *Estimating the return on debt: Discussion Paper*, 4 March 2015, p. v.

603 Post Tax Revenue Model weights adjust the weighting of each year in the trailing average to account for the proportion of the RAB that comprises new capital expenditure in that year. The marginal cost of the new capital expenditure in its first year is then the prevailing annual rate, rather than the trailing average. The marginal cost for the new capital expenditure then transitions to the hybrid trailing average over 10 years. See the section on 'Method for weighting the trailing average for capital expenditure' below for further detail.

1402. The Authority held a public workshop, which had 35 attendees, to discuss the merits of the three approaches.[604] Submissions were invited on the Discussion Paper, and three were received, from:

- ATCO;
- Goldfields Gas Transmission (**GGT**); and
- Dampier Bunbury Pipeline (**DBP**).

1403. In what follows, the Authority considers;

- the merits of ATCO's revised proposal for a hybrid trailing average in comparison to the Authority's approach set out in the Draft Decision and the alternative approach set out in the Discussion Paper, with a view to determining a preferred approach that best meets the requirements of the NGL and NGR;
- the method for implementing the preferred approach, with regard to estimating:
  - the risk free rate;
  - the DRP; and
  - the other components of the return on debt, including debt raising and hedging costs.

1404. The Authority then sets out its Final Decision on the approach to estimating the return on debt for AA4, as well as the resulting return on debt to apply in the first regulatory year.

Evaluation of approaches

1405. The Discussion Paper noted that the various options may be evaluated in terms of their ability to achieve the National Gas Objective (**NGO**), the Revenue and Pricing Principles (**RPP**), the National Gas Rules (**NGR**) and the allowed rate of return objective (**ARORO**) set out in NGR 87(3), as well as the other requirements of NGR 87. In line with these requirements, any approach to estimating the rate of return should, among other things:

- promote efficiency, such that the regulated return on debt:
- is 'commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk in provision of the reference services', and
- delivers 'effective incentives to promote efficient investment in, or in connection with a pipeline, efficient provision of pipeline services, and efficient use of the pipeline';[605]
- minimise any differences between the regulated return on debt and that of the benchmark efficient entity, as a factor the Authority must have regard to under the NGR;[606]

---

604 The on-the-day approach, the hybrid trailing average approach and the Authority's alternative hybrid trailing average approach.

605 National Gas Rule 87(3); National Gas Rule 87(11)(c); National Gas Objective, Revenue and Pricing Principles (see relevant parts of the *National Gas Access (WA) Act 2009*). See also Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, pp. 5–9.

606 National Gas Rule 87(11)(a).

- remunerate efficient financing costs, over the lives of the assets, in net present value terms;[607]
- minimise regulatory costs.[608]

1406. The workshop invited comment from stakeholders on the framework in submissions. However, not all submissions considered the framework reasonable, or agreed with the Authority's interpretation that it would need to weigh up relative performance across the framework criteria:

- ATCO's consultant CEG considered that all of the elements in the framework are 'reasonable, in the sense that they are desirable to achieve and this is reflected in the provisions of the NGL and NGR'.[609] However, CEG's view is that there is no trade-off to consider between the first three elements, and that it would be incorrect to do so. CEG considers that all three elements are instrumental to achieving the allowed rate of return objective, the NGO and the RPP.
- GGT considers that the NGL and NGR 'does not require a tariff, or an approach to estimating the cost of debt, which is consistent with economic efficiency'. GGT is of the view that:[610]

  > The requirement for efficiency derives from the National Gas Objective, and the reference to efficiency in the objective is a reference to efficiency broadly defined. It is not a reference to economic efficiency.

- DBP does not take issue with the evaluation framework itself.

1407. With regard to CEG's point, the Authority accepts that in an ideal world there would be no trade off: one approach might be clearly preferred. However, in the Authority's view, none of the approaches under consideration clearly perform better than the others on all elements of the framework. A weighing up of the variable performance against each element is therefore required. This is discussed further in the evaluation below.

1408. The Authority does not agree with GGT's point that economic efficiency is not relevant to the choice of approach. As set out in the Rate of Return Guidelines, the Authority considers that it was very clear that the NGO is established with a view to promoting economic efficiency.[611]

---

607 Revenue and Pricing Principle 2 (*National Gas Access (WA) Act 2009*, s. 23, clause 24).

608 National Gas Rule 87(3) – least cost regulation is in the long term interests of consumers.

609 ATCO, Re: Estimating the return on debt: ATCO Gas Australia's response to the ERA's Discussion Paper, 25 March 2015, Attachment, p. 3.

610 Goldfields Gas Transmission, *GGT submission on ERA return on debt discussion paper*, 25 March 2015, p. 2.

611 The Guidelines (Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 5) noted thet clear reference to economic efficiency at the time of the establishment of the NGO (the following from National Gas (South Australia) Bill 2008, *Second Reading Speech*, www.ret.gov.au, p. 4:

The national gas objective is an economic concept and should be interpreted as such.

The long term interest of consumers of gas requires the economic welfare of consumers, over the long term, to be maximised. If gas markets and access to pipeline services are efficient in an economic sense, the long term economic interests of consumers in respect of price, quality, reliability, safety and security of natural gas services will be maximised. By the promotion of an economic efficiency objective in access to pipeline services, competition will be promoted in upstream and downstream markets.

1409. The Authority therefore considers that the evaluation framework set out in the Discussion Paper is fit for purpose. The approach that performs best in net terms with regard to the elements in the framework will best meet the requirements of the NGL and NGR.

1410. In what follows, the performance of the various alternatives is evaluated against each of the elements in the framework.

Promote efficiency

1411. The Authority considers that effective incentives for economic efficiency will achieve outcomes similar to those observed in markets with effective competition, including:[612]

- efficient production; profits at levels just sufficient to encourage and reward investment, efficiency and innovation;
- prices that signal appropriate consumption decisions, clear markets, and enhance cyclical stability;
- output levels and product quality responsive to consumer demands, and which reward those firms which best deliver such responsiveness.

1412. To the extent that an estimator for the return on debt is a better predictor for the future path of the cost of debt over the access arrangement period, it will lead to tariffs that reflect actual efficient costs, signalling appropriate decisions both by the benchmark efficient entity and by users of its services.

1413. The Authority evaluated the efficiency properties of alternative return on debt estimators in the Rate of Return Guidelines. As noted above, the Guidelines set out the Authority's view that considerations of efficiency are key to the achievement of the NGO, and also the RPP and the allowed rate of return objective. Relevant efficiency considerations include:

- the efficiency of the approach to financing debt (the debt management strategy itself); as well as
- the resulting signals provided for investment and use of pipeline services.

1414. The Authority's conclusion in the Guidelines was that the 'on the day' approach, annually updated, had the best efficiency properties.[613] However, stakeholders have been critical of this conclusion, and the reasons underpinning it. The Authority therefore revisits the reasoning in what follows.

Prediction performance

1415. The Guidelines concluded that – to the extent the on the day approach is a better predictor of interest rates going forward, all other things equal – it provides better signals with regard to the expected cost of debt. This in turn implies that basing the return on debt on the 'on the day' approach would lead to greater economic efficiency for investment decisions and for upstream and downstream use.

---

612 See for example Scherer F. and Ross D., *Industrial Market Structure and Economic Performance*, 1990, Houghton Mifflin, Chapter 2.

613 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 70.

1416. ERA Secretariat research, reported in the Guidelines, compared differences between the average of five actual annual interest rate outcomes for the risk free rate – over a five year forward looking period (mimicking the actual outcomes across five regulatory years of an access arrangement period – and the average of the alternative forward looking interest rate estimators (giving an 'error forecast' series).[614] The error performances of various approaches were compared, with the conclusions that:

- the 'on the day' estimator (based on an averaging period of 20 to 60 days) of the risk free rate was a (statistically significant) superior predictor as compared to five and 10 year trailing average estimators;[615]
- the only time a trailing average was a superior predictor was when it was annually updated just prior to each regulatory year, but the on the day estimator was not (in other words the on the day approach was based on the estimate at the start of the regulatory period).

1417. The Discussion Paper noted that the Guidelines' conclusions are disputed by DBP in its access arrangement submission.

1418. First, DBP has been unable to replicate the Authority's statistical tests on the risk free rate. This appears to be an issue related to data acquisition by DBP with regard to the Bloomberg GACGB10 index data used by the Authority for the tests.[616]

1419. Second, DBP takes issue with the comparison between the various sets of tests on the risk free rate, and the inferences made from those with regard to prediction. In particular, DBP argues that comparing the on the day estimator, ex ante the regulatory period, versus 10 year trailing average, annually updated, indicates that there is no superiority in the on the day approach in terms of forward prediction.[617,618]

1420. Third, the Discussion Paper noted that DBP also disputes the robustness of the ERA's statistical testing set out in the Guidelines, despite the peer review conducted by Data Analysis Australia.

---

614 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 5.

615 Application of the Diebold Mariano test demonstrated that the on the day forecast was superior in terms of minimising the error performance, at a statistically significant level (see Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 5).

616 Dampier Bunbury Pipeline, *Estimating the Return on Debt Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 4.

617 Dampier Bunbury Pipeline, *Proposed Revisions: DBNGP Access Arrangement: 2016 – 2020 Access Arrangement Period: Access Arrangement Proposal: Submission 12: Rate of Return*, 31 December 2014, p. 36.

618 The Authority notes that DBP's contention is not relevant to the context of the Authority's comparison – at the time it was made – which compared the on the day estimate, annually updated, and the trailing average, annually updated (see Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, section 6.2.1.4, pp. 62 - 67.

1421. Finally, DBP takes issue with the notion that tests on the risk free rate offer any insight as to the predictive power of the various estimators of the DRP.[619]

1422. In response, the Authority accepts that tests on the risk free rate, while of relevance for the overall return on debt, may not have relevance for the predictive properties of the DRP, which is the issue at hand. The counter would be if the DRP was a random walk and therefore had similar statistical properties to the risk free rate. However, while the Authority is satisfied that risk free rates are non-stationary, and hence a random walk, there is not enough data to inform the statistical properties of the DRP.[620] The Authority therefore accepts that it is difficult to distinguish the prediction properties of the on the day versus trailing average of the DRP over the whole of the regulatory period.[621]

1423. That said, the Authority notes that the on the day approach will provide the best estimate of the prevailing rate for the DRP corresponding to the time it is estimated for.[622] Equally, a 10 year trailing average of annual DRPs will diverge from the prevailing rate, to a greater or lesser degree, dependent on the extent that historic rates differ from the prevailing rate.

1424. The Authority therefore remains of the view that the on the day approach can be a better estimator as compared to the trailing average. However, that superiority, is likely to relate to only a relatively short period, the exact length of which is difficult to determine. Analysis by the Authority of the available RBA data for the BBB credit band DRP suggests that the on the day approach generally performs equal to or better than various span (that is, 2 year, 3 year etc) trailing average approaches in terms of predicting the average of the following 12 months DRP (Table 82).[623]

1425. In Table 82:

- the performance of various annually updated DRP estimators in terms of predicting the next 12 months average of actual DRP outcomes is evaluated;
- the average of the following 12 months of actual DRP outcomes is chosen to measure performance as that is the period an annual update of the DRP estimator would occur;
- the 'performance' is calculated by taking the absolute values of the differences between each estimator and the average of the next 12 months 'actual DRP' outcomes, over the same set of data;
- using the data from the RBA BBB band spread to swap for the 10 year tenor;

---

619 Both options under consideration here – the Authority's annually updated on the day approach and ATCO's hybrid trailing average – fix the risk free rate once at the start of the regulatory period. This assumes that firms will manage this component of the return on debt by hedging the risk free rate.

620 For the stationarity properties of the risk free rate, see Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 16).

621 The Authority also recognises that there are some reasonable doubts around the statistical properties of the comparison of the annually updated estimators. The Authority therefore no longer will rely on those statistical results. The Authority still considers, however, that the Guidelines analysis showing that the once off on the day estimator for the risk free rate, for the risk free rate over the course of the regulatory period, is superior to a once off trailing average estimator, remains statistically valid.

622 That is, the Authority considers that the extended bond yield approach estimate for the DRP in say, the month of January in 2015, will be the best estimate for the DRP in the month of January in that year. It will clearly be superior to any trailing average estimate made for the month of January in 2015.

623 The DRP is the spread of the 10 year corporate non-financial bond to the corresponding term Commonwealth Government Security. Similar results are obtained for the spread over swap.

- so for example, the second row compares:
- the on the day estimator – given by the absolute sum of differences over the observed (100 points of) data, between the DRP in the month just prior, and the average of the actual DRP in the following 12 months (column B); with
- the 2 year trailing average estimator – given by the absolute sum of differences over the observed (100 points of) data, between average of the DRP in the month just prior and the DRP in the same month a further year prior, with the average of the actual DRP in the following 12 months (column A);
- the relative performance is measured as the ratio of the absolute sum of differences in column A over those of column B;
- the longer the trailing average, the less data points may be observed:
  - so in the second row, comparing the relatively short 2 year trailing average, 100 observation points are achieved using the RBA data;
  - whereas in the fifth row, comparing the longer 5 year trailing average, 63 observations are achieved.

Table 82 Relative performance of the on the day and trailing average estimators for the next 12 months average DRP - analysis of RBA BBB credit spread data

Trailing average type (available data set)	Trailing average (A) Absolute value of differences between specified TA DRP estimator and the average of the next 12 months DRP (basis points)	On the day (B) Absolute value of differences between prior month DRP estimator and the average of the next 12 months DRP (basis points)	Performance (C) Ratio of trailing average absolute value to on the day absolute value over available data set
Average of 2 years prior DRP (Jan 2006 to Apr 2014 = 100 observations)	10276	8673	1.18
Average of 3 years prior DRP (Jan 2007 to Apr 2014 = 87 observations)	9279	8325	1.11
Average of 4 years prior DRP (Jan 2008 to Apr 2014 = 75 observations)	7124	7130	1.00
Average of 5 years prior DRP (Jan 2009 to Apr 2014 = 63 observations)	3252	4123	0.79
Average of 6 years DRP (Jan 2010 to Apr 2014 = 51 observations)	2792	2311	1.21
Average of 7 years DRP (Jan 2011 to Apr 2014 = 39 observations)	2741	1967	1.50
Average of 8 years DRP (Jan 2011 to Apr 2014 = 27 observations)	1560	1108	1.41

Notes The rows are n year trailing averages based on the average of the same month DRP in each of the prior n years. So for example, a January 2010 three year trailing average estimate would be the average of the observed DRPs for January 2010, January 2009 and January 2008.

Source RBA, *Statistical Table F3 Aggregate Measures of Australian Corporate Bond Spreads and Yields: Non-Financial Corporate (NFC) Bonds*, accessed 21 April 2013; ERA analysis.

1426. The on the day approach generally performs better than the trailing average in predicting the average of the DRP over the following 12 months. The exception is the 5 year trailing average. Its better performance reflects the influence of the Global Financial Crisis falling in the middle of the span of the 10 years of the RBA's data, and therefore strongly influencing the 5 year trailing average.

1427. That said, equivalent analysis to that in Table 82 indicates that the 5 year trailing average performs less well as compared to the on the day estimator in predicting the average rate for any periods up to seven months ahead (for example, the calculated ratio for five months ahead is 1.52, for seven months ahead is 1.11). In addition, when similar data is examined for the A- credit band, no trailing average performs better in predicting the average rate for the following 12 months than the on the day approach.[624] The A- credit band will have been less influenced by the extreme results evident for the BBB credit band during the GFC.

1428. The results in Table 82 provide some limited evidence that the trailing average performs less well in terms of predicting the average DRP over the following 12 months, although it needs to be recognised that the number of observations gets smaller as the number of years in the trailing average gets longer (and there is not enough RBA data to evaluate a 10 year trailing average).

1429. It is clearly not possible to infer the statistical significance of these results, absent a longer span of data, so these results are only indicative. However, intuition supports the idea that the on the day estimator will perform at least as well for the average of the next 12 months' DRP, given that month to month estimates are not independent, but are linked through the influence of prevailing economic conditions (which only change slowly much of the time). The linkage between the predictor and the forecast will be stronger, the closer together they are.

1430. The implication is that an on the day estimator of the DRP, annually updated, is likely to perform at least as well as, or better than a trailing average estimator, annually updated, in terms of estimating prevailing DRPs to apply over the following year. For these reasons, the Authority considers that its approach set out in the Draft Decision is potentially superior in prediction performance, much of the time, as compared to the hybrid trailing average approach proposed by ATCO.

Investment incentives

1431. The issue of incentives for the service provider to invest efficiently in the network is strongly related to the issue of prediction performance. An estimator which delivers better signals with regard to prevailing rates of interest over the course of the regulatory period will better signal efficient investments by the service provider.

1432. The Authority considers that the on the day approach is likely to potentially have better predictive properties in the near term (as noted above). Therefore, the Authority considers that the annually updated on the day approach set out in the Draft Decision will perform as well as, or better than, the hybrid trailing average approach proposed by ATCO in this regard.

1433. On a related issue, ATCO's consultant CEG argues that firms consider interest rates over the life of an investment project – not just the prevailing rate – when making investment decisions (see discussion of this point below). However, the Authority notes that this does not preclude the relevance of the predictive properties of the return on debt estimate inherent in the prevailing rates, given the importance of near future rates in any present value discounting analysis for investment.

---

[624] The 'performance ratio' for the A- credit band 5 year trailing average DRP is 1.26. This is the lowest result for any trailing average term evaluated.

1434. In addition, it is likely that any investment decision will account for the term of the prevailing rate; for example, the prevailing estimate for the 10 year DRP would rationally be applied for the first 10 years of a long term investment's discounted cash flow analysis. This further reinforces the importance of matching the prevailing rate in any estimator.

1435. The impact on economic efficiency will be driven by the difference in *actual* (ex post) outcomes for the DRP, as compared to the ex-ante DRP estimator included in the regulated return on debt. Again, this highlights the importance of the prediction performance of the forward looking DRP estimator.[625] Based on the analysis in the prediction performance section above, the Authority is now of the view that there is only limited evidence that the on the day estimator is superior to ATCO's simple hybrid trailing average proposal.

1436. That said, the Authority notes that it is possible to weight the trailing average approach to ensure that new investment faces a marginal cost of debt that is based on the on the day estimator of the prevailing rate. This would attenuate any potential shortcoming of the trailing average approach with regard to prediction performance. For this reason, the Authority has considered an alternative to ATCO's 'simple' hybrid trailing average approach, which incorporates PTRM weights (see discussion of the 'weighted' trailing average below in the section 'Method for estimating weights').[626]

1437. The Authority considers that the alternative 'weighted' hybrid trailing average approach would perform as well as the on the day approach in terms of signalling prevailing rates for investment, and therefore that both of these approaches could perform better than ATCO's simple hybrid trailing average approach in this regard.

---

625 ATCO in its response to the Draft Decision appears to misunderstand the effect of the true up in the Authority's Draft Decision approach on the signals for investment each year (ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 211):

> The ERA states that its annual update is required so that the changes in debt costs are passed through to create a stronger incentive for investments. However, the ERA then applies 'guiderails' to constrain the pass through, undermining its own stated intention.

DBP also appears to be under this misconception when it states (Dampier Bunbury Pipeline, Proposed Revisions: DBNGP Access Arrangement: 2016 – 2020 Access Arrangement Period: Access Arrangement Proposal: Submission 12: Rate of Return, 31 December 2014, p. 36):

> Overall, however, the AER's trailing average, as distinct from the trailing average the ERA discusses in its Guidelines is considered likely to deliver the correct signal to marginal investment precisely because it updates during the access period. The same cannot be said for the revised proposal from the ERA in the ATCO Draft Decision that delays the transmission of information.
>
> While the true up will mask the annual prevailing DRP for end users, but given the present value nature of the true up, will retain the prevailing nature of the on the day DRP estimate for the service provider. It follows that a rational service provider would utilise the annual estimate – to be published on the Authority's website each year – in its investment decision making. To do otherwise would be to incorporate an incorrect return on debt for its investment cash flow analysis.

626 A 'simple' trailing average refers to an equally weighted trailing average. A 'weighted' trailing average refers to a capex weighted trailing average.

1438. Finally, ATCO and CEG also contend that the mechanics of regulation mean that intra-regulatory period changes in the return on debt will not have an influence on investment.[627 ,628]

> First, the nature of the regulatory regime is that, within the regulatory period, businesses do not receive an additional allowance for the cost of debt the more they invest (and vice versa). The ERA's annual update to the cost of debt will be applied to the RAB that was forecast to apply in that year at the beginning of the regulatory period.
>
> The first time that a regulated business will receive any additional allowance for the cost of debt based on higher investment (and vice versa) will be at the beginning of the next regulatory period – and that will be based on the ERA's future risk free rate and DRP estimates. Consequently, the interest rates that feed into the allowance that is provided in the year an investment is made is irrelevant to a business's incentives to invest in that year. Rather, it is the expected future interest rates that will apply in the next and subsequent regulatory periods over the assets life that matter. There is no reason that an entity will expect a different level of cost of debt allowance in future regulatory periods as a result of having their cost of debt allowance updated in this regulatory period.

1439. CEG therefore questions whether the prediction performance matters at all for investment decisions. However, the Authority considers that where the trailing average under-remunerates a new (approved forecast) investment, as compared to the actual costs which will incorporate the prevailing cost of debt – for example when the trailing average is below the prevailing rate – then there will be an incentive to defer that forecast investment until a later date. Prediction performance and the specification of the estimator therefore remain important considerations.

1440. This is because (forecast) investment that is approved for the regulatory period under a trailing average regime will receive the trailing average return on debt applying in the year that it is commissioned, not the prevailing rate for that regulatory year (see Box 1). The corresponding trailing average return will already have been incorporated in tariffs for the expected year of the forecast capital expenditure included in the tariff modelling. To the extent that expectations of prevailing rates are above the trailing average, then there will be an incentive to delay making investments. This will lead to distorted investment decisions.

1441. This investment distortion has been recognised by DBP, at least for investments greater than 10 per cent of the RAB (with a 10 year trailing average). With regard to investments less than 10 per cent of the RAB, DBP has stated:[629]

> The ERA notes that a problem with the "trailing averages" it considers is that the information will be stale, and that the marginal investment will not face the marginal cost of investment (Explanatory Statement paragraph 345). However, this is clearly not the case with the AER's trailing average approach, whereby one tenth of the return on debt is rolled over every year. Thus, every marginal investment made during the access period will in fact face the marginal return on debt relevant at that time. Further to our discussion on sunk costs above, existing capital serviced by existing debt does not influence whether new investment is viable or not; what matters is the interest rate faced by that marginal investment, and the AER's approach delivers the signal which ensures that investment will occur at the right time.

---

627 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 210.

628 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 32. See also pp. 39 – 41.

629 Dampier Bunbury Pipeline, *Proposed Revisions DBNGP Access Arrangement 2016 – 2020 Regulatory Period Rate of Return Supporting Submission*: 12, 31 December 2014, p. 36.

> The AER's approach does present problems where the "marginal" investment is not really marginal, but is greater than one-tenth of the asset base.

1442. DBP proposes in its access arrangement revision to apply a transitional approach to major new capital expenditure as a means to overcome the problem. However, the Authority in the Discussion Paper did not agree with DBP that the marginal cost of debt for capital expenditure that is less than 10 per cent of the RAB with a trailing average regulated return on debt is the prevailing annual rate – rather it is the trailing average (Box 2).

Box 2 Return on debt applying to approved (forecast) investment

Under a simple trailing average, the marginal return on debt applying to a new investment is not the prevailing rate, but rather the trailing average estimate of the return on debt that is incorporated in tariffs.

So for example, if a firm increases the size of its regulatory asset base by 5 per cent in any year, then it will receive the regulated rate of return on that investment for the year in which it is expected to enter the asset base, and for subsequent years. That rate of return will incorporate the trailing average. Hence the return to that investment will be based on the trailing average; it will not be the prevailing rate.

It makes no difference whether the new investment, as a proportion of the asset base, is greater or lesser than the proportion of debt annually updated in the trailing average.

Therefore, to the extent that the prevailing rate exceeds the trailing average cost of debt allowance incorporated in the tariff that applies to a new investment, then there will be an incentive to delay the forecast investment, so as to avoid making a loss on that investment. This is a clear distortion in investment incentives.

1443. DBP clarified in its submission to the Discussion Paper that it did not consider that a 10 year trailing average would deliver the correct prevailing rate for investments that comprised less than 10 per cent of the RAB. Instead, DBP agreed that the 'logical alternative is precisely that which the ERA proposes, to base the weight on additions to the RAB, which then ensures that the marginal investment faces its marginal cost'.[630]

1444. The Queensland Treasury Corporation (**QTC**) summarises its view on this issue thus (where 'unweighted' means a simple equally weighted trailing average):[631]

> If an unweighted average is used, a service provider's investment decisions will be affected by the difference between the prevailing cost of debt and the trailing average return on debt. Due to the use of overlapping data, large differences between these rates will naturally occur on an annual basis. Therefore, it is inappropriate to incorporate

630 Dampier Bunbury Pipeline, *Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 6.

631 Queensland Treasury Corporation, *Draft Rate of Return Guideline*, Submission to the AER, 11 October 2013, p. 18.

> a bias towards under (over) investment when the prevailing cost of debt is above (below) the trailing average return on debt.

1445. Therefore, potential differences in the marginal cost of investment between a trailing average and the prevailing cost of debt do arise and will be relevant for forecast investment decisions.

1446. CEG states that:[632]

> …actual incentives to invest in maintaining existing regulated networks are not solely, or even primarily, driven by a comparison of the entity's actual cost of debt with the expected allowed cost of debt. Rather, they are driven by the need to keep the service in operation and to meet safety and other quality of service standards. It will be economic to make such investments, and avoid the potential costs of service interruptions etc., even if the allowed cost of capital is temporarily below the actual cost of capital.

1447. The Authority considers that this argument is reasonable for safety type and other maintenance of existing investments, but does not apply to growth investments. The Authority's view therefore remains that prediction performance of the return on debt estimator does need to be considered, as it will have an effect on the signals for growth investment.

1448. The alternative 'weighted' hybrid trailing average approach could perform as well as the on the day approach in terms of signalling prevailing rates for new capital investment, as it will apply prevailing rates to any new forecast investment. Therefore, the Authority concludes that both of these approaches have the potential to perform better than ATCO's simple hybrid trailing average approach, given that the latter does not signal the prevailing rate for forecast new investments. However, this conclusion depends on the inference that the on the day/prevailing rate is a better predictor than the trailing average. As noted above, there is only limited evidence for this finding.

Signalling efficient use

1449. The Authority noted in the Guidelines that the economic efficiency requirements of the National Gas Objective and Revenue and Pricing Principles also imply a need to consider the signals for efficient upstream and downstream use. The Guidelines stated:[633]

> The Authority considers that effective incentives for economic efficiency will achieve outcomes similar to those observed in markets with effective competition, including:[634]
>
> - efficient production;
> - profits at levels just sufficient to encourage and reward investment, efficiency and innovation;

---

632 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 33.

633 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 3, p. 33.

634 See for example Scherer F. and Ross D. 1990, *Industrial Market Structure and Economic Performance*, Houghton Mifflin, Chapter 2.

- prices that signal appropriate consumption decisions, clear markets, and enhance cyclical stability;
- output levels and product quality responsive to consumer demands, and which reward those firms which best deliver such responsiveness.

…A divergence between actual debt costs and the allowed regulatory return on debt – where the latter is established at the start of the regulatory period ('ex ante') – would likely result in sub-optimal investment decisions by the regulated firm and by upstream and downstream users

1450. However, a number of service providers took issue with this notion. CEG for example sum up this view in the following:[635]

> The ERA believes that if prices in a given year reflect the prevailing interest rate on corporate debt in that same year then this will promote efficient use of the pipeline. However, the ERA has not based this assertion on any explicit economic reasoning.
>
> The ERA seems to take it for granted that this is the case and does not explain why it is so. In my view it is demonstrably not the case. This reflects the fact that the infrastructure in question is almost entirely 'sunk' – it has been invested in the past and it cannot (economically) be used for any alternative purpose other than transporting gas along the route in question. Consequently, the prevailing yield on corporate debt is irrelevant to whether it is efficient for users to marginally increase or decrease the throughput of gas on the sunk asset.
>
> Encouraging consumers to use sunk infrastructure less intensively just because corporate debt yields are high in the current year does not send an efficient price signal. The infrastructure has been invested in and financed (or refinanced) in the past. This investment cannot be undone just because corporate debt yields rise and it is inefficient to send a signal to consumers to stop using the asset when interest rates rise.[636]
>
> Ultimately, efficiently promoting consumption on large scale sunk infrastructure where marginal cost is below average cost is a well understood problem in the economic literature. In this literature the focus is on price structure (e.g., setting two part tariffs, peak load pricing and discriminating between high and low value users).[13] I am aware of no line of research that suggests creating price volatility by reflecting prevailing interest rates in tariffs in each year will promote efficient use for sunk monopoly assets.

1451. However, the Authority does not agree with these contentions. Rather, it agrees with Incenta when it states the following:[637]

> …the potential for a change to the average level of prices to affect economic efficiency, even where prices are already below stand alone cost. As prices are raised above marginal cost (which… is likely to be necessary to recover the "residual costs"), different forms of inefficiency may result:

---

635 ATCO Gas Australia, *Re: Estimating the return on debt: ATCO Gas Australia's response to the ERA's Discussion Paper*, 25 March 2015, Attachment, p. 4.

636 [CEG footnote] The only scenario where it would potentially be sensible to send such a signal would be where the asset was not sunk. That is, where it could be costlessly 'dug up' and transplanted to another location and where customers in that other location would otherwise invest in a new pipeline at prevailing interest rates. In that scenario, it may be efficient to charge existing customers a price that is 100% based on 'today's' interest rate because the opportunity cost of using the asset in its current location is the investment funds that could be avoided in another location by (costlessly) transplanting the asset. Of course, this is an irrelevant scenario precisely because gas pipelines (and other infrastructure of its kind) are sunk assets (i.e., cannot be transplanted to another location in order to avoid capex in that location).

637 BHP Billiton, Public Submission by BHP Billiton In response to Goldfields Gas Transmission Pty Limited's Proposed revisions to the Goldfields Gas Pipeline Access Arrangement, 27 November, 2014, Attachment, p. 17.

a. customers may be discouraged from using the infrastructure even though that the value from that use exceeds the cost, which would be inefficient, and

b. once prices exceed stand alone cost, customers may be encouraged to build their own duplicate infrastructure or seek alternative fuels even though there is sufficient capacity on the existing infrastructure, which would also be inefficient.

1452. The implication is that it is not just the marginal cost of use that matters for allocative efficiency, but also the average cost, which recovers the residual associated with the fixed capital.

1453. With this in mind, the Authority considers that the forward prediction performance of the return on debt estimator also has relevance for the efficiency of upstream and downstream use of the network services at any point in time:

- The Authority notes that its Draft Decision approach attenuates the signals for efficient use by upstream and downstream users, as the regulatory period progresses, given that both the risk free rate and DRP would – from the perspective of the user – be set (on the day) once at the start of each regulatory period. (End users would only have seen the impact of the annual update on tariffs at the 'true up', to occur at the next regulatory period.)
- On the other hand, the hybrid trailing average, annually updated, will provide a signal that incorporates debt components that are as much as nine years old, and which on average might be five years old.

1454. To assess the relative performance of these approaches, the Authority examined the prediction properties of the on the day estimator for the DRP – set at the start of the regulatory period – for the subsequent 60 months (5 years). Again, similar to Table 82 above, the Authority used the available RBA data series for the DRP for the BBB band. The resulting average difference of the estimator to the actual outcomes for the 60 month period was compared to various length trailing average estimators, annually updated, on a consistent basis.

1455. The 'consistent basis' requires, first, that the trailing average DRP predictor's performance is assessed against the average DRP for the next 12 month period (as it annually updated). Second, the resulting annual differences for the trailing average DRP estimator, for each of five years of the regulatory period (or the same 60 months as was considered for the on the day DRP estimator), are then summed, to give a total difference over the 60 months of the regulatory period.[638] The relative prediction performance of the two estimators over the course of potential five year regulatory periods since January 2006 may then be compared on an equivalent basis (Table 83).

[638] See paragraph 1425 for an explanation of how Table 82 was constructed, which involves similar calculations. That said, in this case the 'actual outcomes' which the prediction performance is being assessed on are the following 60 months after the estimator prediction, rather than 12 months ahead which underpinned the analysis in Table 82.

Table 83 Relative performance of the on the day and trailing average estimators for the next 60 months (on the day with true up) and 12 months (trailing average annually updated)- analysis of RBA BBB credit spread data

Trailing average type (available data set)	Trailing average Absolute value of differences between specified trailing average DRP estimator and the average of the next 12 months DRP (summed over five years of regulatory period) (basis points)	On the day: Absolute value of differences between prior month DRP estimator for the average of the next 60 months DRP (the five years of the regulatory period) (basis points)	Ratio of trailing average absolute value to on the day absolute value for the five years of the regulatory period
Average of 2 years prior DRP (Jan 2006 to Apr 2014 = 52 observations)	30283	8255	3.67
Average of 3 years prior DRP (Jan 2007 to Apr 2014 = 40 observations)	20120	6042	3.33
Average of 4 years prior DRP (Jan 2008 to Apr 2014 = 28 observations)	10219	3946	2.59
Average of 5 years prior DRP (Jan 2009 to Apr 2014 = 16 observations)	3860	2063	1.87

Source RBA, *Statistical Table F3 Aggregate Measures of Australian Corporate Bond Spreads and Yields: Non-Financial Corporate (NFC) Bonds*, accessed 21 April 2013; ERA analysis.

1456. The comparison suggests that the on the day estimator performs at least as well as the trailing average approaches (Table 83). Again, this is indicative analysis only (in this case, there is only enough data for up to a five year trailing average to be meaningful). However, it does provide some support that the on the day approach will signal efficient upstream and downstream use, as compared to the trailing average approaches examined.

1457. The Authority concludes therefore that while it is difficult to differentiate between the approaches in terms of prediction performance for end users, there is some evidence based on the outcomes set out in Table 83 that the Authority's Draft Decision approach remains at least equivalent, and perhaps superior, in terms of signalling prevailing rates for upstream and downstream users. It will therefore achieve allocative efficiency at least as well as compared to the hybrid trailing average approaches, annually updated.

1458. The Authority also concludes that there are only limited differences for end users in terms of the stability of tariffs under the two approaches. The Authority's approach set out in the Draft Decision results in stable tariffs over the course of the regulatory

period, with only a generally small adjustment in the next access arrangement under the 'true up' mechanism. On the other hand, the hybrid trailing average results in a smoothed annual adjustment each year, based on the 10 year trailing average.

Conclusions with regard to economic efficiency

1459. The foregoing discussion suggests that:

- there is not enough data to determine the statistical properties of the DRP – whether it exhibits a random walk or is mean reverting – hence it is not possible to be definitive about prediction performance;
  - however, there is some evidence from the available data that the on the day approach performs at least as well as the trailing average for the DRP for the year ahead, and may be superior;
- it follows that the Authority's Draft Decision on the day approach is at least equivalent to ATCO's annually updated hybrid trailing average in terms of providing signals for efficient investment by the service provider, and may be superior (in the event that it is a better predictor);
- it is possible to address prevailing investment incentives within the trailing average framework through the use of capex weights, suggesting that the alternative 'weighted' hybrid trailing average approach would have the same performance as the Draft Decision approach;
- all approaches have some shortcomings in terms of signalling efficient use of pipeline services by upstream and downstream users, however, on balance, the Authority considers that there is some evidence that the on the day approach has better performance in this regard;
- by allowing the regulated firm to replicate the return of debt, a trailing average approach may provide some advantage for regulated firms – as compared to comparable competitive firms;
- however, the capital intensity of the gas networks industry suggests that this advantage is likely to be limited, such that the Authority accepts that this factor is less important.

Recovery of efficient costs commensurate with risk

1460. With regard to the recovery of costs, the Revenue and Pricing Principles are clear that the benchmark efficient entity needs to have 'reasonable opportunity to recover at least the efficient costs' it incurs.[639] This may be interpreted as being consistent with the present value principle (or 'NPV=0' condition), which regulators take into account when determining the return on regulated assets.[640] Meeting the present value principle ensures that an investment is 'made whole' over time – such that the return on and of capital is achieved over the life of the asset.

---

639 Revenue and Pricing Principle 2 (National Gas Access (WA) Act 2009, s. 23, clause 24(2)).

640 The present value principle – also known as the financial capital maintenance principle – ensures that the present value of expected capital charges for an asset over its economic life should be equal to the initial value or purchase costs. The capital charge relating to assets comprises both the return on and the return of capital.

1461. The Guidelines considered the present value principle at length.[641] The term of the estimates is key. The Guidelines noted that in the absence of credit default swaps, then following Lally, an approach to estimating the cost of debt combining a five year base rate with a DRP which corresponded to the term of corporate debt would best meet the present value principle, even though there would be a slight deviation from present value neutrality each year.[642] This entails using:

- the five-year risk free rate; plus
- the 10-year debt risk premium; plus
- annualised 10-year debt issuance costs; and
- the transactions costs involved with swap contracts.[643]

1462. This was the approach adopted by the Authority for the ATCO Draft Decision. The ATCO Draft Decision represented a change from the Guidelines with regard to the term of the DRP. Specifically, the Authority recognised that Lally was referring to the average term at issuance of corporate bonds, which is around 10 years, rather than the average term to maturity.

1463. Lally recognises that the trailing average approaches can allow the firm's return on debt to be replicated exactly by the benchmark efficient entity, such that it would be able to meet exactly the present value principle at any point in time.[644] The trailing average approach, therefore, maintains the present value principle in a stronger fashion as compared to the Authority's Draft Decision approach.

1464. However, in his recent advice to the ERA, Lally considered that the ERA's approach to retain the on the day approach was appropriate, as he:

- remained of the view that the violation of the present value principle under the ERA's proposed approach was small;[645]
- considered that capex incentives are important considerations in choosing regulatory policy – and that a simple trailing average approach gives rise to capex incentive problems.[646]

1465. ATCO's consultant CEG, however, disagrees with Lally's analysis – and therefore the Authority's position – that an approach other than some form of trailing average meets the requirements of the NGL and NGR. CEG's contention is that the Authority's approach is not present value neutral, whereas a trailing average approach can be exactly present value neutral.

1466. Second, as noted above, CEG also considers that it is the expected return on debt over the life of the asset (say 40 years) which matters to an investor, not the small differences related to the immediate prevailing rate, which contribute only a 'trivial'

---

641 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 2.

642 Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Appendix 2, p. 25.

643 M. Lally, The Appropriate Term for the Risk Free Rate and the Debt Margin, 27 April 2010, p. 3.

644 M. Lally, The Trailing Average Cost of Debt, 19 March 2014.

645 M. Lally, *The Cost of Debt*, 10 October 2014, p. 12.

646 M. Lally, *The Cost of Debt*, 10 October 2014, p. 5.

amount to the overall return.[647] CEG considers that an 'investor will have an incentive to make the investment if they expect the regulatory DRP over the next 40 years (life) to match their actual DRP'.[648] CEG contends that the prevailing rate will only apply for a short period before changing, and when updated annually (in line with the ERA approach), would not match the *actual costs* associated with the bonds used to fund the investment:

> What matters to investors is an expectation that, on average over the life of the assets, they will receive a regulatory DRP that is consistent with their actual DRP. Annual updating of the DRP does not ensure that this is the case. However, this expectation can be ensured via the adoption of a trailing average DRP. Consider a firm refinancing 10% of its regulatory asset base in a given year. The firm will know that the DRP associated with its investment in that year will enter the trailing average with a 10% weight and will remain in the trailing average for the next 10 years with that same weight (i.e., the period it will be paying the DRP on 10 year debt issued in that year). The operation of a trailing average provides the appropriate level of compensation that the firm requires for an investment in that year.[649]

1467. This argument therefore also relates to present value neutrality considerations.

1468. The latter part of this argument seems weak, suffering from the idea that the firm receives the cost of a bond newly issued to fund capital expenditure – which initially has the prevailing rate – through the trailing average. That is not the case with the simple trailing average, as noted in Box 1 above. However, the argument could be sustained with the PTRM weighted trailing average, discussed at paragraph 1436 above and in the section 'The method for estimating weights' below. In addition, the Authority considers that the prevailing rate on the 10 year bond – which would apply for the first ten years of any investment cash flow analysis – is not 'trivial' in discounting terms.

1469. Overall, it appears reasonable to conclude that the present value condition is approximated under the Authority's current approach, particularly over the longer lives of infrastructure assets. That is, violations in any one year may be significant, but over the long run, unders balance overs, such that present value neutrality is approximately achieved.

1470. That said, it also needs to be recognised that the trailing average approaches can exactly meet the present value condition.

1471. On this basis, consideration of the present value condition on balance favours the trailing average approaches, unless there are other compelling reasons not to adopt them.

---

647 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 35.

648 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 35.

649 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 36.

Incentives for efficient financing costs

1472. The Authority argued in the Guidelines that competitive firms may not always recoup their debt costs in setting their prices at any point in time, and that therefore allowing the regulated firm to do so would in effect lower the regulated firm's risk and provide a lower cost of debt at times, as compared to other firms in the economy, hence leading to an implicit subsidy, a distortion, and financing costs for the regulated firm that were not efficient:[650]

> The view that the trailing average approach is preferred on efficiency grounds is therefore misplaced. Stakeholders claim that, to the extent that the trailing average would match the firm's embedded cost of debt, its mismatch timing risk is reduced significantly… This is correct. The corollary would be that, under the [full] trailing average, regulated firms would be able to reduce their hedging and other debt management activities markedly.
>
> The regulated firm's debt risk premium, under a trailing average approach, would also likely reduce, as lenders would account for the lower risk of future mismatch timing risk and related risks, such as default risk. However, to the extent that this opportunity is not available to other unregulated firms in the economy, such an approach would create a type of financial subsidy to the regulated firm. This creates an economic distortion and an associated reduction in economic efficiency.

1473. However, CEG maintains that competitive firms do not adjust prices in response to frequent interest rate changes, hence they are able to replicate the return on debt of a staggered portfolio in their prices:[651]

> Many, if not most, non-regulated infrastructure investments are undertaken in the presence of long term contracts (typically negotiated prior to investment) that are akin to compensating based on a trailing average cost of debt. That is, the contract will specify a revenue/price path that is expected to recover the investors' actual costs (which will not be based on the assumption that actual costs move one for one with annual fluctuations in interest rates).
>
> Moreover, where investment proceeds without a long-term contract market forces do not create a scenario where revenues/prices fluctuate one for one with prevailing interest rates. As discussed above, short term fluctuations in interest rates are more likely to cause short term prices to move in the opposite direction (to the extent demand in the economy is inversely related to the level of interest rates). Sustained increases in interest rates over an extended period can be expected to raise prices, especially for capital intensive services, but this is precisely what will be delivered by a trailing average in these conditions.

1474. The result is that pricing which incorporates the return on debt from a staggered debt portfolio can be consistent with an efficient financing strategy.[652]

1475. The Authority accepts that long term contracts may be typical for wholesale customers of the benchmark efficient entity. Further, the Authority also accepts that it is difficult to clearly identify superiority for the on the day approach as compared to the trailing average approaches over any period longer than the short term (see paragraph 1426), despite some limited supporting evidence. The Authority therefore

---

650 Economic Regulation Authority, *Explanatory statement for the rate of return guidelines*, 16 December 2014, p. 70.

651 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 31.

652 DBP make a similar point (Dampier Bunbury Pipeline, *Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 14).

accepts that its previous argument cannot be sustained with regard to those situations where long run contracts apply.

1476. In short run marginal cost pricing, typical of more atomistic competition, the marginal firm – which sets price – is likely to charge the expected average cost of a debt portfolio, or else make losses. If there were very low capital costs, with easy entry and exit to the industry, competing firms would need to manage their debt to meet new entrant costs, or else make losses. However, the Authority accepts that this situation is less relevant for the benchmark efficient entity, given the highly capital intensive nature of the industry.

1477. With this analysis in mind, the Authority now considers that a trailing average for the return on debt is less likely to subsidise the incumbent, or as a corollary, distort investment outcomes, as compared to other similarly placed firms in the economy. This removes a key objection of the Authority to the trailing average approaches.

1478. CEG also contends that if there is an approach to estimating the return on debt which can lower the cost of debt, for example by raising the creditworthiness of the benchmark efficient entity, then that approach should be adopted:[653]

> To the extent that it is within the ERA's power to lower the risks, and therefore the costs, of service providers then the ERA should adopt that practice and, in doing so, it would promote economic efficiency. This would result in a cost reduction due to regulatory innovation that is just as valuable to society as a technological innovation of another kind. No economist would argue against the introduction of a technological innovation that lowered costs for industry "X" just because this would lower their costs relative to other industries who cannot have this technological innovation applied to them. Such a cost reduction does not involve a 'subsidy' nor does it create a 'distortion'. Such a cost reduction is clearly welfare enhancing 'progress' and is the primary engine of economic growth in the economy.

1479. To the extent that a trailing average better matches the efficient financing costs of the benchmark efficient entity, thereby removing unnecessary risk – for example, the risks that might be associated with mismatch timing and achievement of present value outcomes (see below) – then it may lower financing costs in an efficient manner. The Authority accepts that any approach which did this would promote economic efficiency.

Efficient debt management strategy

1480. ATCO contends that the Authority's approach is based on a debt management strategy that cannot be replicated. ATCO therefore considers that the approach does not provide an estimate of the benchmark efficient entity's cost of debt, or adequately remunerate its costs:[654]

> AGA has previously submitted that the annual update of the DRP does not reflect an efficient benchmark efficient strategy.[655] It has been established that both AGA and the ERA's consultant Lally, agree that a benchmark efficient debt management strategy involves the staggered issuance of 10 year debt. The DRP paid by a business is fixed

---

653 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 31.

654 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 209.

655 ATCO Gas Australia, *Access Arrangement Information 1 July 2014 – 31 December 2019 (AA4)*, March 2014.

> for the term of that debt. As such, where 10 year staggered debt is used the update to the DRP should reflect the changes that result from the rollover of newly issued debt. The ERA's approach reflects the changes in costs that would result from reissuing the entire debt portfolio each year. Therefore, updating the prevailing DRP annually does not reflect the costs incurred by the benchmark efficient entity at all.

1481. With regard to the need for 'replicability', the Authority notes that NGR 87(11)(a) requires it to have regard to 'the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity'.

1482. This requirement may be interpreted as relating to the replicability or otherwise of the return on debt by the benchmark efficient entity. The rule clearly states the desirability of allowing the benchmark efficient entity to replicate the return on debt.

1483. ATCO argues that, in order to satisfy the allowed rate of return objective at NGR 87(3):[656]

> …the cost of debt must be estimated based on the cost of implementing a well-defined debt management strategy that is efficient and consistent with a policy that a benchmark efficient entity with a similar degree of risk to AGA would undertake. As a matter of logic, the cost of debt estimated must reflect a debt management strategy that can actually be implemented. Otherwise, it could not be efficient.

1484. In similar fashion, ATCO's consultant CEG contends that the NGR and NGL require that the cost of debt allowance must be:[657]

- replicable in the sense that it is based on a well-defined debt management strategy;
- based on a debt management strategy which is efficient in the sense that it reflects a prudent strategy that minimises the expected (risk adjusted) costs of financing. In order to achieve this, the benchmark strategy should be based, as far as possible, on observed behaviour of regulated businesses (where it can be assumed that regulated business have an incentive to behave efficiently); and
- estimated based on the best available data.

1485. CEG therefore considers that it is necessary for the Authority to define a financing strategy for the benchmark efficient entity, and then to estimate the efficient financing costs of implementing that strategy. CEG quotes the AEMC – where it refers to the NGR 87(11)(a) requirements – in support of this approach.[658]

1486. DBP on the other hand does not consider that a trailing average is replicable:[659]

---

656 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 204.

657 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 9.

658 Australian Energy Market Commission, *National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, 29 November 2012, p. 84, quoted at ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Appendix 9.2, p. 11.

659 Dampier Bunbury Pipeline, *Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 12.

> In the first instance, we would not consider that a trailing average is, as the ERA appears to think it is, perfectly replicable. DBP has made this point in previous submissions to the Guidelines process. Perhaps, in a world where firms paid attention only to economic regulators and not other pressures (such as ratings agencies or the desires of lenders), and in a world where firms could costlessly roll-over one debt instrument into a new one meaning there is no path-dependency in debt, then the trailing average (or hybrid) would be perfectly replicable.[660] However, no regulated firm lives in this abstract world, and a trailing average is not perfectly replicable in any practical sense.

1487. It is clear that the AEMC had 'better matching' in mind when it developed NGR 87(11):[661]

> The first factor in the rule requires the regulator to have regard to the characteristics of a benchmark service provider and how this influences assumptions about its efficient debt management strategy. As highlighted by SFG in its report, debt management practices tend to differ according to the size of the business, the asset base of the business, and the ownership structure of the business.
>
> The current prevailing market conditions "one-size-fits-all" approach required under the NER, and applied under the NGR, may lead to various mis-matches between the regulatory estimate allowed by the regulator and the actual interest rate exposures of those service providers that employ debt management practices that are not closely aligned with the benchmark assumptions.
>
> The second factor requires the regulator (and service providers when making their proposals) to have regard to any potential benefit to consumers that could flow from reduced financing risks that may result from different return on debt methodologies. The intention is to require consideration of the potential impact on the return on equity that may result from a return on debt methodology that reduces the overall volatility of cash flows to equity holders. As modelling results provided by SFG show, in certain cases the cash flow volatility to equity holders can be reduced by better matching the debt component of the regulated return with borrowing costs.
>
> The third factor that requires the regulator to have regard to the incentive effects on capex recognises that any methodology for the return on debt allowance may affect service providers' incentives to make efficient investment decisions.
>
> The purpose of the fourth factor is for the regulator to have regard to impacts of changes in the methodology for estimating the return on debt from one regulatory control period to another.

1488. The Authority considers that the AEMC's observations makes it clear that it is desirable that a firm be able to 'minimise differences' to its return on debt, but does not consider that this implies that the return on debt needs to be exactly replicable at all times.

1489. DBP appears to agree with this interpretation:[662]

> More importantly, we don't believe that either the AEMC or CEG intends that only perfectly replicable debt management strategies are acceptable. Instead, we believe the point being made, by CEG at least, is that a given cost of debt mechanism cannot

---

660 Note that FMG, which recently attempted to roll over its debt, found that it could not do so at an acceptable price (see https://au.news.yahoo.com/thewest/business/a/26700650/fmg-slumps-after-canning-bond-issue/).

661 Australian Energy Market Commission, *National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, 29 November 2012, p. 84.

662 Dampier Bunbury Pipeline, *Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 13.

> be impossible to replicate under any circumstances. This is very different from the "perfect replicability" requirement that the ERA seeks to argue against.

1490. The Authority has to date considered that its annual update for the DRP, in concert with the risk free rate set on the day, would allow the firm to come very close to meeting the present value principle.

1491. ATCO submits that:[663]

> The ERA has erred in its assertion that resetting the DRP each year mimics the conditions found in competitive markets. As detailed by CEG many, if not most, non-regulated infrastructure investments are undertaken in the presence of long term contracts that deliver a similar level of compensation to that based on a trailing average cost of debt. The prices and revenues will not vary based on annual variations in the level of interest rates. Further, where an investment proceeds without a long-term contract, market forces will not create a scenario where revenues fluctuate one for one with prevailing interest rates.[664]

1492. The Authority accepts that the return on debt implicit in pricing in competitive markets may not always reflect the prevailing rate (as noted in paragraph 1479 above). However, the Authority considers that the extent to which this occurs will depend on the capital intensity of the industry, among other things. So for example, new entrants may undercut incumbents for a time in some industries, if they are able to finance at the prevailing rate. The pricing in such industries would tend to incorporate prevailing rates, and this would be efficient.

1493. On the other hand, full new entrant pricing is less likely for industries with significant sunk costs, given the lead times associated with establishing the new entrant. As a result, the Authority now accepts that the return on debt implicit in pricing may diverge from the prevailing rate, having some element of historic debt costs.[665]

1494. The Authority accepts that a hybrid trailing average approaches could be (but may not always be) replicated exactly by the benchmark efficient entity, by adopting a staggered debt portfolio with refinancing in proportion to the trailing average weights.

1495. On the other hand, the Authority's on the day approach set out the Draft Decision will lead to unders and overs – over time – as compared to the average return on the typical staggered debt portfolio of the benchmark efficient entity. It therefore performs less well on this element as compared to the hybrid trailing average approaches, and is thus less desirable on this count.

---

663 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 210.

664 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, paragraph 95.

665 IPART for example changed its position in 2013, stating: 'Our final decision represents a change from the objective for our previous WACC methodology, in which the benchmark entity was a new entrant in a competitive market. In line with this objective, we previously set the WACC with reference to the current costs of debt and equity, since a new entrant would be financed at prevailing rates. However, because new entry is rare in practice, it was difficult to infer the efficient financing strategy for a new entrant from observed behaviour.' (IPART, *Final Report – Review of WACC Methodology*, December 2013, p. 10.

Unnecessarily constrains the estimate of the DRP

1496. ATCO contends that the Authority's 'guiderails' approach set out in the Draft Decision unnecessarily constrains the estimate of the DRP and restricts the ability of the benchmark efficient firm to recover the efficient cost of debt.[666]

1497. The guiderails approach was intended to retain the properties of the annual update with regard to efficiency, as it ensures that ATCO faces the prevailing annual debt risk premium. However, the approach would also deliver a single rate of return to apply in each access arrangement, thereby allowing a stable tariff path.

- First, the debt risk premium for the fourth access arrangement period (**AA4**) would be estimated 'on the day' at the start of the regulatory period. The debt risk premium would be calculated as the 40 day average of the daily rates determined using the Authority's revised bond yield approach, set out above. This actual rate would be published at the commencement of the access arrangement, after the elapse of the 40 days, in line with the Authority's usual practice.
- Second, the debt risk premium *to apply* for AA4 would be based on the estimated rate determined in the first step, but would be required to fall within the bounds of 100 to 300 basis points, as 'guide rails'. An estimated 'on the day' debt risk premium above 300 basis points would be constrained to 300 for the duration of the access arrangement, and a debt risk premium below 100 would be constrained to 100. This is to ensure that the rate set for the duration of the access arrangement is not influenced by unusually low or high prevailing conditions, such as occurred during the global financial crisis.
- The resulting debt risk premium would then apply for the whole of the AA4 period.
- Third, the Authority would publish the annually updated debt risk premium at the start of each of the second to fifth regulatory years of AA4, but not require that this update be reflected in tariffs. The published annual updates would be based on the 40 day average that coincided with the anniversary of the 40 day period used to set the debt risk premium at the start of the access arrangement. Not translating the update to tariffs during the access arrangement period would allow for a stable tariff path.
- Fourth, at the subsequent regulatory reset for the fifth access arrangement period (**AA5**), the debt risk premium would be set based on the guide rails 'on the day' rate at the start of AA5, similar to AA4. However, the debt risk premium for AA5 will incorporate a 'true up' adjustment – in present value revenue neutral terms – which will account for the difference between the debt risk premium set at the start of AA4, and the actual annual update outcomes for the debt risk premium that applied in each of the second to fifth years for AA4 (see Appendix 7 of the Draft Decision for more detail on the properties of this adjustment). In this way, the service provider continues to face during AA4 the cost of debt signal provided by the (published) annually updated debt risk premium, even though the full impact on revenue is not reflected until AA5.

1498. The Authority notes that the revised approach set out above would result in the AA4 on the day estimate of the return on debt – determined in the Authority's final decision for AA4 – applying *in tariffs for end users* for the duration of AA4. To ensure that the signals with regard to the (reported) annually updated debt risk premia continue to

---

666 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 204.

apply for the service provider's investment decisions for the duration of AA4, the Authority determined to require ATCO to insert a fixed principle clause in AA4, which would bind the Authority and ATCO to apply the 'true up' adjustment formula to whatever debt risk premia apply in AA5. This will maintain the benefit of the annual update over the AA4 period, providing efficient signals for new capital expenditure, while allowing for stable tariffs over the period.

1499. ATCO submits that the additional requirements for an annual update and true up have no other effect than to increase the risk faced by the network business with no additional compensation:

> Effectively, the ERA plans to carry forward the difference in revenues that would have been passed through network tariffs had an annual update of the DRP been implemented. This means that customers and the network business must lend/deposit revenue to the other party in one regulatory period to be paid back in the next regulatory period. There is no guarantee that the same customers who receive the benefit of lower prices in the first regulatory period will be the same customers that pay it back in the following period. Postponing the update of the DRP to the end of the access arrangement period simply shifts price volatility from within an access arrangement period to between access arrangements.
>
> The ERA states that its annual update is required so that the changes in debt costs are passed through to create a stronger incentive for investments. However, the ERA then applies 'guiderails' to constrain the pass through, undermining its own stated intention. The ERA has introduced the guiderails approach with no supporting analysis and results in an outcome that is contrary to the ERA's stated intention. AGA does not propose to implement this component of the ERA's approach as even if the correct change in costs were to be passed through the annual update, the guiderails approach reduces the likelihood that the business can recover its efficient costs. Thus, the guiderails do not allow the benchmark efficient entity to recover the true costs associated with the efficient debt management strategy.
>
> For these reasons and those set out in the expert report of CEG, AGA submits that the ERA's annual update of the DRP does not represent an efficient practice that a benchmark efficient firm would or could undertake.[667] The ERA's approach to the annual update imposes additional risks on the benchmark efficient entity without providing sufficient compensation. Further, the ERA's carryover update would impose an inefficient practice upon network service providers and would fail to deliver any additional efficiency.

1500. The key points are that the guiderails approach:

- reduces the likelihood that the business can recover its efficient costs; it does not recompense the true costs associated with the efficient debt management strategy, thereby adding risk which is not compensated;
- leads to lending and borrowing between the service provider and its customers, with no guarantee that the same entities would be repaid;

1501. The Authority does not accept that the guiderails approach – which constrains the annual DRP to be within the range of 100 to 300 basis points – would restrict the

---

667 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, paragraph 201.

ability of the benchmark efficient firm to recover the efficient cost of debt, or constrain the signals for the benchmark efficient firm in terms of its efficient investment.[668]

1502. Given that the 'true up' at the next access arrangement reset is in net present value terms, the firm is recompensed for the cost of debt. While there are timing differences, the Authority considers that the net amount of any difference between the regulated tariff and the updated annual tariff is likely to be small. Analysis of the RBA data by the Authority suggests that from any one access arrangement period to the next, the average adjustment (based on the RBA data since 2005) would be 20 basis points per annum, smoothed through the next access arrangement.[669]

1503. The main effect therefore is to smooth tariffs for end users, much like the previous on the day approach to setting the DRP. There will generally be very little impact on the overall return on debt at any point in time. Furthermore, the service provider should be indifferent to that difference as it is recompensed in present value terms, so there is no loss to the service provider.[670]

1504. ATCO also considers that the approach to delay the revenue adjustment to the next access arrangement period, through the 'true up' arrangement, implies a cross subsidy between current and future customers, with no guarantee that customers who receive the benefit in the first regulatory period will be the same customers that pay it back in the following period.[671]

1505. However, the Authority does not consider the mechanism much different from the previous 'on the day' approach to setting the return on debt. In that case, the service provider or customers would have either have been better or worse off as compared to prevailing rates, with the effect averaging out in the long run given unders and

---

668 The Authority also rejects CEG's view that somehow it would continually defer the true up by opportunistically adjusting the top guiderail (ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 59).

669 The calculation assumes that the DRP for the access arrangement is set in a particular month of year 1 of the access arrangement, and then the annual update would follow for the same month in each of the following years 2 to 5. The 'true up', to apply at the next access arrangement, is then the sum of the deltas for each of the years 2 to 5, with the deltas given by the difference in the DRP between each of years 2 to 5 and the DRP in year 1.

For the period of the RBA data – which is since January 2005 – the average adjustment for a five year true up is 104 basis points. When smoothed/divided over five years, the true up would require a change of around 20 basis points per annum, which is small. The maximum adjustment observed in the RBA data would have been 52 basis per annum (which would have resulted from the GFC spike falling in the middle of the access arrangement).

The period since 2005 includes the Global Financial Crisis. Taking just the data after August 2009 – thereby excluding the main impact of the GFC – results in the average adjustment falling to just 8 basis points, or 2 basis points per annum on a smoothed basis over the following access arrangement. For that series of data, the maximum adjustment would have been 16 basis points per annum.

670 DBP also appears to believe that the Guiderails would somehow lead to 'loss' (Dampier Bunbury Pipeline, *Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 7). This misunderstands the NPV neutral nature of any subsequent true up. The effect of the Guiderails is to simply clip extreme movements in the DRP, and allow their recovery in adjacent periods. There is no loss involved. There should also be no 'clawback' (Dampier Bunbury Pipeline, *Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 13) – if rates drop in one access arrangement, revenue *may* be lower in the next, all other things equal, but there is no 'clawback' of previous revenue.

671 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 210.

overs. A similar outcome would occur with the 'true up' arrangement, although any unders and overs would be attenuated given the more frequent updates (annual in this case, as opposed to every five years with the previous approach), the small amount resulting from the net 'true up', and the present value approach which ensures that neither service provider nor consumers are better or worse off.

1506. The Authority also considers that the principle effect of the true up is smoothing of tariffs. The Authority considers that consumers have expressed a preference for this outcome. Consumers did not appear to be concerned that this would result in inequities between consumers.

1507. In addition, the Authority notes that the hybrid trailing average approach results in a transfer of interest rate risk from the service provider to consumers; at times, the trailing average will be above the prevailing rate, and at others, below it. The outcome is smoothing. This sets up a similar disparity for consumers over time as with the 'true up'.

1508. For these reasons, the Authority considers that any cross subsidy effects are second order issues, and should not detract from the main considerations of the merits of the two approaches.

1509. ATCO also contends that the 'true up' undermines incentives for efficiency of investment.[672]

1510. The Authority does not accept this is the case for the service provider. The rational service provider would act according to the published annual rate, as it is that rate which would apply in present value terms.

1511. The Authority does accept that efficient signals are attenuated for upstream and downstream users. While not an issue at the start of the regulatory period (as the DRP is 'on the day'), the signal will become attenuated as the regulatory period progresses and as the DRP fluctuates away from the initial rate. However, there is some evidence that the efficiency of signals under the Authority's approach is no worse, but in fact better, than the hybrid trailing average approaches (see paragraph 1426 above).

1512. Given that network costs are generally only a small proportion of upstream and downstream users' costs, the Authority considers this efficiency effect second order to the efficiency signals for the service provider itself. The Authority therefore considers that the true up arrangement in the Draft Decision approach maintains the efficiency signal for the service provider's new investments, while performing as well as the hybrid trailing average approaches with regard to the efficiency of decisions by upstream and downstream users.

Regulatory costs

1513. All approaches have regulatory costs. However, some approaches entail greater regulatory complexity than others, requiring more active input from the regulator and service provider.

---

672 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 211.

1514. The traditional on the day approach previously used by regulators was relatively simple to implement. It did not require an annual update, and once set, was fixed for the duration of the regulatory period.

1515. Annual updating – which is a requirement under the approaches under consideration – adds some complexity and resource intensity.

1516. Other additional analysis required at the regulatory reset – such as 'true ups' and capital expenditure 'weights' adjustment – will add further complexity again.

1517. Overall, the Authority considers that the regulatory costs involved in the Draft Decision approach and the capital expenditure weighted hybrid trailing average approaches are comparable. Therefore, the Authority does not prefer one approach over the other in the context of this element of the evaluation framework. However, the Authority considers that the simple trailing average approach involves less complexity, and therefore has less regulatory cost than the other two options.

Other costs

1518. Other approved costs relate to debt raising and hedging costs. These will be identical for all the approaches under consideration. Therefore the Authority does not prefer one approach over the other in the context of these costs.

The preferred method for estimating the return on debt

1519. The Authority has considered two broad approaches for estimating the return on debt. The two approaches are:

- the Authority's approach set out in the Draft Decision, which is a variant of the on the day approach, albeit with annual updating of the DRP; and
- the hybrid trailing average approach to estimating the DRP, with annual updating, a variant of which is proposed by ATCO.

1520. Overall, the foregoing assessment against each of the elements of the Authority's evaluation framework suggests that the two approaches to estimating the return on debt have strengths and weaknesses.

1521. Both broad approaches allow for hedging of the risk free rate at the start of the regulatory period, so are not distinguished in this regard. The approaches also are not distinguished in terms of debt raising costs, hedging costs or regulatory costs.

1522. The key differences relate to the outcomes for the DRP:

- With regard to efficiency, there is not enough data to determine the statistical properties of the DRP – whether it exhibits a random walk or is mean reverting – hence it is not possible to be definitive about prediction performance;
- However, there is some evidence from the available data that the on the day approach performs at least as well as the trailing average for the DRP for the year ahead, and may be superior;
  - The on the day approach appears to deliver a DRP that is closer to the prevailing rate over the next 12 months much of the time, thereby providing for superior signals for investment by the benchmark efficient entity when it is annually updated.

- However, trailing average approaches can be weighted for new capex, overcoming this shortcoming, albeit at the cost of some complexity. This is considered in more detail below. Given this outcome, the capex weighted trailing average is considered as a third 'alternative' hybrid trailing average option in this evaluation.
- In terms of signalling efficient use by upstream and downstream users, there is again some evidence that the on the day approach performs at least as well as, and potentially better than, the hybrid trailing average DRP, even with the true up at each regulatory reset.
- With regard to 'minimising differences', the trailing average approach to estimating the DRP can be replicated exactly by the firm, whereas the Authority's current approach cannot. Under the Authority's current approach, the firm is required to manage the ups and downs of prevailing rates, with its cost of debt sometimes exceeding the regulated return on debt, and sometimes undercutting it. On that basis, the hybrid trailing average approach is superior.
- To the extent that the trailing average may be matched by the regulated firm, it potentially may lower credit risk, and hence cost, as compared to the on the day approach. However, over time, on average, there are likely to be limited differences between the various approaches with regard to this consideration. Nevertheless, this consideration adds further support for the hybrid trailing average approach.
- Trailing average approaches can achieve the present value condition exactly at any point in time, whereas the Authority's current approach only approximates the condition, on average, over the longer term. Again, this provides support for the hybrid trailing average approaches.

1523. The Authority has weighed up these strengths and weaknesses in this Final Decision.

1524. First, the Authority placed considerable weight on the efficiency properties of the various approaches in its evaluation in the Guidelines.

1525. Contrary to that evaluation, the Authority is now satisfied that the trailing average approaches do not imply a subsidy for the regulated firm, as compared to other firms in the economy. This removes a key objection informing the Authority's previous position for the on the day approach.

1526. With regard to the efficiency of the investment incentives for the service provider, the Authority accepts that the use of capital expenditure weights removes any distinction between the two approaches. Accordingly, the Authority also considers further the alternative 'weighted' hybrid trailing average approach, with its capital expenditure weights, which maintain on the day incentives for new investment.

1527. With regard to efficiency considerations relating to signals for upstream and downstream use, the Authority considers that the evidence indicates that the two approaches are either comparable, or that the Authority's on the day approach may possibly be superior. The Authority also considers that there is little to distinguish between the two approaches with regard to signals for end users.

1528. Second, the Authority notes the emphasis in the NGR as to the desirability of minimising differences between the return on debt estimate and the return on debt cost faced by the benchmark efficient entity. The Authority considers that this provides support for the hybrid trailing average approaches.

1529. Third, the Authority also notes that the hybrid trailing average approaches meet the present value condition exactly, whereas the Authority's Draft Decision approach does not.

1530. Weighing these strengths and weaknesses, the Authority considers that the hybrid trailing average approaches may perform slightly less well on efficiency grounds, although there is not strong evidence for this.

1531. On the other hand, the hybrid trailing average approaches clearly perform better in terms of 'minimising differences' and the present value condition. The simple hybrid trailing average approach also performs best with regard to regulatory costs.

1532. Overall, weighing up the pros and cons, the Authority considers that the hybrid trailing average approaches are slightly preferable in terms of meeting the requirements of the NGL and NGR, including the allowed rate of return objective and the requirements of NGR 87 more generally. In coming to that conclusion, the Authority is mindful of the very limited evidence separating the approaches in terms of their outcomes for economic efficiency.

1533. The Authority for this Final Decision has determined to adopt a hybrid trailing average approach, annually updated, for estimating the return on debt for AA4.

Key features of the hybrid trailing average approach

1534. The annually updated hybrid trailing average approach will have a number of features that remain the same as the approach set out in the Authority's Draft Decision. An estimate of the return on debt based on a hybrid trailing average will:

- be comprised of the sum of a debt risk premium and a base risk free rate, combined with a margin for administrative and hedging costs:

  Return on Debt = Risk Free Rate + Debt Risk Premium + Debt raising costs + Hedging costs

- estimate the risk free rate once, based on an averaging period at the start of the regulatory period (implying the 'on the day' approach for the risk free rate);
- adopt a 10 year term for the DRP – following Lally's recommendations with regard to achieving the present value principle (or NPV=0 condition), estimate the DRP consistent with the average term at issuance, which the Authority in the Draft Decision determined was 10 years;
- continue to annually update the estimate of the DRP, just prior to the start of each regulatory year, but now based on the updated hybrid trailing average estimate of the DRP;
  - the annually updated hybrid trailing average will feed through into each annual tariff variation;
  - such that the 'true up' mechanism for the DRP included in the Draft Decision – which was to occur at each regulatory reset – is no longer required.

1535. Having determined to adopt the hybrid trailing average approach for this Final Decision, the remaining key details of the approach are now considered:

- the averaging periods for the DRP estimates;

- the method for estimating the base rate and the resulting point estimate for this Final Decision;
- the term of the DRP;
- the number of years in the trailing average for the DRP;
- the method for weighting for the trailing average;
- the need for a transition;
- the credit rating for the benchmark efficient entity;
- the method for estimating the DRP and the resulting point estimate for this Final Decision;
- the method for estimating the other debt raising and hedging costs and the resulting point estimates for this Final Decision;
- the method for annually updating the return on debt in tariffs, so as to account for the annual update of the DRP component.

The averaging period of the DRP estimates

1536. The averaging period for the risk free rate estimate for the base on the return on debt is the 20 days ending 2 April 2015 (see paragraph 1018 above). This averaging period for the risk free rate applies for the whole of the AA4 regulatory period.

1537. However, with annual updating of the DRP trailing average, it is necessary to adopt a different approach to the averaging period for the DRP. The annual update process requires additional averaging periods for the forward looking estimates of the DRP for 2016, 2017, 2018 and 2019.

1538. First, the Authority has developed a forward looking estimate for the DRP – for the period in 2015 that falls after 2 April 2015 – that is estimated over the 20 day averaging period ending 2 April 2015. Prior to that date, the Authority will use RBA monthly data in the trailing average DRP estimates.

1539. For the DRP estimates for 2016, 2017, 2018 and 2019, the averaging period for the forward looking DRP should be based on a reasonably short period that is as close as practicable to the Final Decision.

1540. ATCO's consultant CEG considers that the service provider should be able to elect any time in a period up to 12 months prior to the cut-off date for the averaging period:[673]

> Prospectively, it may be that a business knows that it expects to raise debt in a particular month, or set of months, of the year. In my view, the business should have the flexibility to nominate this period in advance to the regulator and the DRP measured in that specific period should form part of the trailing average DRP rather than the DRP measured across all 12 months.

1541. However, the Authority does not accept such a long period, given the evidence that the on the day estimate of the DRP likely has better prediction properties for the near future than for subsequent periods further into the future. That points to adopting a

[673] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 94.

reasonably short averaging period close to the period in which it applies, while still allowing sufficient flexibility to conduct debt operations without moving the market. The period also needs to give sufficient time for the Authority to consider and approve the annually updated tariffs prior to their subsequent application date on 1 January.

1542. For those reasons, the Authority considers that choosing the averaging period in the window between two months and six months prior to the regulatory period is preferred. The Authority therefore will require that the nominated averaging period occur in the period 1 July to 31 October in each year, which is reasonably close to the following 1 January update. Hence the next averaging period would be in the window 1 July 2015 to 31 October 2015, providing the updated DRP for inclusion in the 1 January 2016 tariff variation.

1543. The Authority considers that adopting a consistent length for the averaging period – therefore of the same length as that used for the risk free rate – has clear advantages for internal consistency. This will be important when the averaging period for the two estimates coincide, for example when setting the rate of return prior to the next access arrangement. ATCO nominated a length of 20 consecutive business days for its 2 April 2015 averaging period. The Authority therefore will require ATCO to nominate 20 consecutive business days for the future averaging periods.

1544. The averaging periods should be nominated in advance, with the dates then remaining confidential. This is to ensure that the resulting estimates are not biased by opportunistic behaviour. The Authority will require ATCO to nominate the averaging periods for 2016 to 2019 as soon as practicable around the time of release of this Final Decision. The Authority does not require that the nominated 20 business day averaging period for each of the 4 years be identical periods, only that they occur in the period 1 July to 31 October.

1545. In summary, averaging periods are required for each year of the regulatory period, in order to facilitate the annual update of the DRP for the tariff variations to occur on 1 January in 2016, 2017, 2018 and 2019. The Authority requires ATCO to nominate all four averaging periods, consistent with the following averaging period criteria, as soon as possible. Each of the four averaging periods;

- is required to be 20 consecutive business days;
- needs to fall in the period between 1 July and 31 October – in the year prior to the year which the resulting forward looking estimate of the DRP first contributes to the hybrid trailing average estimate of the return on debt;
- does not need to be over the same dates as that in other years.

The method for estimating the base rate and the resulting point estimate

1546. In the Draft Decision, the Authority used Commonwealth Government Securities (**CGS**) with a 5 year term as the proxy for the risk free rate.

1547. ATCO however consider that the Authority has, as a result, failed to estimate the return on debt correctly:[674]

> However, as demonstrated by CEG, the ERA has failed to estimate the costs associated with the efficient debt management strategy. This is because the ERA, while assuming

[674] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 207.

> that a benchmark efficient strategy is to enter into swaps, does not compensate for these swap costs in the cost of debt. This is because the ERA has substituted yields on CGS for swap rates. The ERA does not explain or provide any evidence as to why this departure from the efficient debt management strategy is necessary or how it could reflect an estimate of the costs of the benchmark efficient entity with a similar degree of risk to AGA. The substitution of CGS yields in the place of swap rates will lead to significant under or over estimation of costs.

1548. ATCO further submits that:[675]

> …as the cost of debt estimate can be observed directly, it is not necessary to estimate the risk free rate component of debt. There is no requirement in the NGR for the cost of debt to be estimated in this way.[676] Therefore AGA proposes to base its estimate of the cost of debt on the DRP combined with a swap contract overlay (the hybrid approach). Consistent with the ERA's Draft Decision, AGA has also incorporated a margin to account for administrative and hedging costs.

1549. Interest rate swaps are derivative contracts, which typically exchange – or swap – fixed-rate interest payments for floating-rate interest payments. They provide a means to hedge and manage risk. Investment and commercial banks with strong credit ratings are swap market-makers.

1550. A swap has two 'legs', one floating and one fixed. The floating rate is generally referenced to either the Bank Bill Swap Rate (**BBSW**) or the Bank Bill Bid Rate (**BBSY**).[677] There is usually a difference or spread between the rate on CGS and that of swaps (for example, the 5 year swap spread to CGS is shown in Figure 14). The difference reflects the higher risk associated with the counterparty involved in a floating swap transaction, for a particular credit rating, as compared to the lower risk of the government-backed CGS.

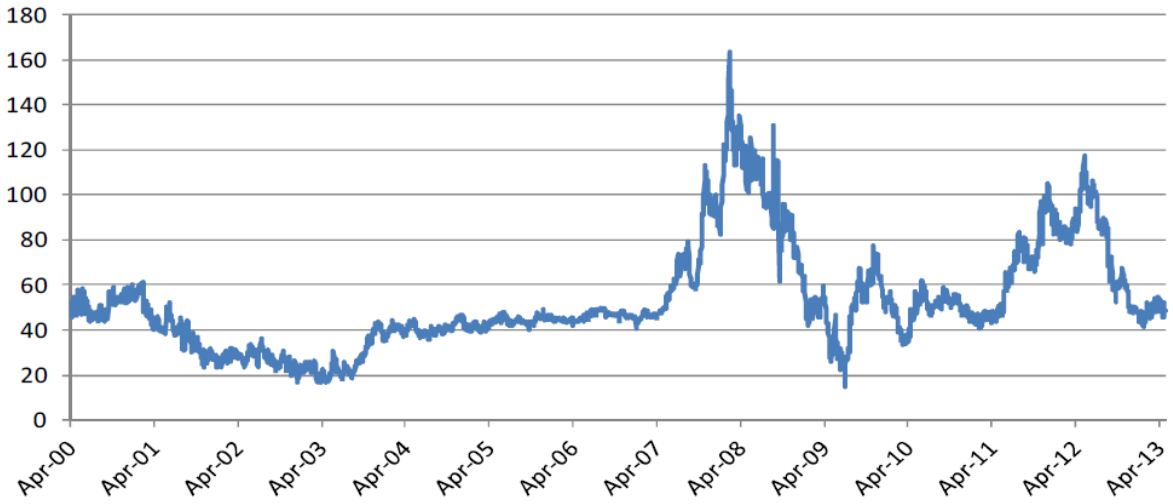
---

675 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 202.

676 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, section 6.1.

677 BBSW is the average mid rate for Australian Dollar bills of exchange having various tenors which appear on the Reuters Screen BBSW Page at approximately 10.10am Sydney time on the relevant Payment Date. BBSY is the Australian Bank Bill Swap Bid Rate, being the average bid rate for Australian Dollar bills of exchange having various tenors which appear on the Reuters Screen BBSY Page at approximately 10.10am Sydney time on the relevant Payment Date (Westpac, *Interest Rate Swap*, accessed 17 March 2015, pp. 6 and 15).

Figure 14 5 year swap spread 2000-2013



Source Chairmont Consulting, *Comparative Hedging Analysis*, 12 June 2013, p. 17.

1551. The Authority considered this issue in the Guidelines:[678]

> As set out by Chairmont Consulting in its June 2013 report to the Authority, the difference between a CGS risk free rate and a swap rate of similar term is called the spread of swap (**SS**). However, it should not matter which rate is used for determining the overall return on debt. If debt risk premiums are estimated consistent with the chosen base – whether that base be the CGS risk free rate or BBSW – there should be no difference in the resulting build up of the overall return on debt. The two approaches just represent 'two different ways of splitting up the total interest rate', with:[679]

$$Yield = R_F + SS + DRP_s \quad (15)$$

Where

R_F is the CGS risk free rate;

SS is the spread of swaps to the CGS rate; and

DRP_s is the debt risk premium to the underlying swaps rate base.

1552. The Authority considered a move to using swap rates for the risk free rate when estimating the return on debt at the time of the Guidelines. Such an approach would align with typical hedging practices. However, the Authority had concerns that available IRS market data on swap rates for longer maturities – such as beyond 6 months – are less reliable than short term swaps rate.

678 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 83.

679 Chairmont Consulting, *Comparative Hedging Analysis*, www.erawa.com.au, 12 June 2013, p. 14.

1553. The Authority noted that using observed market transactions of swap rates will result in estimates of the risk free rate that are biased upward. This is a consequence of the possible counter-party credit risk present in IRS, and the implicit premium paid by those hedging when entering into a swap.[680] This approach also relies on the assumption that longer maturity swap markets are sufficiently liquid.

1554. Therefore, the Authority considered that it was more appropriate to retain the use of CGS as the proxy for the risk free rate, as the longer dated rates may be more robustly estimated from CGS data. The Authority noted that such an approach would ensure that firms have 'reasonable opportunity' to recover their cost of debt.

1555. The Authority considered that firms base their hedging on the swap rates and that the risk-free rate is generally lower than the relevant swap rate. On this basis, the Authority was of the view that using a risk-free rate as a base rate would allow regulated businesses to hedge a small part of the Authority's estimate of the DRP, together with the risk-free rate.[681]

1556. The Authority recognised this issue in the Draft Decision, when it developed the 'regulated DRP'. The 'regulated DRP' differed to the spread to swap DRP by adding on the spread of swaps to the CGS.[682] The Authority therefore recognised that if it used the CGS as the base rate, then it needed to add on the relevant term spread of the CGS to the swaps rate, to ensure that the overall base rate was consistent with the data.

1557. GGT in its submission on the Discussion Paper expressed a preference for retaining the CGS yield as the base, in preference to swaps, on the basis that they are easily accessed on the RBA website.[683]

1558. The Authority however is now of the view that – as it is moving to the hybrid trailing average approach – the benefits associated with using CGS are less important, given that the benchmark efficient entity may exactly replicate a hybrid trailing average based on the swaps rate.

1559. Therefore, for the purposes of estimating the return on debt, the Authority will use the 5 year swap mid-rate, as published on Bloomberg (Last Price), over the 20 days of the relevant averaging period for each regulatory year. The Authority considers that this will simplify the understanding of the estimate, but remain entirely consistent with the underlying CGS rate that is used more broadly for this decision. The difference will be the spread between the two.

---

680 Hull J.C (2009), *Options, Futures and other Derivatives*, Seventh Edition, Pearson Prentice Hall, p. 169.

681 This arises because the debt risk premium estimated by the Authority, against a CGS base, will be larger than the debt risk premium over and above the swap rate. Then, to the extent that firms use the swaps market to hedge movements in the base, some of the Authority's estimate of the debt risk premium will also be hedged. The additional amount hedged will be the spread of swaps.

682 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 201.

683 Goldfields Gas Transmission, *GGT submission on ERA return on debt discussion paper*, 25 March 2015, p. 4.

The term of the DRP

1560. The Authority in the Draft Decision accepted a 10 year term for its estimate of the DRP, following clarifying advice from Lally, and evidence that the average term at issuance of debt by the benchmark efficient entity is 10 years.[684]

1561. ATCO's consultant suggests that it is not clear why the Authority changed in this regard, but then states:[685]

> This [Lally] logic is consistent with the logic that I have previously set out. Namely, that if regulated businesses are observed to borrow at a term of 10 years then this should be presumed to be the efficient practice and a 10 year term at issuance should be incorporated into the benchmark efficient debt management practice to be costed.

1562. On this basis, the Authority considers that ATCO is not taking issue with the 10 year term for the DRP. The Authority notes CEG's point in this context that by implementing a trailing average approach, the NPV=0 condition is met.[686]

The credit rating for the benchmark efficient entity

1563. The Guidelines and the Draft Decision both proposed a credit rating in the BBB/BBB/BBB+ band for the benchmark efficient entity.

1564. ATCO has accepted this rating for the purposes of estimating the return on debt.[687] Therefore, the BBB/BBB/BBB+ band will be retained for this Final Decision.

The method for developing the estimator of the DRP

1565. The Authority evaluated two approaches in the Draft Decision for estimating the 10 year DRP:

- the RBA credit spread estimates, as proposed by ATCO; and
- the Authority's revised bond yield approach, which was augmented to allow estimation of a yield curve.

---

684 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 189.

685 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 56.

686 In this context, CEG take issue with the Authority's position in the Draft Decision that the emergence of a liquid Credit Default Swap market could require a review of the term of the DRP. CEG suggest that the CDS market would not provide an acceptable avenue for the firm to adjust the term of the DRP in a cost effective way (ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 56).

687 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 213.

The RBA's corporate credit spread

1566. The Authority in the Draft Decision noted the availability of the RBA's estimates of corporate credit spreads, at the targeted tenor of 10 years, for the A-rated and BBB credit rating bands.[688]

1567. The RBA credit spreads are estimated with respect to both contemporaneous estimates of the return on Commonwealth Government Securities and Bank Bill Swap rates, at various target tenors.[689] They provide one potential approach to estimating the debt risk premium for the BBB band, at 10 year target tenor.

1568. A starting point for the RBA's estimation approach is the development of the samples of Australian corporate bonds that are used to estimate the spreads for the A and BBB credit rating bands respectively. The RBA adopts the following selection criteria to filter the corporate bonds for each of the respective benchmark samples:[690]

- a credit rating of A-rated band or BBB-rated band;
- a remaining term to maturity of 1 year or longer;
- an amount at issuance of A$1 million or greater;
- inclusion of bonds denominated both in Australian dollars and foreign currencies; including US dollars and Euros;
- inclusion of bullet bonds and bonds with embedded options, such as callable bonds; and
- all bonds identified by Bloomberg that were outstanding after 1 January 1990 and were issued by non-financial corporates (**NFCs**) incorporated in Australia.[691]

1569. Once the benchmark sample is developed, the RBA estimates the aggregate credit spreads for A-rated and BBB-rated Australian NFCs given the desired target tenor, based on the weighted average of the Australian dollar equivalent credit spreads over the swap rate. The method is applied to the cross-section of bonds in the sample that have the desired credit rating.

1570. The RBA estimates are determined by the Gaussian Kernel method. This approach assigns a weight to every observation in the bond sample – informed by the distance of the observation's residual maturity from the target tenor – according to a Gaussian (normal) distribution centred at the target tenor.[692] The RBA notes that this method recognises that the observed spreads on bonds with residual maturities close to the

---

688 Reserve Bank of Australia, Interest rates: aggregate measures of Australian corporate bond spreads and yields, Table F3, www.rba.gov.au/statistics/tables/index.html.

689 Reserve Bank of Australia, *'New Measures of Australian Corporate Credit Spreads'*, *Bulletin*, December quarter 2013.

690 Reserve Bank of Australia, *'New Measures of Australian Corporate Credit Spreads'*, *Bulletin*, December quarter 2013.

691 Non-financial corporations are identified based on their classification by Bloomberg in a group other than banking, commercial finance, consumer finance, financial services, life insurance, property and casualty insurance, real estate, government agencies, government development banks, governments regional or local, sovereigns, supranationals and winding-up agencies.

692 Reserve Bank of Australia, *'New Measures of Australian Corporate Credit Spreads'*, *Bulletin*, December quarter 2013, p. 20.

target tenor contain more information about the underlying spread at that tenor than spreads on bonds with residual maturities further away. The RBA also argues that:[693]

> The advantage of the Gaussian Kernel over parametric methods that have been popularised in the literature on the estimation of government yield curves, is its simplicity. Also, it does not impose a particular functional form on the credit spread curve but allows the observed data to determine its shape.[694]

1571. Formally, the Gaussian Kernel average credit spread estimator $S(T)$ at target tenor T (say, 5 years) for a given broad rating (say, BBB-rated bonds) and date is given by (16):

$$S(T) = \sum_{i=1}^{N} w_i(T;\sigma) \times S_i \qquad (16)$$

Where

$w_i(T;\sigma)$ is the weight for the target tenor T of the i^{th} bond in the sub-sample of bonds with the given broad rating; and

S_i is the observed spread on the i^{th} bond in the sub-sample of N bonds with the given broad rating.

σ (sigma), which is measured in years, controls the weight assigned to the spread of each observation based on the distance between that bond's residual maturity and the target tenor. Sigma is the standard deviation of the normal distribution used to assign the weights. It determines the effective width of the window of residual maturities used in the estimator, with a larger effective window producing smoother estimates.

693 Reserve Bank of Australia, '*New Measures of Australian Corporate Credit Spreads*', *Bulletin*, December quarter 2013, p. 20.

694 A number of estimation methods were investigated. These methods produced very similar estimates of credit spreads across tenors and broad credit ratings. These methods included a range of parametric models estimated by least squares regressions applied to the cross-section in each period. In particular, the Nelson and Siegel (1987) method was examined in detail owing to its wide use in practice for estimating government yield curves (BIS 2005); this method has also been adapted for the estimation of corporate bond yield and spread curves (Xiao 2010). However, the RBA notes that in its sample these models displayed spurious statistical properties, producing very high model fit but largely statistically insignificant coefficients. Other studies have also found evidence of possible over-fitting of the data using parametric methods, particularly in the case of the Nelson and Siegel model.

1572. The weighting function is as follows in (17).

$$w_i(T;\sigma) = \frac{K(T_i - T;\sigma) \times F_i}{\sum_{j=1}^{N} K(T_j - T;\sigma) \times F_j} \quad (17)$$

Where

$K(T;\sigma)$ is the Gaussian Kernel function giving weight to the i^{th} bond based on the distance of its residual maturity from the target tenor $(|T_i - T|)$.

F_i is the face value of the i^{th} bond.

1573. The Gaussian Kernel may then be defined as below in (18).

$$K(T_i - T;\sigma) = \frac{1}{\sqrt{2\pi}\,\sigma} \exp\left[-\frac{(T_i - T)^2}{2\sigma^2}\right] \quad (18)$$

1574. The Gaussian Kernel method provides for a degree of flexibility in weighting the observations around the target tenor through the choice of the value of the smoothing parameter, σ.

1575. The RBA then selects a smoothing parameter of 1.5 years for both A-rated bonds and BBB-rated bonds.

1576. The RBA concluded that the Gaussian Kernel method produces effective weighted average tenors that are very close to each of the target tenors. The exception is the 10 year tenor, where the effective tenor is currently 8.6 years. The RBA argues that this difference reflects the dearth of issuance of bonds with tenors of 10 years or more.

1577. The Authority evaluated the estimates developed by the RBA in the Draft Decision and expressed concern that they are not the best means to deliver on the allowed rate of return objective.

1578. First, the Authority was of the view that there is a need for consistency in the term estimates (that is, the estimates for the target tenors). The Authority notes that the RBA approach does not necessarily achieve this outcome, particularly at the 10 year target tenor. As noted above, the RBA method produces an estimate that is 8.6 years. The Authority recognises that methods are available to adjust the target tenor, which while less than ideal, are able to circumvent this problem.

1579. Second, the Authority noted that the RBA estimates are only available for the BBB and A bands. However, Australian economic regulators, including the Authority, have adopted various other combinations of credit ratings for their regulatory decisions. The Authority considers it should not be constrained in its credit rating evaluation by a limited set of estimates of the related debt risk premia, as this may not be consistent with the requirements of the NGR, or the allowed rate of return. The Authority does

not consider that ATCO's consultant CEG's view – that the Authority uses the same bond sample as the RBA – is relevant to this consideration.[695] If the Authority determined to use a different credit rating it would use a different bond sample (as indeed it does for its rail decisions). The Authority considers that this flexibility is important.

1580. Third, the RBA estimates are reported as the month-end estimates of the debt risk premium using relevant swap rates or Commonwealth Government Security (**CGS**) rates. The resulting estimates are less than ideal because Australian regulatory practice is to adopt an average over a period between 20 or 40 trading days, so as to avoid significant fluctuation of the estimates on any particular day. The Authority recognises that interpolation may be used to approximate daily rates, but considers that its own estimation will not require approximation, which has statistical advantages (see paragraph 1588 below).

1581. On this basis, the Authority remains of the view that it is more appropriate to develop its own yield estimates. To this end, the Authority revised its bond yield approach with two additions: (i) the benchmark sample was extended to recognise the importance of Australian bonds denominated in foreign currencies; and (ii) various curve fitting techniques are adopted to allow the estimation of the debt risk premium at various tenors.

Revised bond yield approach is not the best available data

1582. ATCO consider that the data for estimating the DRP should be based on that reported by the Reserve Bank of Australia (**RBA**), as it considers that the 'methodology behind the RBA's estimates is transparent, well documented and repeatable' as well as being 'robust, relevant and the best source of data to use for estimating the cost of debt'.[696]

1583. ATCO submits:[697]

> For the reasons set out by CEG, AGA submits that the ERA's extended bond yield methodology will not result in a reliable estimate of the prevailing efficient cost of debt for a benchmark efficient entity. This is because the approach is not a transparent or replicable process. Further, the Bloomberg sources from which the yield on interest rate swaps and spreads to swaps data is sampled has not been specified. Due to this lack of transparency it has been impossible for CEG to replicate the ERA's DRP estimate. As demonstrated by CEG, the ERA may have made a series of errors in calculating its estimate of the debt risk premium. These errors may include:[698]
>
> - Failing to convert foreign currency issue amounts into Australian dollars to weight bonds when applying the Gaussian Kernel methodology ·
> - Failing to exclude duplicate bonds from the extended bond yield sample ·

---

695 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 65.

696 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 207.

697 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 207.

698 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, Section 5 and paragraph 228.

- Implementing a simplified version of a cross-currency swap that does not apply the conversion factor ·
- Including bonds that have a country of risk or a country of domicile as Australia when it claims that only bonds with country of risk as Australia have been included

1584. ATCO consider that as the RBA data is BBB band, there is no difference to the Authority's estimate, which is also BBB band.[699] But, as noted above, this point does not respond to the Authority's position in the Draft Decision that developing its own estimates would allow it to adopt a rating other than the BBB band, such as, for example, the BBB- estimates that is required for its rail WACC decisions. The Authority remains of the view that this is an important advantage, in that does not constrain its estimate of the credit rating in the future, based on changing benchmark sample results.[700]

1585. Competition Economics Group (**CEG**) submitted that it could not replicate the Authority's spread to swap data.[701] The Authority has addressed this issue with the assistance of Bloomberg LP who have developed tools that allow for the retrospective conversion of foreign currency denominated bond yields into hedged Australian dollar equivalents. The approach uses asset swap spread or 'ASW Spread' data from Bloomberg. The specific details of this methodology are outlined in Appendix 10. The approach can be easily implemented by anyone that has access to a Bloomberg terminal even with minimal technical knowledge. In light of this development the Authority considers that CEG's contentions with respect to transparency in sourcing the data and thus replicability have been adequately addressed.[702]

1586. A further advantage of the revised bond yield approach is the ability to average the three different estimation methods (Gaussian Kernel, Nelson Siegel, and Nelson Siegel Svennson), which adds to the robustness of the estimate. The yield curves are not subject to the issue of the weighted effective yield being lower than 10 years from which the Gaussian Kernel estimates suffer. The Authority's use of the Gaussian Kernel estimate directly, also allows it to select a *target* tenor that results in a Gaussian Kernel weighted effective tenor of exactly 10 years.

1587. The revised bond yield approach allows for the specification of bond selection criteria for a given credit rating band. A regulator or Network Service Provider (**NSP**) employing the approach therefore has the flexibility to assess the impact of employing criteria that differ to (or are the same as) that used by the RBA. In a scenario where few bonds are available under a given set of criteria, less restrictive criteria can be specified to produce yield estimates that can serve as a robustness check.

---

699 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 208.

700 The Authority considers that ATCO's point that the Authority's estimates suffer the same shortcomings as the RBA's Gaussian Kernel is not supported in fact (ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 208\9). All of the Authority's estimates are at the actual 10 year tenor. The same cannot be said for the RBA's estimate.

701 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 70.

702 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, pp. 72-73.

1588. The Authority views the interpolation of a point estimate between two 1 day estimates to approximate 20 or 40 day averages to be less representative of yields prevailing in the averaging period in question and subject to a higher degree of statistical noise. Two observations represent a very small sample and it is entirely possible that the two observations could differ substantially to those prevailing throughout the averaging period.

1589. Additionally, the Authority considers its approach to be more transparent than using RBA corporate credit spreads because the sample of bonds underlying the bond yield approach estimates are published.

1590. The Authority is therefore not persuaded to depart from its use of the revised bond yield approach for its forward looking on-the-day estimates of the cost of debt. The Authority remains of the view established in the Draft Decision that the revised bond yield approach:

- provides flexibility in sampling bonds within a particular credit rating bands;
- directly addresses the issue of the effective tenor of the Reserve Bank of Australia (**RBA**) corporate credit spread estimates being less than 10 years; and
- is more robust to anomalous market yields by virtue of using 20 to 40 days of yield observations than using methods based on one day of observations;

Extending the benchmark sample for the bond yield approach

1591. In its bond yield approach discussion paper in December 2010, the Authority considered the trade-off between the 'market relevance' and the 'accuracy' of the approach to be adopted in estimating the proxy for the cost of debt/the debt risk premium for a benchmark sample of Australian corporate bonds.[703] The Authority considered that a bond price (or its observed yield) is determined by the markets, not by the companies or the regulators. As a result, the Authority was of the view that relying on market data will provide the best means of estimating the proxy for the cost of debt. This means that observed bond yields play a fundamental role in the method of estimation.

1592. In addition, the Authority places emphasis on market relevance. This takes account of the fact that new bond issuers consider the prevailing market conditions prior to the issuance of the bonds. In particular, issuers will consider issuing longer term bonds in a 'normal' market situation, whereas shorter term bonds may be more appropriately issued during very unstable market conditions. As a result, the observed yields of bonds currently traded in the market will reflect the nature of the prevailing market conditions prior to the issuance of the bonds.

1593. The Authority notes that firms are increasingly choosing to issue Australian bonds denominated in offshore markets and currencies.[704] As long as the majority of bond issuances of the various markets and currencies can be captured, then the associated outcomes are 'market relevant', and ideally should be included in the benchmark sample.

---

703 Economic Regulation Authority, *Measuring the debt risk premium: bond-yield approach*, 30 November 2010.

704 Reserve Bank of Australia, *'New Measures of Australian Corporate Credit Spreads'*, *Bulletin*, December quarter 2013, p. 16.

1594. The decision to issue bonds in the Australian or overseas financial markets lies with businesses. There may be a cost advantage in issuing bonds overseas taking into account all possible risks associated with the process such as exchange rate risk. Alternatively, it may be more convenient to issue longer term bonds and/or bonds with larger amounts at issuance in overseas markets given the Australian financial market is generally considered a smaller market in comparison with the US, European, and UK markets.

1595. An initial search on the Bloomberg terminal, as at 18 June 2014, indicates that Australian corporate bonds are largely denominated either in Australian dollars, US dollars (**USD**), Euros, or British pounds (**GBP**).

Table 84 Australian corporate bonds denominated in various currencies

Currency	No of bonds	Percentage	Amount (in relevant currency)	Exchange rate as at 18 June 2014	Amount (in A$)	Percentage
AUD	74	39%	20,531,775,500	1.0000	20,531,775,500	21%
CAD	2	1%	521,370,000	1.0148	513,766,259	0.52%
CHF	3	2%	492,910,000	0.8399	413,995,109	0.42%
EUR	14	7%	10,805,920,000	0.6893	15,676,657,479	15.81%
GBP	12	6%	6,196,342,000	0.5504	11,257,888,808	11.36%
JPY	2	1%	109,813,500	95.4700	1,150,241	0.0012%
NZD	3	2%	771,090,000	1.0778	715,429,579	0.72%
SGD	1	1%	217,903,000	1.1704	186,178,230	0.19%
USD	78	41%	46,539,000,000	0.9337	49,843,632,859	50.28%
Total	**189**	**100%**	**86,186,124,000**		**99,140,474,063**	**100%**

Source: ERA analysis based on data obtained from Bloomberg and the RBA (for exchange rate), June 2014

1596. The above table indicates that if only Australian corporate bonds denominated in Australian dollars are included in the benchmark sample, then only 39 per cent (in terms of number issued) and 21 per cent (in terms of value at issuance) of bonds are covered. However, when foreign currencies such as USD; Euros; and GBP are included, the benchmark sample captures relevant information relating to 93 per cent of all debt (in terms of the number of bonds issued) and 98 per cent of all debt (in terms of the amount at issuance).

1597. It is clear then that the majority of Australian corporate bonds are denominated in foreign currencies.[705] Furthermore, overseas markets have assumed greater importance for the longer end of the yield curve.

1598. In conclusion, the Authority considers that Australian corporate bonds denominated in selected foreign currencies should be included in the benchmark sample, given the changing nature of debt markets, and the clear trend to foreign issuance. Doing so will increase the sample size of the benchmark sample, which leads to a more robust estimate of the DRP.

1599. The Authority will include Australian bonds denominated in USD; Euros; and GBP in the benchmark sample under its revised bond yield approach. The Authority notes that as at August 2014, bonds denominated in AUD; USD; Euros and GBP cover the majority of debt issued by Australian corporates. Should the debt market evolve in the future and other currencies play a more significant role, the choice of currencies

[705] Reserve Bank of Australia, *'New Measures of Australian Corporate Credit Spreads'*, *Bulletin*, December quarter 2013, p. 17.

may need to change. The Authority considers that provided the bond sample covers at least 90 per cent of both the number of bonds and the amount at issuance, then its estimates are likely to be sufficiently representative of actual debt issuing practices.

1600. As a further consideration, the Authority notes that it is standard practice to exclude firms operating in the financial sector, because these firms have a different capital structure.[706] Exclusion of bonds issued by firms in the financial sector may reduce the sample size. However, given the approach to include bonds denominated in foreign currencies, this reduction in the sample size does not have an effect on the robustness of the estimates.

1601. In summary, the Authority considers that it is appropriate to include Australian corporate bonds denominated in key foreign currencies in the benchmark sample, as well as domestic issuance in Australian dollars. The Authority also considers it appropriate to exclude bonds issued by financial entities.

1602. Since the Draft Decision, the Authority has made some amendments to the revised bond yield approach criteria in light of submissions received from CEG and for practical purposes when applying the approach. These are outlined in Table 85.

Table 85 Revised Bond Yield Approach Selection Criteria

Criteria	ERA's approach
Remaining term	>= 2 years
Amount at issuance	N/A
Denominated currency	AUD, USD, EUR and GBP
Industry of issuers	Non-financial corporates only
Country of Risk	Australia
Maturity Type	Bullet, Callable and Putable
Exclude	Perpetual, inflation linked, called instruments
Consolidate	Duplicate issues

Source: ERA analysis

1603. The first four criteria were discussed in the Draft Decision.[707] The country of risk criteria ensures that yields and credit spreads estimated on the bonds issued are reflective of risks primarily linked to economic and financial market conditions in Australia. Perpetual, inflation linked and called instruments are excluded. This is because these instruments appear infrequently in sampling and require additional complexity in calculating yields that are comparable to those of the other instruments. The additional benefit of including such instruments does not justify the additional complexity of including them. Duplicate issues such as those that are reported by Bloomberg as both privately placed and publically issued are excluded to avoid double counting their yields in the sample.

---

706 The Authority notes that the RBA estimates exclude financial sector bonds.

707 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, pp.193-195.

1604. CEG submitted that the Authority's bond sample published in Appendix 4 contained bonds that reported a country of risk other than Australia.[708] These bonds are reproduced in Table 86.

Table 86 Bonds in Draft Decision Sample with Country of Risk other than Australia

No.	Bond	Country of Domicile	Country of Risk	S&P Credit Rating	Years to maturity	Currency	Amount (A$)
12	Holcim Finance Australia Pty Ltd	AU	CH	BBB	2.9	AUD	250,000,000
32	Holcim Finance Australia Pty Ltd	AU	CH	BBB	4.6	AUD	200,000,000
41	Barrick PD Australia Finance Pty Ltd	AU	CA	BBB	5.4	USD	400,000,000
99	Barrick PD Australia Finance Pty Ltd	AU	CA	BBB	25.1	USD	834,000,000

Source: Bloomberg and ERA Analysis

1605. The Authority can confirm that these bonds should have been excluded from the sample. The country of risk criteria outlined in Table 85 addresses CEG's concerns with respect to the inclusion of bonds in the sample that are domiciled in Australia.

1606. CEG also submitted concerns with respect to the exclusion of duplicate bonds from the sample.[709] The Bloomberg search function will return bonds that are listed twice, typically those issued under two different regulatory regimes. The Authority accepts CEG's submission that excluding bonds by consolidating duplicates is an appropriate step. The consolidation criteria outlined in Table 85 addresses this issue and is implemented by checking the consolidation option in the Bloomberg search function.

1607. The sample of bonds as at 2 April 2015 includes 92 instruments which are outlined in Table 133 in Appendix 6. These bonds are used for the purpose of developing the 2015-16 DRP estimate.

Techniques to estimate the debt risk premium

1608. The Authority in the Draft Decision investigated methods for the purpose of estimating the cost of debt at tenors beyond 5 years.

1609. The Authority notes that there are different curve fitting techniques that could be used for this purpose. However, the following three techniques are widely used:

- the Gaussian Kernel;
- the Nelson-Siegel methodology; and
- the Nelson-Siegel-Svennson methodology.

---

708 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 68.

709 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 68.

1610. Each of these techniques is discussed in turn below.

Gaussian Kernel

1611. This methodology was discussed in detail previously under the discussion of the RBA's approach.

1612. CEG submitted that bond issue amounts expressed in foreign currencies should be converted to Australian dollar amounts before being applied as weights in the Gaussian Kernel estimates.[710] The Authority accepts this recommendation. Consequently, where a bond is issued in a foreign currency the weighting in the Gaussian Kernel estimates now uses the principal amount converted into an Australian dollar amounts. The currency conversion uses the closing exchange rate on the date of the bond's issue.

The Nelson-Siegel methodology

1613. The Nelson-Siegel methodology assumes that the term structure of the yield curve has the parametric form shown in (19):

$$y_t(\tau) = \beta_{0t} + \beta_{1t}\frac{1-e^{-\lambda\tau}}{\lambda\tau} + \beta_{2t}\left(\frac{1-e^{-\lambda\tau}}{\lambda\tau} - e^{-\lambda\tau}\right) \quad (19)$$

Where

$\hat{y}(\tau)$ is the credit spread (debt risk premium) at time t for maturity τ ; and

$\beta_{0t}, \beta_{1t}, \beta_{2t}, \lambda$ are the parameters of the model to be estimated from the data.

1614. The Nelson-Siegel methodology uses observed data from the bond market to estimate the parameters $\beta_{0t}, \beta_{1t}, \beta_{2t}, \lambda$ by using the observed yields and maturities for bonds. With the estimated parameters $\beta_{0t}, \beta_{1t}, \beta_{2t}, \lambda$, a yield curve is produced by substituting these estimates into the above equation and plotting the resulting estimated yield $\hat{y}(\tau)$ by varying the maturity τ . $\hat{y}(\tau)$ has the interpretation of being the *estimated* yield for a benchmark bond with a maturity of τ for a given credit rating.

The Nelson-Siegel-Svennson methodology

1615. The Authority also notes CEG's submission in relation to the notation errors in the parametric form of the Nelson-Siegel-Svennson curve published in the Draft Decision. The form published in the Draft Decision was incorrect, however it was not used in the calculations used in the Authority's estimates of the cost of debt. The parametric from of the Nelson-Siegel-Svennson curve used by the Authority is that

[710] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 72.

specified in the Svennson (1994) paper referenced by CEG.[711] The correct notation for this parametric form is shown in equation (20).

$$\hat{y}_t(\tau) = \beta_{0t} + \beta_{1t}\frac{1-e^{-\tau/\lambda_1}}{\tau/\lambda_1} + \beta_{2t}\left[\frac{1-e^{-\tau/\lambda_1}}{\tau/\lambda_1} - e^{-\tau/\lambda_1}\right] + \beta_{3t}\left[\frac{1-e^{-\tau/\lambda_2}}{\tau/\lambda_2} - e^{-\tau/\lambda_2}\right] \quad (20)$$

Where

$y_t(\tau)$ is the credit spread (debt risk premium) at time t for maturity τ ; and

$\beta_{0t}, \beta_{1t}, \beta_{2t}, \beta_{3t}, \lambda_1, \lambda_2$ are the parameters of the model to be estimated from the data.

1616. The Nelson-Siegel-Svennson methodology is estimated in the same way as the Nelson-Siegel method, except uses a different parametric form.

Using the ERA's revised bond yield approach to estimate the regulated debt risk premium

1617. On the basis of the above considerations, the Authority will use its revised bond yield approach for the purpose of estimating the regulated DRP.

1618. To estimate the regulated DRP, the Authority:

- extends the benchmark sample under the bond yield approach to: (i) include Australian corporate bonds denominated in domestic currency (**AUD**) and foreign currencies including USD; Euros; and British pounds; and (ii) exclude bonds issued by financial sectors including banks, duplicates, inflation linked, called and perpetual instruments;
- converts the yields into hedged Australian Dollar equivalent yields inclusive of Australian Swap rates;
- averages AUD equivalent bond yields across the averaging period for each bond (for example, where a 20 trading day averaging period applies, each bond will have a single 20 day average yield calculated for it);
- estimates yield curves on this data – applying the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svennson techniques;
- uses the simple average of these 3 yield curve's 10 year cost of debt estimate to arrive at the market estimate of the 10 year cost of debt;[712]
- estimates the regulated debt risk premium for the purposes of estimating the regulated cost of debt.

---

711 L. Svennson, *Estimating and Interpreting Forward Interest Rates: Sweden 1992-1994*, Institute for International Economic Studies, University of Stockholm, Seminar Paper No 579, p. 6.

712 The Authority intends to adopt the average, because there is no strong evidence to suggest that one approach outperforms the others. It is likely that the average will show less variability under a range of prevailing conditions.

1619. The following sections summarise these steps in more detail.

Step 1: Determining the benchmark sample

1620. The criteria set out in the Rate of Return Guidelines to determine the benchmark sample in the Authority's bond yield approach have been revised. The following characteristics will be applied to select corporate bonds to be included in the benchmark sample:[713]

- credit rating of each bond must match that of the benchmark efficient entity, as rated by Standard & Poors;
- time to maturity of 2 years or longer;
- bonds issued where the country of risk is Australia (except by the financial sector[714]) and denominated in AUD; USD; Euros; and GBP;[715]
- inclusion of both fixed bonds[716] and floating bonds;[717]
- inclusion of both bullet and callable/ puttable redemptions;[718]
- at least 50 per cent of observations for the averaging period is required (that is, 20 yield observations over the required averaging period of 40 trading days are required);[719] and
- are not called, perpetual, a duplicate or inflation linked.

1621. CEG noted that it was not able to replicate the sample used by the Authority in the Draft Decision.[720] It found 111 instead of 104 bonds based on the search criteria in the Draft Decision indicating that the Authority omitted 7 bonds from the sample. The reconciliation is set out in Table 87.

---

713 Economic Regulation Authority, *Discussion Paper – Measuring the Debt Risk Premium: A Bond Yield Approach*, December 2010, p. 11.

714 As classified by Bloomberg Industry Classification System level 1.

715 Country of risk is based on Bloomberg's methodology using four factors listed in order of importance; management location, country of primary listing, country of revenue and reporting currency of issuer. This criteria allows for the largest sample of bonds that reflect an Australian risk premium.

716 This is a long term bond that pays a fixed rate of interest (a coupon rate) over its life.

717 This is a bond whose interest payment fluctuates in step with the market interest rates, or some other external measure. Price of floating rate bonds remains relatively stable because neither a capital gain nor capital loss occurs as market interest rates go up or down. Technically, the coupons are linked to the bank bill swap rate (it could also be linked to another index, such as LIBOR), but this is highly correlated with the RBA's cash rate. As such, as interest rates rise, the bondholders in floaters will be compensated with a higher coupon rate.

718 A callable (putable) bond includes a provision in a bond contract that give the issuer (the bondholder) the right to redeem the bonds under specified terms prior to the normal maturity date. This is in contrast to a standard bond that is not able to be redeemed prior to maturity. A callable (putable) bond therefore has a higher (lower) yield relative to a standard bond, since there is a possibility that the bond will be redeemed by the issuer (bondholder) if market interest rates fall (rise).

719 The Authority notes that there is a tendency for fewer bonds to be available on the long end of the yield curve. If circumstances arise where this criteria results in a paucity of bonds such that curve fitting is impractical the Authority may exercise judgement to determine whether exclusion of bonds based on this criteria is appropriate.

720 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 74.

Table 87 Bonds not included in the Authority's 9 September 2014 sample

Bond Name	Remaining Term to Maturity as at 9 September 2014	Currency	Amount	AUD Amount	Reason for Exclusion
New Terminal Financing Co Pty	2.03	AUD	165,000,000	165,000,000	Only one observation available 01/09/2014
Broadcast Australia Finance Pty	4.83	AUD	450,000,000	450,000,000	Cannot be found (Ticker Required)
Barrick PD Australia Finance	5.35	USD	400,000,000	436,442,990	Cannot be found (Ticker Required)
Barrick PD Australia Finance	5.35	USD	400,000,000	436,442,990	Duplicate
Sydney Airport Finance Co Pty	6.2	AUD	535,000,000	535,000,000	Inflation Linked
Sydney Airport Finance Co Pty	16.2	AUD	300,000,000	300,000,000	Inflation Linked
Barrick PD Australia Finance	25.1	USD	850,000,000	927,441,353	Cannot be found (Ticker Required)
Barrick PD Australia Finance	25.1	USD	850,000,000	927,441,353	Duplicate
Newcrest Finance Pty Ltd	27.18	USD	250,000,000	241,289,451	Cannot be found (Ticker Required)

Source: Bloomberg, CEG consulting and ERA Analysis

1622. The Authority notes that of this 111 bonds 6 cannot be found in Bloomberg. These are the 4 Barrick PD Australia finance bonds, a Broadcast Australia Finance bond and a Newcrest finance bond listed in Table 87. Of the 4 Barrick bonds 2 were duplicates reducing the list of 6 bonds that could not be found down to 4. CEG notes 4 bonds were called which the Authority deduces accounts for these 4. However, this cannot be confirmed without knowing the Bloomberg identification for these bonds which was not published by CEG.[721]

1623. The remaining 3 bonds that could be located in Bloomberg can be accounted for as follows. The Australian dollar New Terminal Financing bond only reported one observation on 1 September 2014 – no observations were reported thereafter up until 9 September 2014. As a result of the small sample the bond was excluded. The remaining two Sydney Airport Finance bonds were excluded on account of being inflation linked. The reasons for this have been discussed in paragraph 1603.

1624. The inclusion of the last criteria in paragraph 1620 above ensures the exclusion of duplicates, called, perpetual and inflation linked instruments. Employing these

[721] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 74.

criteria in the Bloomberg search function should ensure a consistent sample with that employed by the Authority.

1625. The sample of bonds as at 2 April 2015 – used for the 2015-16 estimate – includes 92 instruments which are outlined in Appendix 6.

Step 2: Conversion of yields into AUD equivalents

1626. CEG submitted that it could not find data for bond number 98; a floating rate note issued by Caltex Australia, published in Appendix 4 of the Draft Decision.[722] The Authority notes that the figure of 450 basis points reported was a mid asset swap spread that was erroneously included. Under the finalised approach for conversion of yields into Australian dollar equivalents only hedged Australian dollar equivalents yields (as opposed to spreads) are reported. The spread to an Australian dollar swap is calculated as a single estimate based on the observed cost of debt on the entire sample of bonds, as opposed to downloading individual swap spreads.

1627. CEG also submitted that the Authority's omission of the conversion factor has no basis. The Authority's finalised approach for conversion into Australian dollar equivalents does not require estimates of a conversion factor as it utilises Bloomberg Swap Manager facilities directly. The Authority believes this approach is transparent and replicable - anyone with access to a Bloomberg terminal can enable the functionality will get the same hedged Australian dollar equivalent yield for any given bond, provided they use the same date, currency, payment frequency and deal type. Further details of the approach are outlined in Appendix 5.

Step 3: Averaging yields over the averaging period

1628. Under the finalised approach for conversion of yields into Australian dollar equivalents only hedged Australian dollar equivalent yields (as opposed to spreads) are reported. The averaging period (in this case 20 days) results in 20 hedged Australian dollar equivalent yields for each bond. The days are based on Australian eastern states trading days and are counted back from and include the determination date for the DRP calculation.

1629. The observations on these days are then averaged to create one 20 day average observation for each bond. The spread to an Australian dollar swap is calculated as a single estimate based on the observed cost of debt estimated using all three techniques on the entire sample of bonds.[723]

Step 4: Apply curve fitting techniques

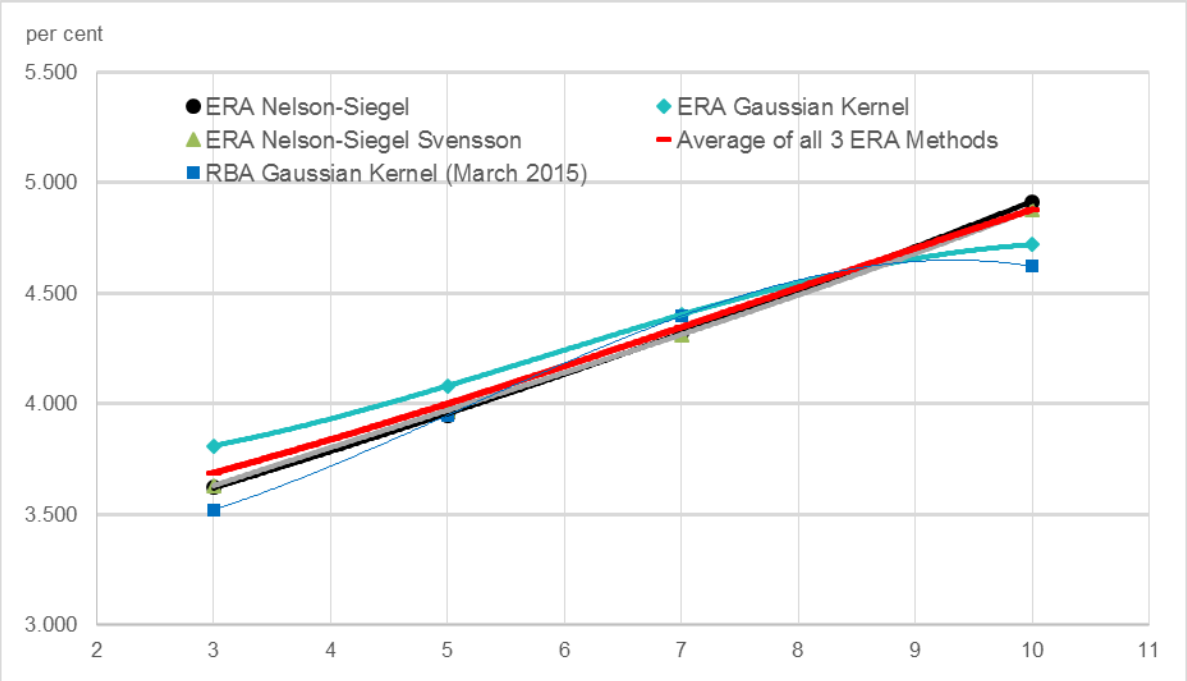
1630. The results of the three curve fitting techniques applied to the sample of bonds listed in Appendix 6 are plotted in Figure 15.

---

722 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 71.

723 As opposed to downloading individual swap spreads.

Figure 15 Estimated Effective Annual Spot Yield Curves for the Cost of Debt for the Averaging Period up to 2 April 2015



Source: Bloomberg, Reserve Bank of Australia and ERA Analysis

1631. CEG submitted that its curves fitted using the Nelson-Siegel and Nelson-Siegel-Svennson specifications produced 10 year estimates that were higher than those produced by the Authority. It also submitted that the Authority did not specify whether constraints were applied to parameters when fitting the curves.[724] The parameters and constraints for the fitted curves are reproduced in Table 88 and Table 89.

Table 88 Nelson-Siegel-Curve Fitted Parameters and Constraints

Parameter	Value	Constraints
β_{0t}	10.43797	> 0
β_{1t}	-7.13218	
β_{2t}	-6.70704	
$\beta_{0t} + \beta_{1t}$	3.30579	> 0
λ_1	0.15734	> 0

Source: ERA Analysis

[724] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, pp. 76-78.

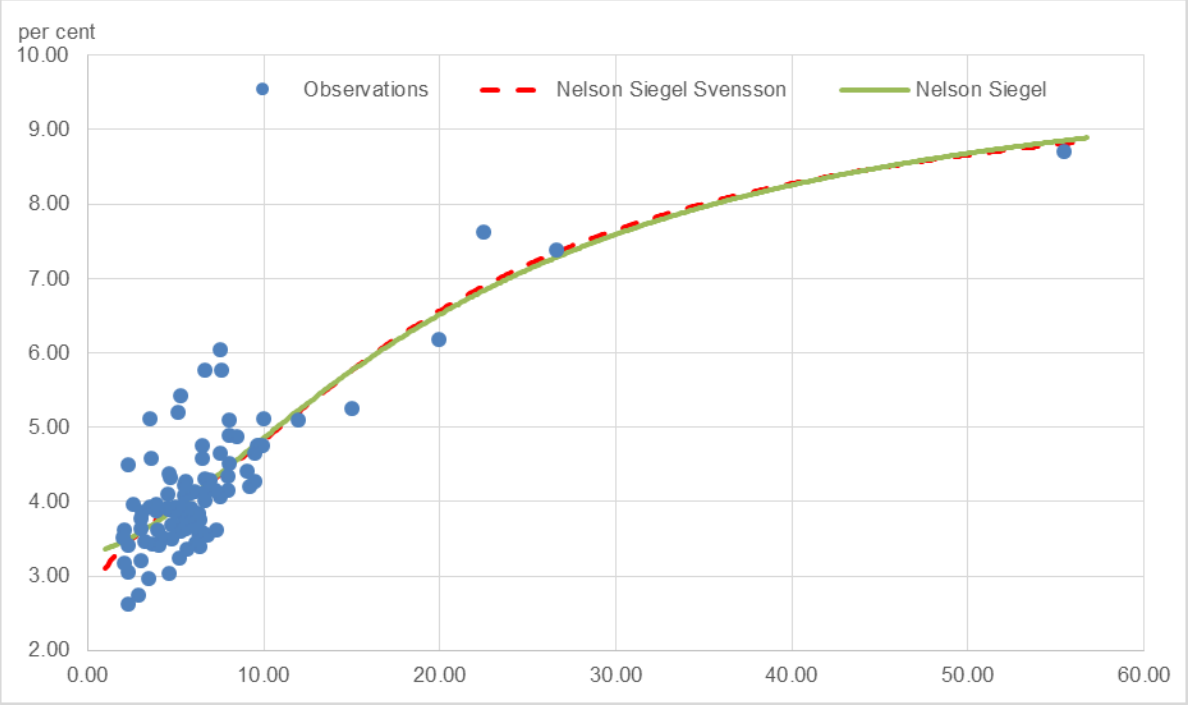
Table 89 Nelson-Siegel-Svennson Curve Fitted Parameters and Constraints

Parameter	Value	Constraints	
β_{0t}	10.20747	0 =<	=< 15
β_{1t}	-7.53168	-15 =<	=< 30
β_{2t}	2.94275	-30 =<	=< 30
β_{3t}	-14.29823	-30 =<	=< 30
λ_1	2.50000	0 =<	=< 2.5
λ_2	4.61199	2.5 =<	=< 5.5

Source: ERA Analysis

1632. A graphical representation of the curves and the data points they were fitted on is shown in Figure 16.

Figure 16 Fitted Nelson-Siegel and Nelson-Siegel-Svennson, Curves



Source: Bloomberg and ERA Analysis

1633. The curve in Figure 15 representing the average of all three estimates employs a different ERA 10 year Gaussian Kernel estimate to that depicted on the ERA Gaussian Kernel estimate curve. The 10 year Gaussian Kernel estimate employed in the average of all three methods has been calculated setting the target tenor such that the *effective tenor* equals 10 years. This changes the 10 year Gaussian Kernel estimate from 4.720 to 4.841 per cent; an increase of 16.1 basis points. The specific yields at each tenor for the various methods are shown in Table 90.

Table 90 Estimated effective annual spot yields at each tenor for the cost of debt as at 2 April 2015

Years	3	5	7	10
RBA Gaussian Kernel (March 2015)	**3.520**	**3.948**	**4.397**	**4.622**
ERA Gaussian Kernel	3.811	4.082	4.404	4.720
ERA Gaussian Kernel with 10 Year Weighted Tenor Correction				4.841
ERA Nelson-Siegel	3.622	3.949	4.325	4.915
ERA Nelson-Siegel Svennson	3.630	3.971	4.313	4.881
Average of all 3 ERA Methods	**3.688**	**4.001**	**4.347**	**4.879**

Source: Bloomberg, Reserve Bank of Australia and ERA Analysis

Step 5: Estimate the regulatory debt risk premium

1634. For the purposes of calculating the 10 year DRP for the period 2015 in the Final Decision the Authority will use the 10 year cost of debt estimate of 4.879 per cent based on the average of all three methods, estimated as at 2 April 2015.

1635. The 20 day average of the Australian dollar swap rate as at 2 April 2015 expressed as an annual effective yield was 2.838 per cent.[725]

1636. CEG submitted that it could not replicate the 10 year swap rates reported by the Authority in its Draft Decision.[726] In the Draft Decision the Authority reported this figure as 3.417 per cent, while CEG calculated this figure over 7 trading days to 9 September 2014 based on "ADSWAP 10 Curncy" data from Bloomberg as 3.826 per cent.[727] The Authority acknowledges that the figure of 3.417 per cent rate used in the Draft Decision was incorrectly calculated as the 40 day average of the 10 year Australian Commonwealth Government Bond Index rates. Consequently, this has been rectified to ensure that the 10 year Australian dollar swap rate is used.

1637. Subtracting the 10 year swap rate of 2.838 per cent from the 10 year cost of debt gives a spread to swap of 2.041 per cent.[728] The Authority will therefore apply a DRP

---

725 The 20 day average coupon for 'ADSWAP10 Curncy' was 2.818 per cent which is paid semi-annually.

726 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, pp. 72-73.

727 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 201.

728 Previously, the Authority's regulated DRP estimates have been expressed as a percentage that is inclusive of the interest rate swap spread over CGS or in other words the 10 year cost of debt less the 10 year CGS rate. The corresponding 10 year return on debt spread to the CGS rate as at 2 April 2015 was 2.919 per cent.

of 2.041 per cent as the spot estimate for the 2015 year for the purposes of the Final Decision.[729]

1638. The foregoing method will be used to annually update the forward looking DRP, consistent with the 'automatic formula' requirement of NGR 87(12). The automatic formula is set out at Appendix 8.

Method of applying weights

1639. The trailing average estimate of the DRP would weight the past 10 years of estimates of the annual DRP, consistent with the average term of debt issued by the benchmark efficient entity and its staggered debt portfolio.[730]

1640. The resulting 10 year trailing average is proposed to be updated annually, adding in the most recent estimate of the DRP, according to its weight, and dropping the estimate from 10 years ago. This replicates the cost of debt for the benchmark efficient entity under a strategy whereby it rolls over 10 per cent of its debt each year.

1641. The weights for a simple hybrid trailing average DRP estimate would be 10 per cent for each year's estimated of the DRP over the most recent relevant 10 years.

1642. The benchmark efficient entity could then replicate a simple 10 year trailing average by issuing one tenth of its debt each year. While a simplification of likely practice in reality, this would closely proxy the cost of debt under the observed financing strategies of benchmark efficient entities.

1643. However, the Authority also considered whether to overlay capital expenditure weights on this simple trailing average. The Authority's consideration of this additional weighting component is discussed in the section on 'Capex Weights, at paragraph 1649 below.

The simple equally weighted trailing average

1644. A first step in developing weights is to establish the formula for the equally weighted trailing average. This develops the weights to each of the DRP annual estimates for the nine past regulatory years, plus the 'current' estimate, that would contribute to the hybrid trailing average DRP estimate for each current regulatory year.

729 In the past the Authority's DRP estimates have been expressed as a percentage that is inclusive of the interest rate swap spread over CGS or in other words the 10 year cost of debt less the 10 year CGS rate. The Authority's estimated 10 year CGS rate as at 2 April 2015 was 2.145 per cent. Accordingly, the DRP expressed in this way would be 2.514 per cent.

730 Analysis in the Rate of Return Guidelines supported a term at issuance for the benchmark efficient entity of around 10 years. (Economic Regulation Authority, Appendices to the Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules, www.erawa.com.au , December 2013, p. 39).

1645. The following equation in (21) specifies the formula for estimating the simple equally weighted 10 year trailing average of the DRP to apply in any regulatory year:

$$TA\ DRP_0 = \frac{\sum_{t=0}^{-9} DRP_t}{10} \quad (21)$$

Where

$TA\ DRP_0$ is the equally weighted trailing average of the DRP to apply in the following year as the annual update of the estimate used in the current year; and

DRP_t is the DRP estimated for each of the 10 regulatory years t = *0, -1, -2…. , -9*.

1646. All years are in the same year convention as year *0*. For example, if year *0* is the next regulatory year 2016 for which the $TA\ DRP_0$ is being calculated, t = *-9* is the calendar year 2007 because 2016 is a calendar year in this Access Arrangement. Using the same logic if year *0* is regulatory year 2014-15, t = *-9* is the financial year 2005/2006.

1647. So for example, in (22) the DRP trailing average estimate for the calendar 2016 regulatory year will be:

$$\begin{aligned} TA\ DRP_{2016} = {} & 0.1 \times DRP_{2016} + 0.1 \times DRP_{2015} + 0.1 \times DRP_{2014} \\ & + 0.1 \times DRP_{2013} + 0.1 \times DRP_{2012} + 0.1 \times DRP_{2011} \\ & + 0.1 \times DRP_{2010} + 0.1 \times DRP_{2009} + 0.1 \times DRP_{2008} \\ & + 0.1 \times DRP_{2007} \end{aligned} \quad (22)$$

1648. In terms of the notation used by the Australian Energy Regulator (but in the Authority's case applying just to the DRP trailing average), the foregoing TA DRP for the 2016 calendar year may be written as follows in (23):[731]

$$\begin{aligned} {}_{2015}kd_{2016} = {} & 0.1 \times {}_{2006}R_{2007} + 0.1 \times {}_{2007}R_{2008} + 0.1 \times {}_{2008}R_{2009} \\ & + 0.1 \times {}_{2009}R_{2010} + 0.1 \times {}_{2010}R_{2011} + 0.1 \times {}_{2011}R_{2012} \\ & + 0.1 \times {}_{2012}R_{2013} + 0.1 \times {}_{2013}R_{2014} + 0.1 \times {}_{2014}R_{2015} \\ & + 0.1 \times {}_{2015}R_{2016} \end{aligned} \quad (23)$$

Capex weights

1649. Weighting the trailing average to account for new capex can ensure that the marginal cost of investment for new capex reflects the Authority's most recent forward looking

731 Australian Energy Regulator, *Draft Decision: Jemena Gas Networks (NSW) 2015-20*, November 2014, Attachment 3, p. 3-288.

estimate of the prevailing DRP. This efficiency consideration is a key concern of the Authority, given the requirements of the NGL and NGR.

1650. However, the approach adds complexity. That said, the Authority notes that QTC and DBP have demonstrated how a spreadsheet calculation relating to weights could be implemented for a Post Tax Revenue Model (**PTRM**) capex weights approach.

1651. The Discussion Paper incorporated PTRM capex weights as part of the 'alternative' hybrid trailing average option set out by the Authority. Submissions on the Discussion Paper provided mixed support for the mooted capex weights approach:

- ATCO made no comment on the capex weights;[732]
- GGT in its submission on the Discussion Paper stated that 'in advance of a draft decision on the GGP Access Arrangement revisions proposal, GGT maintains the position set out in the Supporting Information, that it is appropriate to use a simple trailing average to estimate the return on debt';[733]
- DBP on the other hand supported the capex weights approach, with caveats.[734]

1652. The Authority has further considered a potential approach for including a PTRM capex weights overlay for the ATCO Final Decision (see Appendix 7).

1653. In its evaluation of whether to accept the simple hybrid trailing average approach, the Authority has determined that there are costs and benefits associated with the capex weighting overlay.

1654. First, the Authority notes the potential benefits of capex weights in aligning the marginal cost of investment for the benchmark efficient entity with the forward looking estimate of the prevailing rate. However, in deciding to adopt the trailing average approach for this Final Decision, the Authority has recognised the difficulty of distinguishing between the on the day and the trailing average approaches with regard to prediction performance.[735] While there is some evidence for the on the day approach in the available data, it is very limited. This outcome is relevant; if the annually updated trailing average performs as well as the annually updated 'on the day' approach in predicting the forward looking DRP, then there would be no gain in adopting capex weights.

1655. Second, the Authority notes the potential for actual capex undertaken by the service provider to diverge from forecast capex. This might be in response to changing financial conditions, and therefore may be an efficient response. For example, the DRP might rise sharply for a period, causing the service provider to delay a capital expenditure program.

---

732 ATCO, *Re: Estimating the return on debt: ATCO Gas Australia's response to the ERA's Discussion Paper*, 25 March 2015, Attachment.

733 Goldfields Gas Transmission, *GGT submission on ERA return on debt discussion paper*, 25 March 2015, p. 1.

734 Dampier Bunbury Pipeline, *Estimating the Return on Debt: Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, p. 10.

735 As noted above at paragraph 1532, this recognition has led the Authority to accept the hybrid trailing average approach over the on the day approach, both annually updated.

1656. However, the capex weights method would lock in a sharply higher return on debt into the trailing average for the remainder of the regulatory period, which did not reflect actual costs.

1657. PTRM weightings also could feasibly add incentives to game the capex estimates and their timing under some circumstances. For example:

- if the DRP was expected to rise over the initial part of the access arrangement period, then there would be an incentive to shift scheduled capex to that period in the forecasts, all other things equal;
- where the expected increase in the DRP did not eventuate as expected, but instead was delayed, it could pay the service provider to defer some of the scheduled initial period capex to the end of the access arrangement, knowing that the weighting would be 'trued up' for actual capital expenditure at the next access arrangement reset (see Appendix 7).

1658. Third, the Authority notes the significant complexity involved in developing a capex weights overlay within the PTRM. It creates the need for a complex series of adjustments at each access arrangement revision, which increases the potential for error (see Appendix 7).

1659. In conclusion, the Authority has carefully considered the PTRM weights approach, given its potential ability to improve the efficiency of the incentives for new capex. On balance, however, the Authority is not convinced that limited evidence for the benefits of the capex weighted approach outweigh the clear regulatory costs in terms of the additional complexity.

1660. Therefore, the Authority has determined not to include capex weights in the DRP trailing average.

The need for a transition

1661. A transition would gradually phase in the hybrid trailing average approach. A transition consistent with the 'QTC method' would, for the DRP component:

- provide for 100 per cent weight to the prevailing estimate of the DRP in year 1;
- in year 2, provide for 90 per cent weight to the prevailing estimate of the DRP in year 1, and 10 per cent weight to the annually updated (prevailing) estimate of the DRP in year 2;
- in year 3, provide for 80 per cent weight to the prevailing estimate of the DRP in year 1, and 10 per cent weight to each of the annually updated (prevailing) estimates of the DRP in years 2 and 3 respectively;
- and so on;
- until at year 10, the trailing average is estimated with equal 10 per cent weights for each of the 10 annual updates of the DRP;
- at year 11, the year 1 estimate of the DRP drops off, and is replaced by the year 11 annual update;
- at year 12, the year 2 estimate of the DRP drops off, and is replaced by the year 12 annual update;
- and so on ad infinitum.

1662. ATCO did not propose a transition as part of its hybrid trailing average approach.

1663. In its Discussion Paper, the Authority proposed a 10 year transition period phasing in the full trailing average would:[736]

- enhance confidence in the predictability of the regulatory regime;
- facilitate data collection for implementing the trailing average, as historic data would not be required;
- remove the potential for gaming of the regulatory regime by service providers (with the specified trailing average approach established through a fixed principle and to apply for 10 years).

1664. The Authority also noted that a transition could allow firms time to adjust arrangements from the previous regulatory regime (on the day), where firms would have undertaken hedging arrangements to align the cost of debt closely to the regulated rate, consistent with the approach adopted by the AER:[737]

> As discussed in chapter seven, we consider that an efficient financing practice of the benchmark efficient entity would be to minimise the expected present value of its financing costs over the life of its assets subject to managing the associated financial risks (and subject to the regulatory regime). On this basis we have concluded that the benchmark efficient entity would have likely entered into hedging contracts to manage its interest rate risk in the current regulatory control period (that is, under the 'on the day' approach). Further, we consider that holding a (fixed rate) debt portfolio with staggered maturity dates to align its return on debt with the regulatory allowance is likely to be an efficient financing practice of the benchmark efficient entity under the trailing average portfolio approach. To achieve this the benchmark efficient entity would need to unwind its existing hedging contracts and issue new (fixed rate) debt over a transition period to gradually accumulate a portfolio that matches the trailing average regulatory return on debt allowance. Consistent with this, we consider that post transition the benchmark efficient entity is not likely to engage in an active debt management strategy using swaps.

1665. ATCO's consultant CEG submitted that adopting a transition would 'fail to compensate the benchmark efficient entity for its estimated future costs consistent with its trailing average debt risk premium (DRP) costs incurred over the last 10 years'.[738]

1666. CEG further argues that:[739,740]

- if the benchmark efficient debt management strategy in the past was the hybrid (as accepted by the AER); and
- if the ERA is proposing to adopt the hybrid as the benchmark efficient strategy in the future; then
- there is no need to transition to the hybrid – it should be implemented immediately because it simply reflects benchmark efficient costs.

---

736 Australian Energy Regulator, *Explanatory Statement Rate of Return Guideline*, December 2013, p. 122.

737 Australian Energy Regulator, *Explanatory Statement Rate of Return Guideline*, December 2013, p. 141.

738 ATCO Gas Australia, *Re: Estimating the return on debt: ATCO Gas Australia's response to the ERA's Discussion Paper*, 25 March 2015, Attachment, p. 11.

739 ATCO Gas Australia, *Re: Estimating the return on debt: ATCO Gas Australia's response to the ERA's Discussion Paper*, 25 March 2015, Attachment, p. 12.

740 DBP make similar points (Dampier Bunbury Pipeline, *Response to ERA Discussion Paper of 4 March 2015*, 25 March 2015, pp. 16-18).

1667. The Authority recognises that a key reason for a transition would be to allow firms time to unwind hedging positions in the event that, like the AER, a full trailing average was being adopted. That is, the transition would be important for the risk free rate component of the return on debt. However, with the hybrid trailing average, there is no need to transition for the risk free rate, as the same hedging strategy could continue.

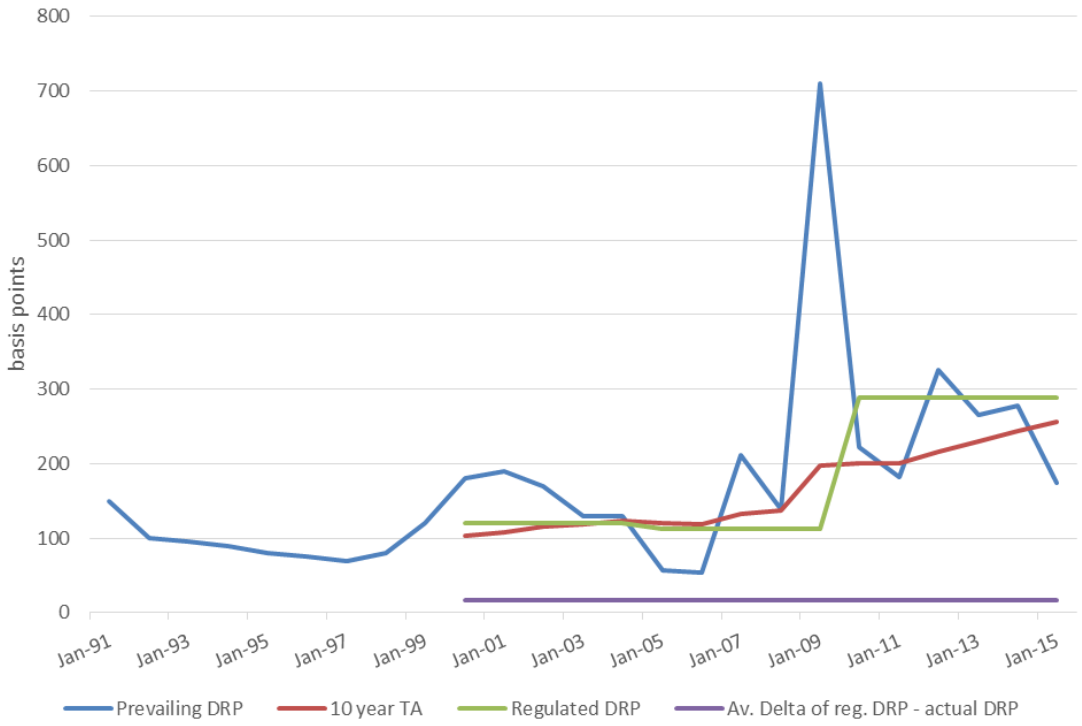
1668. With regard to the DRP, the concern would be if the previous on the day arrangement had resulted in the regulated firm receiving a regulated return on debt that significantly exceeded the actual DRP financing costs of the firm. Network users could reasonably expect to have a period of 'unders' to compensate for such a period of 'overs' – as this is the nature of the on the day approach. The concern in moving to a trailing average approach would be that users would be denied such an opportunity to recover over payments. Further, reintroducing historic estimates might have the effect of consumers overpaying twice (for example, if the spike in the DRP that occurred in late 2008 during the GFC was incorporated in the trailing average), particularly as it is possible that an efficient debt financing strategy would have been forced to raise debt on the market at that time.

1669. To examine this issue, the Authority has constructed a 10 year trailing average series for each of the ATCO GDS's access arrangement periods, and compared the resulting 10 year trailing average DRP with the actual regulated DRP (Figure 17).[741] The benchmark efficient entity's assumed actual DRP costs is based on the RBA's credit spread on 10 year BBB bonds to the 10 year spread to swap back to 2005, and then a range of indicative estimates for the period prior to that, back to 1991.[742] This is compared to the regulated DRP that was granted – on the day – for each of the three access arrangements AA1 to AA3.

[741] This assumes that the benchmark efficient entity would have hedged the risk free rate component.

[742] The averaging period is assumed to be the month of January in each year, as this is closest to the start date of each of the access arrangement period.

Figure 17 Comparison of BBB trailing average DRP and the GDS regulated rate



Source Reserve Bank of Australia, *Aggregate measures of Australian corporate bond spreads and yields: non-financial bonds*, February 2015 (accessed 18 March 2015); Macquarie Investment Management, *The changed nature of credit investment*, December 2012, p. 15; ERA analysis.

1670. The results indicate that there was possibly a small overpayment up to the start of AA4, of around 17 basis points per annum on average for the whole three periods. However, the Authority does not consider that this amount is significant, particularly given the indicative nature of the estimates. Furthermore, other factors, such as the spread of the BBSW to the risk free rate and hedging costs, have not been taken into account. Overall, the Authority concludes that this (limited) evidence does not support the occurrence of a significant under or over payment on the DRP or the return on debt.

1671. It is also clear that the benchmark efficient entity could be 'out of the money' over the AA4 period under the on the day approach, given the current low level of the on the day DRP, and the high levels of the DRP over the period 2008 to 2014, which will tend to lift the trailing average DRP over the next few years.

1672. For these reasons, the Authority is prepared to accept that it is more appropriate to move directly to the hybrid trailing average approach, without any phasing in transition.[743]

1673. In doing so, the Authority recognises that there is no change required in hedging arrangements between the previous approach and the hybrid trailing average approach, as both involve a single estimate of the risk free rate, set once at the start of the regulatory period. For the DRP, however, it is likely that the benchmark efficient

[743] This conclusion refers to an overall transition for the DRP hybrid trailing average. It does not refer to the need to transition in new forecast capex to the hybrid trailing average, which is a feature of applying capex weights. See the discussion in Appendix 7 below commencing at paragraph 21.

firm would have adopted a portfolio of debt with a ten year average term, and that the firm would have been reasonably recompensed over the past three access arrangements, without being excessively compensated. However, a transition on the DRP would likely introduce a shortfall 'under' for the regulated firm over the AA4 period, which could then not be recovered as the full transition to the trailing average DRP occurred in the AA5 period.

Estimates of the DRP prior to the current on the day estimate

1674. The Authority has determined to adopt the simple hybrid trailing average of the DRP. The trailing average requires annual estimates of the DRP for past years – back to 2005 – to combine with the Authority's forward looking annual estimates of the DRP (the first of which – as at 2 April 2015 – is set out above).

1675. The Authority endeavoured to obtain historic bond data to estimate the historic annual DRP estimates through its revised bond yield approach. However, while the Authority was able to access historic BBB credit band bond yields from Bloomberg back to 2005, the resulting bonds did not provide a large enough sample to estimate the return on debt in all years. Further, the Authority was not able to augment its bond sample for the Final Decision, given the short time available since the submissions on the Discussion Paper were received, and its subsequent decision to not require a transition period (which would have alleviated the need for historic data).[744]

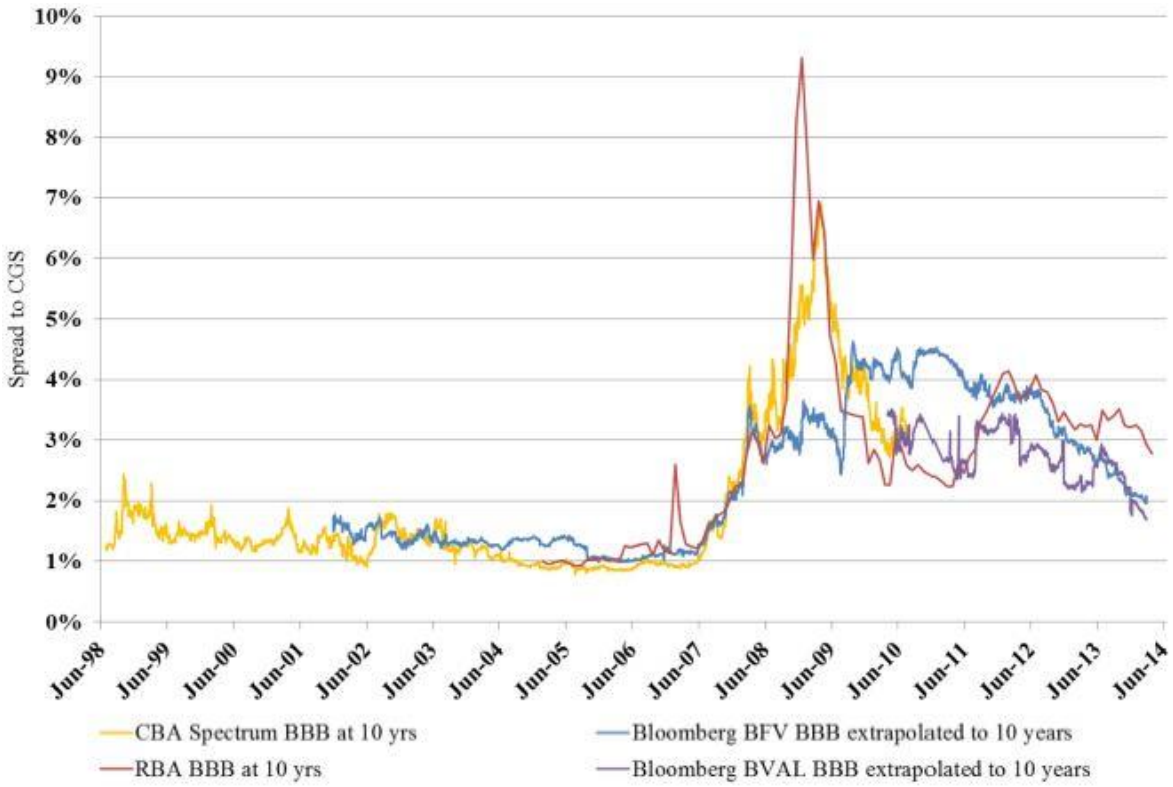
1676. The Authority therefore has determined to adopt a third party source for the DRP estimates in past years, for incorporation in the trailing average to be used in this Final Decision. A number of potential options are available which could provide historic estimates of the DRP:

- the RBA's credit spread estimates;
- Bloomberg's FVC estimates; and
- Bloomberg's BVAL estimates.

1677. The Authority notes that these sources give different estimates for the period in question (Figure 18).

[744] The RBA have been able to acquire larger sample sizes by combining UBS historic bond data with the Bloomberg historic bond data.

Figure 18 Estimates from alternative historical DRP data series (spread to CGS)



Source: Competition Economists Group, *Memorandum to ActewAGL*, 24 May 2014, p. 5.

1678. The Bloomberg BVAL data does not go back past 2010 so does not provide a consistent series over the entire period. The Authority considers that it should overlook this series for this reason.

1679. It is clear from the relative performance of the two remaining series – the RBA and Bloomberg FVC series – that there is considerable variation in the estimates post June 2008, leading to uncertainty as to the best data series to adopt. An option to overcome this issue could be to average the two series. However, given the Authority's intention to use an annual average of the available data for the whole year of each of the past nine years (see below), and also to adopt a simple weighting scheme for each of those nine years (see below), there are limited differences between adopting one or the other series, or an average of the two.[745]

1680. The Bloomberg FVC also does not include foreign bonds, which raises a clear point of departure from consistency with the Authority's preferred approach. The RBA data does not suffer from this omission.

[745] This may be confirmed by simple inspection of the areas between the RBA series and the FVC series – unders tend to offset overs. CEG confirm this, noting 'that even though the RBA and Bloomberg estimates differ materially through some periods in the last 10 years these differences tend to cancel each other out – with the RBA estimates being higher in some periods and the Bloomberg estimates higher in other periods. The net difference over the period January 2005 to October 2014 is only 6 basis points – with the Bloomberg average being higher' (ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 63).

1681. A further advantage of the RBA data is the smaller extrapolation that is generally required (commonly between 1 and 2 years) as opposed to the three or more for the FVC (which only goes to tenors of 7 years in more recent times).

1682. The Authority therefore considers that adopting the RBA series is fit for purpose for estimating past DRP returns, particularly given the uncertainties, and that averaging the two series is unlikely to deliver any material improvement to the historic estimates.

1683. Over time, the historic RBA estimates will be progressively replaced in the trailing average by the Authority's own forward looking estimates.

Use of the RBA estimates

1684. The RBA data provides an available source of historic credit spreads for 10 year non-financial corporate bonds.

1685. Issues that arise in using the RBA estimates are:

- the averaging period to apply – whether to align with that adopted for the current 2015 estimate or some other averaging period;
- whether to apply capex weighting to the historic estimates; and
- the extrapolation issue – estimating the DRP to match the 10 year term assumed for this Final Decision.

1686. These issues are discussed in what follows.

Aligning with the averaging period dates

1687. ATCO's proposed revised access arrangement covers the period 1 July 2014 to 31 December 2019 (the AA4 period).

1688. The averaging period dates for the Authority's current forward looking return on debt estimate, made prior to the release of this Final Decision, were the 20 business days from 6 March to 2 April 2015. The resulting 'current' ('t=0') estimate will be included in the trailing average estimate to apply for the 2015-16 financial year.

1689. An issue arises whether the historic DRP estimates for inclusion in the hybrid trailing average should be based on the same averaging period in each of the historic years, that is for example, aligning with the 6 March to 2 April period. This would require interpolation of the RBA monthly estimates to allow a corresponding annual estimate to be made in each previous year. However, those dates may not relate to business days in past years. It may also result in changing estimates for the historic years in the trailing average, depending on whether the averaging period changes.

1690. A better alternative is to average the 12 available months of RBA data, such that the estimated DRP reflects the average DRP in whole of each past year. The Authority prefers the latter approach for the following reasons.

1691. First, the Authority in this instance is not trying to develop an estimator for the year ahead. Rather, it is trying to develop an estimate for the past, which can be actual outcomes. That points to use of the whole year average.

1692. Second, it is not clear when the benchmark efficient entity raised its capital in the past. For the future, the benchmark efficient entity could align its debt issuance with the averaging periods for issuing new debt. However, in the past, it may have issued

debt at any time of the year. Accordingly, the best estimate of the DRP relating to debt raised at an unknown point in a past year will be the annual average.

1693. ATCO's consultant CEG proposes a similar approach with regard to the historic RBA data, adopting 'a simple average of the estimates within the averaging period that falls within (or across all) of the 12 months ending 30 September in calendar year *t*'.[746]

1694. The Authority therefore intends to adopt the annual average of the DRP estimate from the RBA data. Each annual DRP estimate will be derived as the RBA 10 year BBB spread to swap, extrapolated to 10 years (see below for a summary of the method for extrapolating the RBA data), for the year which ends concurrent with the final year in the trailing average.[747]

Averaging period for the forward looking estimates of the DRP

1695. CEG proposes the following annually updated estimate of the trailing average DRP:[748]

$$TADRP_n = \frac{1}{10}\sum_{n-10}^{n-1} DRP_t \qquad (23)$$

Where

$TADRP_n$ is the trailing average DRP to be used in cost modelling allowed revenues in calendar year n;

DRP_t is the estimated DRP estimated during the averaging period specified by ATCO that fall within the 12 months ending 30 September in calendar year t, estimated as the 10 year cost of debt less the yield on 10 year interest rate swaps.

1696. Equal weights of one tenth apply to each element of the trailing average (alternatively if a weighted trailing average is adopted then weights specific to each of the 10 years would need to be computed consistent with the discussion in section 4.2.2.3).

1697. Estimates of DRP_t represent simple averages of the estimates within the averaging period that falls within (or across all) of the 12 months ending 30 September in calendar year t. If only month end values are being used (as per the RBA's current

---

746 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 95.

747 So for example, for the 2015 calendar year, the 9 historic averages to be included in the trailing average estimate would be for the 2014, 2013 and so on back to 2006 calendar years.

748 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 95.

publication) then linear interpolation can be used to estimate the daily DRPs over the period.

1698. For example, CEG proposes that, following the above annually updated DRP estimate formula, that the DRP estimate for:[749]

> 2014 will be the simple average of all DRP estimates 1 October 2003 to 30 September 2013 (which is the same as giving 10% to each 12 month period ending 30 September within the preceding 12 years)…
>
> 2016 will be:
>
> - 80% weight given to the simple average of all DRP estimates from 1 October 2005 to 30 September 2013 (now the year ending 30 September 2005 is dropped from the trailing average); plus
> - 10% weight given to the DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2013 to 30 September 2014; and
> - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2014 to 30 September 2015;

1699. However, the Authority does not agree that this represents the most efficient debt management strategy. For example, taking the 2016 estimate:

- The Authority's 20 day averaging period for 2016 will fall in the four month period 1 July to 31 October 2015. The estimate of the return on debt made during that time will apply for 2016, through its contribution to the annually updated trailing average for the DRP for 2016, which feeds into the 1 January 2016 tariff variation. The benchmark efficient entity can closely replicate that estimated DRP by issuing 10 per cent of its debt in the corresponding 20 days of its nominated averaging period.
- However, under CEG's approach, the inference is that the firm will raise its debt requirement for 2016 over the 12 month period 1 October 2014 to 30 September 2015. That is a long period, which is further removed from the 2016 period than needs be. The length of the period increases the risk that the DRP estimate will not be replicable.

1700. The Authority also does not agree with the approach for 2014. In the Authority's Post Tax Revenue Model (PTRM), the six months ended December 2014 are treated separately. The Authority considers that the most up to date RBA data for this historic period will be given by a DRP estimate that relates to 2014-15.

1701. Thereafter, the PTRM switches to calendar year 2015, and the DRP estimates can be adjusted accordingly to correspond to calendar year.

1702. An advantage of this approach is that there is sufficient data in the RBA series to develop a full 10 years of annual DRP data for the trailing average estimate, when combined with the Authority's 2 April 2015 DRP estimate, without having to revert to other data sources for monthly DRP estimates prior to 1 January 2005.

---

749 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 96.

Composition of the hybrid trailing average estimates of the DRP

1703. The Authority's has determined to adopt the simple equally weighted ten year trailing average for this Final Decision, which may be recalled has the following automatic formula (refer to paragraph 1645):

$$TA\ DRP_0 = \frac{\sum_{t=0}^{-9} DRP_t}{10} \qquad (24)$$

Where

$TA\ DRP_0$ is the equally weighted trailing average of the DRP to apply in the following year as the annual update of the estimate used in the current year; and

DRP_t is the DRP estimated for each of the 10 regulatory years $t = 0, -1, -2 \ldots, -9$.

1704. Therefore, for the 2014-15 financial year estimate of the DRP (to apply in the PTRM model for the six months 1 July 2014 to 31 December 2014) the following estimates are included in the trailing average:

- t=-9: July 2005 to June 2006 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-8: July 2006 to June 2007 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-7: July 2007 to June 2008 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-6: July 2008 to June 2009 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-5: July 2009 to June 2010 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-4: July 2010 to June 2011 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-3: July 2011 to June 2012 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-2: July 2012 to June 2013 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-1: July 2013 to June 2014 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=0: July 2014 to June 2015 : weighted average comprising 75% (interpolated daily) RBA DRP estimates for the period July 2014 to March 2015 and 25% the Authority's current 2 April 2015 DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate).

1705. The Authority's 2 March 2015 estimate contributes to the t=0 estimate in the 2014-15 DRP hybrid trailing average, for that period that falls after March 2015 (prior to that date, RBA actual data is available).

1706. The Authority considered using the 2015 trailing average estimate of the DRP for the 2014-15 year. In this context, it may be noted that in the past, when the initial tariff variation has occurred after the scheduled start date of the regulatory period, the practice has been to apply the revised WACC estimate for the whole regulatory period. So for example, in AA3, the WAGN averaging period for the estimate of the return on debt was based on a 20 day period ending 20 December 2010, but the associated return on debt was applied for the whole period of the access arrangement tariff modelling, which commenced on 1 January 2010.

1707. However, the Authority has determined that this would not be appropriate for this access arrangement, given the approach to annually update the estimate of the DRP in the return on debt.[750] That annual update approach recognises the efficient debt management strategy of the benchmark efficient entity, which involves a staggered debt portfolio. Accordingly, the Authority will back-cast the annual update to 2014-15, as well as forward. The Authority considers that the back-cast approach will minimise the differences between the return on debt estimate and the cost of debt of the benchmark efficient entity for the 2014-15 period. The back-cast therefore best meets the requirements of the NGR.

1708. For the 2015 calendar year estimate (which will apply only from 1 January 2015 to 31 December 2015, before being superseded by the 1 January 2016 update), the following estimates are included in the trailing average:

- t=-9: January to December 2006 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-8: January to December 2007 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-7: January to December 2008 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-6: January to December 2009 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-5: January to December 2010 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-4: January to December 2011 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-3: January to December 2012 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-2: January to December 2013 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-1: January to December 2014 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=0: January to December 2015 : weighted average comprising 25% (interpolated daily) RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate).

[750] The same issue does not apply for the risk free base of the return on debt estimate. Given the assumption of the benchmark efficient entity hedging the whole of its debt portfolio at the time of the averaging period, there is no further need to adjust the estimate for any regulatory year in the regulatory period.

1709. The Authority's 2 March 2015 estimate contribute to the t=0 estimate in the 2015 DRP hybrid trailing average, for that period that falls after March 2015 (prior to that date, RBA actual data is available).

1710. For the subsequent 2016 calendar year, the Authority will adopt the following estimators, incorporating the 2016 forward looking estimate of the DRP that is based on the automatic formula for the annual update (see Appendix 8 for the detail of the automatic formula):

- t=-9: January to December 2007 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-8: January to December 2008 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-7: January to December 2009 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-6: January to December 2010 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-5: January to December 2011 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-4: January to December 2012 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-3: January to December 2013 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-2: January to December 2014 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-1: January to December 2015 : weighted average comprising 25% monthly RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate);
- t=0: January to December 2016 : 100% the automatic formula (t=0) DRP estimate.

1711. The Authority's t=0 DRP estimate for calendar 2016 will be developed in similar fashion to the current 2 April 2015 estimate, the method and results for which were outlined above. The averaging period for the t=0 estimate would be the nominated 20 trading days in the four month window 1 July to 31 October 2015, as per the averaging period requirement.

1712. For 2017, the Authority will estimate the t=0 DRP estimate, based on the nominated 20 trading days in the four month window 1 July to 31 October 2016, as per the averaging period requirement. For the 2017 calendar year, the Authority will adopt the following estimators:

- t=-9: January to December 2008 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-8: January to December 2009 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-7: January to December 2010 : simple average of (interpolated daily) RBA DRP estimates for the period;

- t=-6: January to December 2011 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-5: January to December 2012 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-4: January to December 2013 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-3: January to December 2014 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-2: January to December 2015 : weighted average comprising 25% monthly RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate);
- t=-1: January to December 2016 : 100% the automatic formula (t=-1) DRP estimate;
- t=0: January to December 2017 : 100% the automatic formula (t=0) DRP estimate.

1713. For 2018, the Authority will estimate the t=0 DRP estimate, based on the nominated 20 trading days in the four month window 1 July to 31 October 2017, as per the averaging period requirement. For the 2018 calendar year, the Authority will adopt the following estimators:

- t=-9: January to December 2009 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-8: January to December 2010 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-7: January to December 2011 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-6: January to December 2012 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-5: January to December 2013 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-4: January to December 2014 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-3: January to December 2015 : weighted average comprising 25% monthly RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate);
- t=-2: January to December 2016 : 100% the automatic formula (t=-2) DRP estimate;
- t=-1: January to December 2017 : 100% the automatic formula (t=-1) DRP estimate;
- t=0: January to December 2018 : 100% the automatic formula (t=0) DRP estimate.

1714. The last annual update for the AA4 period will occur as part of the 1 January 2019 tariff variation. For 2019, the Authority will estimate the t=0 DRP estimate, based on

the nominated 20 trading days in the four month window 1 July to 31 October 2018, as per the averaging period requirement. For the 2019 calendar year, the Authority will adopt the following estimators:

- t=-9: January to December 2010 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-8: January to December 2011 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-7: January to December 2012 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-6: January to December 2013 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-5: January to December 2014 : simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-4: January to December 2015 : weighted average comprising 25% monthly RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate);
- t=-3: January to December 2016 : 100% the automatic formula (t=-3) DRP estimate;
- t=-2: January to December 2017 : 100% the automatic formula (t=-2) DRP estimate;
- t=-1: January to December 2018 : 100% the automatic formula (t=-1) DRP estimate;
- t=0: January to December 2019 : 100% the automatic formula (t=0) DRP estimate.

1715. A summary of the automatic formulas for the trailing average calculations, and the actual estimates of the DRP for 2014-15 and 2015, are set out in Appendix 8.

Method of estimating the 10 year term DRP from the RBA data

1716. The Gaussian Kernel method used by the RBA for estimating the return on debt results in the effective tenor of the DRP estimates varying between years, depending on the sample of bands and their relative weighting in the estimate. In recent times, the actual effective tenor of the estimates has been less than the specified tenor of ten years.

1717. The Authority has overcome this problem in its own estimates by targeting the effective Gaussian Kernel estimate to be a true 10 year term (see paragraph 1633 above).

1718. To be as consistent as possible, the Authority has adjusted the RBA estimates from their effective tenors to be the targeted 10 year tenor. The method follows the simple extension technique laid out by Lally.[751] It utilises the slope of the yield curve between the two observed tenors (say the effective 7 and 10 year tenor spread to swap estimates, or '7e' and '10e' tenors respectively), to linearly extrapolate the spread to swap at an exact 10 year tenor. The formula used by the Authority is analogous to that set out by Lally as follows:[752]

$$RBA(10) = RBA(10e) + Base(10) - Base(10e) + \left[\frac{DRP(10e) - DRP(7e)}{10e - 7e}\right](10 - 10e) \quad (25)$$

Where

$$RBA(10) = Base(10) + DRP(10)$$

$$DRP(10) = RBA(10e) - Base(10e) + \left[\frac{DRP(10e) - DRP(7e)}{10e - 7e}\right](10 - 10e)$$

$$DRP(10) = DRP(10e) + (10 - 10e)/(10 - 7e) \times [DRP(10e) - DRP(7e)]$$

1719. The Authority notes that this is the broad method adopted by ATCO's consultant CEG for adjusting the RBA estimates for the DRP spread to swap. However, the Authority does not agree with ATCO's use of the RBA DRP(3e) spread to swap and the term 3e – in place of the DRP(7e) spread to swap and the term 7e – in the equation above.[753] The Authority considers that the use of the 3e estimate may tend to over or underestimate the true 10 year spread, depending on the shape of the yield curve at any point in time. The use of the 7e estimate is more likely to capture the slope of the yield curve at the longer 10 year region, and therefore will be more accurate.[754]

1720. The Authority also interpolates the monthly RBA estimates to daily estimates. This is the same approach adopted by ATCO's consultant CEG in its estimates of the trailing average. The formula for achieving this step shown in (26):

---

751 M. Lally, *Implementation Issues for the Cost of Debt*, 20 November 2014, p. 38.

752 M. Lally, *Implementation Issues for the Cost of Debt*, 20 November 2014, p. 39.

753 ATCO, *Re: Update of ATCO Gas Australia return on debt and equity at the conclusion of the accepted averaging period*, 10 April 2015, Attachment (excel model calculating the updated cost of debt).

754 The Authority notes Lally's view in this context that 'The available evidence suggests that the best method is use of the RBA data for the effective tenors for both the 'seven' and 'ten' year values.' (M. Lally, *Implementation Issues for the Cost of Debt*, 20 November 2014, p. 43).

$$y_t = yield_{start} + \left(\frac{yield_{end} - yield_{start}}{Date_{end} - Date_{start}} \right) x \ (t - Date_{start}) \quad (26)$$

Where

y_t is the interpolated yield for any given date t;

$yield_{start}$ is the first available yield in any given month;

$yield_{start}$ is the last available yield in any given month;

$Date_{start}$ is the date when first yield was available;

$Date_{end}$ is the date when the last available yield is available; and

t is the date for which the yield is being interpolated.

1721. The Authority also annualises the RBA resulting annual data, as the RBA estimates may be generally interpreted as semi-annual rates. To do this, RBA basis point estimates are converted to percentage point numbers and then annualised:

Effective annual rate = 100* (1 + yield in basis points/100/200)^2 – 100

The estimate of the DRP for 2014-15 and 2015

1722. Utilising the RBA monthly data and the Authority's t=0 (2 April 2015) estimates of the DRP delivers the following results for the annual estimates of.

- The estimate of the simple trailing average DRP for 2014-15 is 2.429 per cent (Appendix 8, paragraph 84). This will contribute to the WACC applied for the period 1 July 2014 to 31 December 2014.
- The estimate of the simple trailing average DRP for calendar year 2015 is 2.502 per cent (Appendix 8, paragraph 87).

1723. More detail on the automatic formulas and contributing DRP estimates to these trailing averages are set out in Appendix 8.

Debt raising and hedging costs

1724. In the Guidelines, the Authority provided an allowance for debt raising costs of 0.125 per cent and hedging costs of 0.025 per cent. ATCO proposed these costs in its initial proposal, which the Authority accepted in the Draft Decision.

1725. In its response to the Authority's Draft Decision, ATCO noted:

> Consistent with the Draft Decision, AGA will incorporate an allowance of 0.125% for debt raising costs and a hedging allowance of 0.025% into the cost of debt estimate. This allowance acknowledges the difficulty in hedging the exposure to movements of the risk free rate and is consistent with the Guidelines.

1726. In the Discussion Paper, the Authority noted that the debt raising cost estimate of 0.125 per cent was generally accepted.

1727. With regard to hedging costs, the Discussion Paper stated:[755]

> The current spread cost of the 10 year swap is around 10 bps, half of which would be incurred by the service provider – therefore the total cost of the two swaps required at the current time could approach 2 by 5 bps, or 10 bps. Two swaps would also be required subsequent to cover the amount of any increase in debt associated with capital expenditure over the course of the regulatory period.
>
> To calculate this amount for inclusion in revenue, it would be simplest to provide a single allowance for swaps in the operating expenditure cash flows. The swaps allowance could be based on the swap spread, as outlined above, multiplied by the closing debt balance in the final year of the forecast regulatory period.

1728. In response to the Discussion Paper, ATCO's consultant CEG took issue with these statements. CEG suggests that banks will price interest rate swap contracts based on the prevailing swap bid spread plus execution spread and risk spread costs. CEG considers a hedging allowance of 23 bppa is appropriate, at the upper end of the following range, given that many issues are in foreign currency:[756]

> Based on the evidence surveyed above, swap transaction costs have been estimated to be in the order of 15.5bppa to 23bppa – consistent with the QCA's stated range of 15bppa to 20bppa. The lower/upper end of this range is based on the swap costs estimated by Evans & Peck/UBS and are themselves based on domestic/foreign debt issues.

Debt raising costs

1729. The Guidelines considered the estimate of debt raising costs of 0.125 per cent per annum in depth. The Guidelines noted that the debt raising cost estimate covered:[757]

- gross underwriting fee: including management fees, selling fees, arrangement fees and the cost of an underwriter for the debt;
- legal and road show fee: this includes fees for legal documentation and fees involved in creating and marketing a prospectus;
- company credit rating fee: a credit rating is generally required for the issue of a debt raising instruments, a company is charged annually by the credit rating agency for the services of providing a credit rating;
- issue credit rating fee: a separate credit rating is obtained for each debt issue;
- registry fee: the maintenance of the bond register; and
- paying fee: payment of a coupon and principal to the security holder on behalf of the issuer.

1730. ATCO has no issue with this estimate, so this is adopted for the purpose of this Final Decision.

Hedging costs

1731. The Authority recognises that it did not price the costs of hedging correctly in its Draft Decision.

---

755 Economic Regulation Authority, *Estimating the return on debt: Discussion paper*, 4 March 2015, p. 23.

756 ATCO Gas Australia, *Re: Estimating the return on debt: ATCO Gas Australia's response to the ERA's Discussion Paper*, 25 March 2015, Attachment, p. 9.

757 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 199.

1732. Interest rate swaps are derivative contracts, which typically exchange – or swap – fixed-rate interest payments for floating-rate interest payments. They provide a means to hedge and manage risk. Investment and commercial banks with strong credit ratings are swap market-makers.

1733. Hedging costs involved in converting from typical 10 year fixed debt to the regulated 5 year fixed rate will involve four legs:

- swapping 10 year fixed for a base floating rate at the time of issuance – paying floating and receiving 10 year fixed;
- swapping the base floating rate at the time of the regulatory reset for 5 year fixed – receiving floating and paying 5 year fixed.

1734. For each set of two legs, the following costs may be incurred:

- a credit and capital charge – relates to the risk of the counterparty, and will depend on the credit rating and the potential default loss;
- an execution charge – compensates the swap intermediary for the costs associated with transacting the swap.

1735. The benchmark efficient entity would potentially engage in four different transactions in hedging the base of its portfolio of debt:[758]

- 5-year floating to fixed AUD swaps at start of AA for full amount of debt portfolio;
- bond issuance potentially made up of three different issue types and hence requiring three different swap considerations:
- foreign currency bonds – requiring a cross-currency swap into floating AUD;
- fixed-rate AUD bonds – requiring a fixed-float AUD swap;
- floating rate AUD notes – no swap will be required.

1736. The QCA has been awarding swaps costs for swapping from 10 year fixed debt to shorter term (typically, although not always) 5 year fixed debt, since 2010, utilising estimates made by Evans & Peck. The most recent cost estimate is 13 basis points per annum (bppa) (Table 91).

[758] Chairmont Consulting, *ERA Hedging Costs in the Cost of Debt,* 13 May 2015.

Table 91 Hedging transactions costs for four legs, BBB credit rating

Estimate	10 year fixed to floating (basis points per annum)	Floating to 5 year fixed (basis points per annum)	Total (basis points per annum)
Evans & Peck[a] (12 January 2015)	8.0	5.0	13.0
UBS[b] (November 2014)			23
Jemena[c] (June 2013)			7.9 – 9.4

Source a) Evans & Peck, reported in Incenta, *WACC parameters for GAWB Price Monitoring Investigation 2015-20 – Draft Report*, February 2015, p. 32 (swapping 10 for 5; $250 m debt; BBB; to mid-rate; as at 12 January 2015);

b) UBS, reported in Transgrid, *Revised revenue proposal*, 13 January 2015, Appendix R, p. 6 (BBB+ credit rating).

c) Jemena, *Rate of Return Guidelines – Consultation Paper: Submission*, 21 June 2013, p. 22 (BBB+ credit rating).

1737. Other recent estimates include those reported by Jemena and UBS (Table 91).

- The Jemena range is based on quotes from two separate banks for BBB+ swaps for 10 year fixed to 5 year fixed.[759]
- The UBS estimate is comprised of the AUD interest rate swap credit, capital and execution costs for a BBB+ rated entity (quoted at 5 basis points) and cross-currency interest rate swap credit, capital and execution costs for a BBB+ rated entity (quoted at 18 basis points).[760]

1738. ATCO's consultant CEG, using evidence from Table 91, estimates a range for hedging costs of 15.5 to 23 bppa, based on an Evans & Peck estimate from 4 February 2013 and the UBS estimate (in Table 91):[761]

> Based on the evidence surveyed above, swap transaction costs have been estimated to be in the order of 15.5bppa to 23bppa – consistent with the QCA's stated range of 15bppa to 20bppa. The lower/upper end of this range is based on the swap costs estimated by Evans & Peck/UBS and are themselves based on domestic/foreign debt issues. To the extent that foreign issued debt is relied on then somewhere towards the upper end of this range is appropriate.

---

759 As part of its investigation of this issue, the ERA approached a local bank, which confirmed estimates similar to Jemena's, as at March 2015, for a swap of 10 year fixed for 5 year fixed debt.

760 The Authority does not include other swaps costs estimated by UBS. The tracking risk and deferral cost estimates are 'a quantification of risks associated with an inability to fully hedge to the regulatory allowance even when using swaps' (ATCO, *Re: Estimating the return on debt: ATCO Gas Australia's response to the ERA's Discussion Paper*, 25 March 2015, Attachment, p. 8.).

761 ATCO, *Re: Estimating the return on debt: ATCO Gas Australia's response to the ERA's Discussion Paper*, 25 March 2015, Attachment, p. 9.

1739. However, the Authority does not agree with this estimate. The Authority engaged Chairmont to advise on the costs of undertaking swaps. Chairmont estimates the following costs for each of the components, based on the data in Table 91 and its own enquiries:[762]

- 5-year swaps at the start of the AA. The different submissions provide a range of estimated costs, i.e. Evans and Peck (2015) 5bp; UBS <5bp; Jemena <5bp (i.e. less than half of the total 8-10bp, as a 5-year swap costs less for capital and credit charges). This suggests approximately 4bppa is appropriate. This is also supported by informal discussions held by Chairmont with two banks in late 2014.
- Cross-currency swaps. There was only one estimate provided and that was by UBS which reported 18bp. Chairmont's discussions with the banks suggest that this estimate is at the high end of costs and is likely to overstate a swap in relation to a new issuance. It is important to understand that banks tend to be more aggressive on swap pricing when linked to other business. A lower level of 10bp appears to be reasonable, so for further calculation a mid-point of 14bp is used.
- 10-year AUD fixed-floating swaps. The submissions are Evans and Peck (2015) 8bp; UBS 5bp; Jemena and ERA (implied) 5-7bp. Taking a mid-point such as 6bp appears reasonable for this component.

1740. Only a proportion of debt is raised overseas, thereby requiring overseas credit and executions costs. For example, CEG present evidence that regulated energy companies had around 65 per cent of debt issued in AUD in 2013, with the remainder in foreign currencies.[763,764] Further, CEG identifies that 24 per cent of debt amounts outstanding is already floating, typically bank loans.[765]

1741. On the basis that CEG's estimates remain valid, the Authority calculates the weighted cost of hedging, using Chairmont's estimates set out above, as the sum of:

- 5 year swap floating for fixed for the full amount of debt = 4 bppa x 100 per cent = 4.0 bppa; plus
- 10 year cross currency swaps for (100 – 65 =) 35 per cent of debt issuance = 14 bppa x 35 per cent = 4.9 bppa;
- 10-year fixed-float AUD swaps for (65 – 24=) 41 per cent of debt issuance = 6 bppa x 41 per cent = 2.5 bppa.

1742. That sum gives a total cost of hedging of 11.4 bppa (rounded to the nearest bppa).

1743. Accordingly, the Authority will allow 11.4 bppa as the costs of hedging for this final determination.

---

762 Chairmont Consulting, *ERA Hedging Costs in the Cost of Debt*, 13 May 2015.

763 Competition Economists Group, *Debt strategies of utility businesses*, June 2013, p. 23.

764 This proportion exceeds that of issuance of corporate bonds by Australian corporates, more generally (see Table 84 at p. 274, which reports that only 20 per cent of corporate bonds were issued in AUD as at June 2014).

765 Competition Economists Group, *Debt strategies of utility businesses*, June 2013, p. 22.

New issue premium

1744. ATCO made a subsequent submission during the period for submissions on ATCO's revised proposal, calling for a new issue premium to be added to the cost of debt. Based on CEG's report, ATCO argued that the new issue premium measures the difference between the price at which a network business can roll over its debt portfolio and prices from secondary markets where the debt is resold. ATCO submitted that the current estimate of the new issue premium is 0.27 per cent.[766]

1745. The Authority is not satisfied that ATCO provided any convincing evidence to support its view in relation to the new issue premium. The Authority is of the view that CEG's estimate of the new issue premium is not robust and as such, it is not appropriate to use in the estimate of the total cost of debt for ATCO in this Final Decision. The Authority's reasoning is provided below.

Theoretical considerations

1746. The Authority notes that there is no theory to guide the existence of new issue premium (or the underpricing of corporate bonds) in the literature. The price of newly issued bonds (or their yields) is a function of some key characteristics such as the issuer' credit rating; the industry; the term to maturity of the bond; the face value; the coupon rate; and the current yields on comparable investment options. The Authority is not aware of any theory which provides a reasonable explanation of underpricing of corporate bonds (i.e. higher yields at issuance on a primary market in comparison with yields of currently traded bonds with similar characteristics in a secondary market).

1747. The Authority is of the view that bonds are generally very sensitive to changes in interest rates because interest rates mainly and fundamentally determine the price of the bonds more than anything else. As such, any change in interest rates will lead to a change in the price of the bonds (or their yields) for both newly issued bonds and secondary market bonds.

1748. The Authority notes that the existence of "imperfect information" and "transaction costs" in financial markets is generally used by CEG as a theory to support the view that a new issue premium does exist. CEG argued that this literature is not inconsistent with the simple observation that there are essentially two mechanisms as alternatives or in combination by which the seller of a new issue can convince the requisite number of buyers to participate in the sale process for a new issue (of debt or equity). The first mechanism is to conduct marketing of the issue in an attempt to provide information to potential buyers that raises the price those buyers are willing to pay for the issue. The second mechanism is to lower the price of the issue in order to make the investment value of the issue attractive to the requisite number of buyers.[767]

1749. The Authority disagrees with CEG's view in relation to a theoretical framework. The Authority considers that "imperfect information" and "transaction costs" are simply two characteristics of any market which may incur costs for market participants. The Authority notes that debt raising cost of 12.5 bp has already been provided for

---

766 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22nd December 2014, p. 2.

767 Competition Economists Group, 2014, *The new issue premium*, A report prepared for Citipower, Jemena, Powercor Australia, SA Power Networks, AusNet Services and United Energy, October 2014, p. 22.

efficient benchmark entities to cover their legitimate cost of raising debts. The Authority is not satisfied that underpricing (higher yields) is consistent with an efficient practice of financing debts by an efficient benchmark entity. The Authority considers that if underpricing of newly issued corporate bonds represents a common practice of financing debts, then this practice is clearly inefficient and as a result, underpricing should not be compensated.

Empirical considerations

1750. In order to support its view that the new issue premium exists, CEG has provided a list of eight different empirical papers. A brief summary of these academic papers is presented in Table 92 below.

Table 92 Estimates of the new issue premium

Authors (Year)	Data	Key findings
Ronn and Goldberg (2013)	• A sample of 1,494 non-finance investment grade bonds newly issued from 2008 to January 2012.	• The average new issue premium is 22.5 bp.
Cai, Helwege and Warga (2007)	• 439 IPOs and 2,536 SBOs for the period from 1995 and 1999.	• IPO (37bp) and SBO (2.7 bp) • Investment grade (as a group) is not statistically significantly different to zero.
Datta, Iskandar-Datta and Patel (1997)	• Corporate straight bond initial public offerings made between January 1976 and 1988.	• Underwriters do not, on average, under-price IPOs of straight debt.
Carayannopoulos (1996)	• The pricing of new 3-, 5-, 10-, and 30-year Treasury notes and bonds which were issued during the United States Treasury's regular refunding operation.	• The mean difference at the end of the issue month is -62 bp.
Weinstein (1978)	• Random samples of 412 outstanding bonds and 179 newly issued bonds during any period from June 1962 to July 1974.	• The new issue premium for the first month after issue is 38 basis points, which is not statistically significant. • While bonds are issued at prices below equilibrium, prices reach equilibrium by the end of the month.
Lindvall (1977)	• Bonds issued by electric, gas and water companies which were rated Moody's Aa or Standard and Poors Aa, had maturities of between 25 and 35 years and were at least $10 million in size.	• A range of new issue premiums from 45.3 bp (in periods of rising yields) to -8.0 bp (in periods of falling yields).
Ederington (1974)	• A sample of 611 nonconvertible public utility issues offered through competitive bidding between January 1, 1964 and March 1, 1971.	• The average new issue premium for 1964-1961 was 30.9 basis points, with a spread from -91 to +139 bp.

Authors (Year)	Data	Key findings
Connard and Frankena (1969)	• Aa corporate bonds from 1952-1962.	• An average of 16.7 bp using Moody's series and 9 bp using Moody and Homer series. • It took two to three months, on average, for the new issue premium to be eliminated.

Source: *The Authority's* analysis.

1751. Based on the evidence presented in Table 92, the Authority notes the following: (i) all of the above studies were conducted for the US financial market; (ii) mixed evidence in relation to whether or not a new issue premium does exist; and (iii) where studies found the presence of a new issue premium, the estimates vary significantly among studies.

1752. The Authority also notes that evidence presented in Table 92 does not warrant a solid conclusion on the presence of the new issue premium for newly issued bonds even in the US financial markets. The Authority notes that some studies did confirm a presence of a new issue discount (overpricing) of newly issued bonds or failed to confirm the presence of a new issue premium.

1753. The Authority concludes that the presence of the new issue premium is not supported by any economic theory or by empirical evidence.

The CEG's study in 2014

1754. The Authority is not aware of any Australian studies in relation to the presence of the new issue premium. As such, CEG's estimate (2014) appears to be the first study of this kind for the Australian financial market. Table 93 below presents a summary of the estimates by the CEG under various scenarios.

1755. CEG considered that estimates of the new issue premium at longer measurement periods, where they are statistically significant, are likely to be more robust than estimates at shorter measurement periods. However, the Authority is not satisfied that the estimates using the period from 8 weeks to 16 weeks represent the best estimates as concluded by the CEG.

1756. Based on the CEG estimates of the new issue premium as presented in Table 93, the Authority notes the following:

- *First*, CEG's estimates vary significantly across 8 scenarios, ranging from 0 to 36 basis points.
- *Second*, once a different proxy is used to control for the general movement in interest rates, the estimates vary significantly. This view is supported by the estimates presented under Scenarios 1 and 2; and Scenarios 3 and 4. For example, a difference of 10 basis points or more when Bloomberg's fair value or swaps is adopted to control for the general movement in interest rates.
- *Third*, assuming that all estimates presented in Table 93 are robust, which is highly unlikely, then the possible range of the estimates varies between 4 basis points and 25 basis points.

Table 93 CEG (2014) estimates of the new issue premium

No.	Sample	Control for general movements in interest rates	Key findings	Mid point of the range
1	Full sample (A & BBB credit rating)	Bloomberg's Fair value	0 – 8 bp.	4 bp
2	Full sample (A & BBB credit rating)	Bloomberg's interest rate swaps	10 – 17 bp.	14 bp
3	Core sample (BBB-/BBB/BBB+ credit rating)	Bloomberg's Fair value	13 – 21 bp.	17 bp
4	Core sample (BBB-/BBB/BBB+ credit rating)	Bloomberg's interest rate swaps	16 – 36 bp.	21 bp
5	Exclusions of firms in finance and banking		1 – 16 bp	8 bp
6	Inclusions of only fixed bonds		3 – 24 bp	14 bp
7	Combination of Scenarios 6 and 7		2 – 25 bp	14 bp
8	Weighting of bonds by issue size			25 bp

Source: *The Authority's* analysis.

1757. The Authority notes that interpolation and/or extrapolation has been adopted in the CEG's analysis to ensure that a term of a particular bond matches that of the fair value or the swaps, which is used as a proxy to control for a general movement in interest rates, this process results in a significant approximation in the CEG study.

1758. On balance, the Authority is of the view that any positive new issue premium of newly issued bonds in the CEG's study may well fall within a margin of error of these estimates. This view is supported on the following key bases.

- *First*, CEG's study provides a wide range of estimates for the new issue premium and there is no clear guidance from both theoretical and empirical bases to select a superior estimate from all these available estimates.
- *Second,* a sample of bonds utilised in the CEG study may not be consistent with the benchmark sample used under the Authority's bond yield approach to determine the cost of debt. As such, the Authority is not satisfied that the CEG estimates of new issue premium is relevant for the purpose of estimating the cost of debt for a benchmark efficient entity. The Authority also notes that the AER has rejected the relevance of the CEG estimates of the new issue premium to the Bloomberg BVAL curves and RBA curves.
- *Third,* interpolation and extrapolation of the raw data will generally provide an approximation of the estimates. Unless the estimates under interpolation and extrapolation are consistently significant, the estimates may just simply be an error in this approximation.

Other issues

1759. The Authority notes that the new issue premium may be in existence in particular financial markets at a particular point in time. However, this existence does not imply that the Australian efficient benchmark industry should be compensated by incorporating a new issue premium into its allowed cost of debt. The Authority is of the view that this inclusion may only be possible if, and only if, it is proved that an efficient benchmark entity has been undercompensated in relation to its allowed cost of debt.

1760. In this Final decision, the allowed cost of debt for the 2015 regulatory year is 5.16 per cent. The Authority is of the view that the allowed cost of debt is not underestimated. As a result, a new issue premium should not be included to compensate. This view is supported on the following three bases:

- *First*, the Authority notes that the Productivity Commission was of the view that the average regulatory cost of debt is 1.25 per cent higher than the estimated costs incurred by services providers.[768]
- *Second,* the term of debt of 10 years is used in the estimate of the allowed cost of debt even though the observed term of debt of an efficient benchmark entity is generally less than 10 years. The Authority notes that the longer term debt is generally more expensive than the shorter term debts in normal market conditions.
- *Third,* under the estimates of the cost of debt from the Authority's bond yield approach; the RBA's yield curves; and Bloomberg's fair value curves, the cost of debt is estimated based on a BBB-band credit rating (including BBB-; BBB; and BBB+). The Authority notes that analysis indicates that the most relevant credit rating for Australian regulated utilities is BBB/BBB+. An inclusion of BBB- in the estimate of the allowed cost of debt (due to data limitation) already inflates the estimate. As such, the allowed cost of debt is relatively inflated.

1761. On balance, on the basis of the above assessment, the Authority is of the view that there is insufficient evidence that a new issue premium exists. The proposed new issue premium of newly issued corporate bonds, if any, is not considered to be relevant to an efficient benchmark entity. In addition, there is no robust evidence to confirm that the allowed cost of debt is underestimated. As a result, the Authority is of the view that a new issue premium should not be included in the cost of debt for regulated businesses.

The estimate of the return on debt for this Final Decision

1762. The Authority's estimate for the return on debt for the 2014-15 financial year (which is applied from 1 July 2014 to 31 December 2014) is 5.099 per cent. The estimate is the sum of:

- the on the day 5 year swap rate of 2.431 per cent;
- a hybrid trailing average debt risk premium of 2.429 per cent;
- debt issuing costs of 0.125 per cent; and
- hedging costs of 0.114 per cent.

---

[768] Productivity Commission, *Electricity network regulatory framework*, No. 62, Vol. 1, 9 April 2013, p. 207.

1763. The Authority's estimate for the return on debt for the 2015 calendar year (which is applied from 1 January 2015 to 31 December 2015) is 5.172 per cent. The estimate is the sum of:

- the on the day 5 year swap rate of 2.431 per cent;
- a hybrid trailing average debt risk premium of 2.502 per cent;
- debt issuing costs of 0.125 per cent; and
- hedging costs of 0.114 per cent.

1764. The Authority's estimate will be annually updated for the 2016 calendar year and for the subsequent years of AA4. The automatic formula for updating the estimate of the DRP – consistent with the requirements of NGR 87(12) – is set out at Appendix 8.

Rate of return

1765. The Authority's resulting estimate for the overall rate of return for the (Table 94):

- 2014-15 financial year (which is applied from 1 July 2014 to 31 December 2014) is 5.97 per cent; and
- 2015 calendar year (which is applied from 1 January 2015 to 31 December 2015) is 6.02 per cent.

1766. The Authority's estimate of the DRP will be annually updated for the 2016 calendar year and for the subsequent years of AA4. The resulting revised rate of return will be included in the relevant tariff variations.

1767. The process for implementing the annual update is as follows:

- For each annual update for 2016, 2017, 2018 and 2019, the Authority will estimate the updated DRP following the relevant annual averaging period, recalculate the rate of return, and then notify ATCO of the outcomes as soon as practicable. This will allow ATCO to check the rate of return estimate, prior to its incorporation in the proposed annual tariff variation.[769]
- Following that notification, ATCO is required to respond on any issues as soon as practicable, in order to allow the updated DRP and rate of return estimates to be finalised prior to submission by ATCO of its proposed annual tariff variation.
- In the event that there is a disagreement on the DRP annual update estimate, the Authority will work with ATCO to ensure that any misapplication of the automatic formulas in Appendix 8 of this Final Decision (as amended at 10 September 2015) are corrected in a timely manner.
- The updated annual rate of return based on the correct application of the DRP automatic update formulas is to be utilised for each annual tariff variation.

[769] Annual operating expenses have been approved to cover the regulatory costs of this step (see paragraphs 399 to 400).

Table 94 Rate of return for the Final Decision

WACC as at 02 Apr 2015	for 2014-15	for 2015
Nominal Risk Free Rate	**1.96%**	**1.96%**
Real Risk Free Rate	0.06%	0.06%
Inflation Rate	**1.90%**	**1.90%**
Debt Proportion	60%	60%
Equity Proportion	40%	40%
Debt Risk Premium (10 year trailing average)	**2.429%**	**2.502%**
5 year IRS (effective yield)	**2.431%**	**2.431%**
Return on Debt; 5 year Interest Rate Swap Spread	0.467%	0.467%
Return on Debt; Debt Issuing Cost (0.125%) + Hedging (0.114%)	0.24%	0.24%
Return on debt	**5.099%**	**5.172%**
Australian Market Risk Premium	**7.6%**	**7.6%**
Equity Beta	**0.7**	**0.7**
Corporate Tax Rate	30%	30%
Franking Credit	40%	40%
Nominal After Tax Return on Equity	**7.28%**	**7.28%**
Nominal After Tax WACC	**5.97%**	**6.02%**
Real After Tax WACC	4.00%	4.04%

Required Amendment 7

The Authority requires that the rate of return be consistent with the estimates set out in Table 94 of the Final Decision. The rate of return for 2014-15 is 5.97 per cent and for 2015 is 6.02 per cent.

The Authority requires an annual adjustment to be applied to the debt risk premium to be incorporated in each subsequent tariff update during the fourth access arrangement period. The first annual update will apply for the tariff variation for the 2016 calendar year, and should be determined based on the automatic formula set out in Appendix 8 of the Final Decision. The resulting annual adjustment to the rate of return should be incorporated in the Annual Tariff Variation.

The Authority requires that ATCO nominate, as soon as practicable after the release of this Final Decision, the averaging period for each annual update applying in 2016, 2017, 2018 and 2019. The averaging periods for each year must be a nominated 20 trading days in the window 1 July to 31 October in the year prior to the relevant tariff variation, which will allow estimation of the updated DRP for inclusion in the relevant annual tariff variation. The nominated 20 trading day averaging period for each of the four years do not need to be identical periods, only that they occur in the period 1 July to 31 October in each relevant year, and are nominated prior. The nominated averaging periods will remain confidential.

For each annual update for 2016, 2017, 2018 and 2019, the Authority will estimate the updated rate of return following the relevant annual averaging period and then notify ATCO of the outcomes as soon as practicable. Following that notice, ATCO is required to respond on any issues as soon as practicable, in order to allow the updated estimate to be finalised prior to submission by ATCO of its proposed annual tariff variation within the required timeframe.

Gamma

1768. The Authority is required by the National Gas Rules (**NGR**) to estimate the value of gamma, a parameter in the building block revenue model.

1769. The gamma parameter accounts for the reduction in the effective corporate taxation that is generated by the distribution of franking credits to investors. As a general rule, investors who are able to utilise franking credits will accept a lower required rate of return, before personal tax, on an investment that has franking credits, compared with an investment that has similar risk and no franking credits, all other things being equal.

Regulatory requirements

1770. Rule 87A of the NGR requires that the estimated cost of corporate income tax of a service provider for each regulatory year of an access arrangement period (ETC_t) is to be estimated in accordance with formula (27).

$$ETC_t = (ETI_t \times r_t)(1-\gamma) \quad (27)$$

Where

ETC_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of reference services if such an entity, rather than the service provider, operated the business of the service provider;

ETI_t is the estimated taxable income for the regulated entity;

r_t is the expected statutory income tax rate for that regulatory year as determined by the AER [Authority]; and

γ is the value of imputation credits.

1771. Rule 87A accounts for the ability of imputation credits to reduce the effective corporate tax rate for equity investors.

1772. In determining the value of imputation credits, the Authority is required to account for the National Gas Objective, the National Gas Law (including the Revenue and Pricing Principles) and the NGR.

ATCO's Proposed Revisions

1773. In the Rate of Return Guidelines, the Authority estimated gamma (γ) as the product of the distribution rate F and the estimate of the utilisation rate θ (theta), consistent with the approach set out in the Rate of Return Guidelines:[770]

$$\gamma = F \times \theta \quad (28)$$

1774. Under this Monkhouse formulation, gamma depends on the degree to which imputation credits are distributed and the degree to which investors utilise those credits that are distributed.

1775. Contributing to the estimate of gamma, the Rate of Return Guidelines adopted an estimate for the distribution rate, F , of 0.7. The 0.7 rate was based on Australian Taxation Office (**ATO**) data showing around 70 per cent of cumulative imputation credits created had been distributed.

[770] This follows the analysis by Monkhouse in relation to the impact of imputation credits on the effective tax rate of companies. See equation 2.5 in P. Monkhouse, The valuation of projects under the dividend imputation tax system, *Accounting and Finance*, 36, 1996, p. 192.

1776. For the utilisation rate, the Rate of Return Guidelines adopted a range of 0.35 to 0.55.[771] This estimated range was based on the results of dividend drop off studies.

1777. The resulting range for gamma adopted for the Rate of Return Guidelines – given by the product of distribution rate and the range for the utilisation rate – was 0.25 to 0.385.

1778. ATCO accepted the Monkhouse formula for gamma, but did not agree with the estimate of the utilisation rate. For this reason, ATCO submitted that the Authority's estimate of gamma (γ) set out in the Rate of Return Guidelines – for a range of 0.25 to 0.385 – did not produce the best estimate given the requirements of the National Gas Objective and the Revenue and Pricing Principles.

1779. Specifically, ATCO submitted that the Authority's mid-point estimate of the utilisation rate derived from Dividend Drop Off (**DDO**) studies – from within an estimated range of 0.35 to 0.55 – is not the best estimate given the available information. ATCO considered that the Authority disproportionately weighted its own DDO estimate of theta, at the expense of ATCO's consultant SFG's DDO estimates. ATCO considers that SFG demonstrates that:

- the ERA's own estimates of theta are below 0.45, and a significant proportion of estimates are below 0.35;
- the ERA study estimating theta presents analysis that does not employ standard market adjustments, such as correcting prices for market movements over the ex-dividend day; and
- the SFG estimates (from 2013) indicate that, if anything, the 0.35 estimate for theta is towards the upper end of the reasonable range.

1780. ATCO therefore proposed to base its estimate of theta on the SFG studies. ATCO considered that the approach used by SFG has been subject to a high level of scrutiny from both regulators and the Australian Competition Tribunal.[772]

1781. ATCO in its proposed revisions accepted the distribution rate (F) of 0.7 utilised for the Rate of Return Guidelines estimate.

1782. ATCO therefore proposed the value of imputation credits, gamma, be set at 0.25, on the basis of a distribution rate F of 0.70 and a value for the utilisation rate of 0.35.

Draft Decision

1783. The Authority in the Draft Decision required ATCO to adopt a gamma parameter of 0.5. This estimate was based on the product of a distribution rate F of 0.7 and utilisation rate, theta, of 0.7. The resulting estimate of 0.49 was rounded to 0.5, in acknowledgement that the estimate is based on a fairly wide range, and subject to imprecision.

---

[771] Monkhouse in his 1993 exposition stated that 'the symbol θ is used throughout to represent a 'utilisation factor'' (P. Monkhouse, The cost of equity under the Australian dividend imputation tax system, *Accounting and Finance*, November 1993, p. 5).

[772] Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5)*, 2011.

1784. The distribution rate of 0.7 was based on estimates that are consistent with a broad definition of 'all equity', rather than just 'listed equity'.[773] The Draft Decision noted that this estimate has been widely accepted in recent times, and is supported by a range of evidence.

1785. For the utilisation rate, the Authority exercised its judgment across a range of estimates. The Authority considered that an estimate of theta of 0.7 provided a most likely estimate of the utilisation rate that took account of the various ranges, and the Authority's weighting of their robustness. The range of estimates for the utilisation rate was based on:

- dividend drop off (**DDO**) studies – which suggested an estimate of the utilisation rate in the range of 0.3 to 0.7 – this was given low weight;
- equity share ownership – which suggested an estimate of the utilisation rate of 0.7, based on the ownership of listed and unlisted equities – this estimate was given most weight;
- taxation statistics – which suggested the utilisation rate is in the range of 0.4 to 0.8 – these estimates were given low weight; and
- the conceptual goal posts – which suggested the utilisation rate is in the range of 0.6 to 1 – this estimate was given some weight.

ATCO's Response to the Draft Decision

1786. ATCO agrees that gamma may be estimated as the product of a distribution rate F and the utilisation rate θ.

1787. However, ATCO does not agree that the Authority's estimate of 0.5 provides for the best estimate of gamma, as it does not agree with the Authority's interpretation of theta.

1788. In addition, ATCO considers that it is inappropriate to round the estimate of gamma up from two significant figures (0.49) to one significant figure (0.5).

Distribution rate

1789. ATCO agrees that 0.7 provides a best available estimate of the distribution rate.

1790. Although not relevant to the Authority's position for the Draft Decision, ATCO comment that Lally's estimate of 0.84 for *F* is not robust, submitting that the estimate provides for only a proportion of created credits. ATCO's consultant SFG contends that the ratio is not consistent with the definition in the regulatory framework or the standard specifications of the post-tax revenue model:

SFG contend that the correct definition of the distribution rate is the ratio of:

$$\frac{Distributed\ Credits}{Corporate\ Tax\ Paid}$$

but that Lally has estimated the ratio of:

[773] The Draft Decision also noted recent evidence by Lally for F of 0.84 for listed equity. The Draft Decision did not use this estimate, as its estimate for gamma was based on all equity, listed and unlisted.

$$\frac{Distributed\ Credits}{Created\ Credits}$$

1791. SFG argues that:

> The denominators in the two formulas above differ materially for the 20 companies in the Lally sample. In particular, very large multinational companies, such as those in the Lally sample, pay material amounts of corporate tax to foreign governments (in relation to their overseas operations). These corporate tax payments do not create imputation credits, but are available for distribution to shareholders. For the Lally sample, only 56% of corporate tax payments generate imputation credits.
>
> …In our view, it would be an error to use an estimate of some ratio Y when the regulatory framework and PTRM require an estimate of a different ratio X – particularly in the case where X and Y are materially different for the sample in question

Utilisation rate

1792. ATCO does not agree that 0.7 provides a best available estimate of the parameter θ.

1793. ATCO considers, based on advice from SFG, that the Authority has moved from using a value measure to a redemption measure for theta, and hence for gamma. ATCO submits that DDO studies are of no guidance at all in the context where theta is interpreted as a redemption measure.[774]

1794. ATCO submits that reliance by the Authority in this context on evidence presented by Lally is subject to the following errors, as set out by SFG:

> The ERA has misinterpreted the advice provided in the Lally (2013) report to the AER. The ERA interprets that report as supporting its conceptual definition of theta and its use of the equity ownership approach and tax statistic redemption rates to estimate theta. However, as set out in detail in the SFG Gamma report Lally (2013 AER) provides no such support.
>
> Irrespective of what might be contained in the Lally (2013) report to the AER, on its proper construction the regulatory task pursuant to Rule 87A requires theta to be estimated as the value of distributed credits.

1795. ATCO submits that the Australian Competition Tribunal (**ACT**) ruled that redemption rates cannot be used to estimate the value of imputation credits, and should only be used to provide an upper bound check on the estimates of the value of imputation credits.

1796. ATCO contends that the interpretation of gamma as a weighted average over all investors only applies in two special cases – that of perfect segmentation and perfect integration of equity markets – neither of which correspond to the Authority's definition of the domestic capital market (which includes foreign investors to the extent that they invest in Australia).[775]

1797. ATCO notes that the Authority in its Draft Decision weights a range of estimates in determining its estimate of the utilisation rate (see paragraph 1785 above). ATCO

---

774 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 216.

775 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 217.

considers that there could be more explanation for how the Authority reached its final estimate, in terms of allocating and combining weightings to the various estimates.

1798. With regard to DDO studies, ATCO submits that under the Authority's new interpretation of theta, these studies should be given zero weight, rather than low weight.[776]

1799. That said, with regard to the Authority's estimate of theta from the dividend drop off studies, ATCO considers that the Authority has disproportionately weighted the ERA dividend drop off study, at the expense of SFG's study. ATCO notes that the SFG study has been accepted by the ACT, utilises the 'standard' accepted approach of correcting prices for market movements over the ex-dividend day, and has been shown to be stable and reliable.

1800. ATCO restates its view that a mid-point estimate of the utilisation rate – from within the Draft Decision range of 0.35 to 0.55 – is not the best estimate, as the Authority's own DDO estimates are below 0.45 and a significant proportion of estimates are below 0.35. ATCO considers that the Authority's study supports the SFG DDO estimate once the ex-day market correction has been applied, and notes that ATCO's consultant SFG indicates that, if anything the 0.35 estimate is towards the upper end of the reasonable range.[777]

1801. ATCO reports its consultant SFG's advice that econometric issues raised by the Authority with regard to DDO studies are not material and are not sufficient to limit the use of these studies.

1802. In addition, ATCO objects to the Authority's adoption of the 'Lally adjustment' to the DDO coefficient on the utilisation of an imputation credit, which involves the division of the estimated franking credit coefficient by the estimated coefficient of the cash dividend δ. SFG's interpretation is that the adjustment:[778]

- is inappropriate given a correct interpretation of the utilisation rate as the 'market value' of an imputation credit;
  - in this interpretation, the coefficient on the estimated value of the franking credits is taken to provide a direct estimate of the value of distributed credits, and hence may be interpreted as theta;
- produces perverse outcomes;
  - if δ is smaller, reflecting a lower investor value on dividends, then gamma needs to reduce to ensure that revenues increase and shareholders are equally well off;
  - yet a smaller value of δ would increase the value of theta and gamma, given the adjustment, resulting in lower revenues;
- would have to apply throughout the WACC parameter estimation process;

---

776 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 218.

777 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 219.

778 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 35.

- throughout the estimation process for the rate of return, it is assumed that shareholders value dividends at their face value, that is, that δ=1;
- to do otherwise here sets up an inconsistency.

1803. With regard to the use of the equity ownership estimate for the utilisation rate, ATCO considers that the estimate relied on by the Authority is not the most current and is subject to data quality and reliability issues. ATCO submits that the equity ownership approach should not be used to measure the utilisation rate as it will not contribute to the best estimate of gamma.

1804. First, ATCO contends that a better estimate of the domestic proportion of equity ownership is 0.46, which reflects an updated higher proportion of foreign equity ownership as compared to the 2007 estimate used by the Authority for the Draft Decision.

1805. Second, ATCO contends that issues relating to the reliability of the data suggest that the aggregate Australian Bureau of Statistics (**ABS**) equity ownership estimate is inappropriate and should not be relied upon. SFG demonstrates that the ABS data includes government owned corporations, general government and the Reserve Bank of Australia. This leads to systematic downward bias in the estimate of foreign ownership.

1806. ATCO submits that taxation statistics measure redemption rates and that therefore they should not be used to inform the estimate of the utilisation rate, as they do not measure the value of distributed credits. ATCO considers that the problem with taxation statistics is that they do not 'accurately represent the full costs incurred by investors in obtaining and redeeming franking credits'.[779] ATCO cites the ACT finding that tax statistics should not be used to produce an estimate of the utilisation rate, but rather should be used as an upper bound cross check.[780]

1807. ATCO submits that the conceptual goalposts approach should not be afforded any weight in estimating the utilisation rate. ATCO considers that SFG demonstrates that the approach does not establish a reasonable range for the utilisation rate, as it relies on estimates that do not reflect the partially segmented CAPM assumption adopted by the Authority and relies on a number of inappropriate assumptions.

1808. Overall, ATCO considers that the Authority's approach to estimating the utilisation rate incorrectly estimates redemption rates rather than the value of imputation credits, is illogical and unreasonable, and cannot give rise to the best estimate of the value of imputation credits.

1809. ATCO submits that the most robust and stable estimate of theta is that produced by SFG, which was accepted by the ACT, with a value of 0.35. When combined with a distribution rate of 0.7, the resulting estimate of gamma is 0.25.

Submissions

1810. No submissions commented on the Authority's estimate of gamma in the Draft Decision.

---

779 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 220.

780 Australian Competition Tribunal, *Application by Energex Limited (Gamma)*, A. Comp. T 5, [2011].

Considerations of the Authority

1811. The Authority's position on gamma in the Draft Decision drew on a range of relevant information, some of which had not been accounted for in the Rate of Return Guidelines. Given the new information, the Authority re-examined its method for estimating the gamma parameter, which resulted in a different estimate to that set out in the Rate of Return Guidelines. The Authority noted in the Draft Decision that the ACT in its Energex decision viewed the estimate of gamma as an 'ongoing intellectual and empirical endeavour'.[781]

1812. In revising its position for the Draft Decision, the Authority took into account:

- considerations relating to theoretical framework for estimating gamma;
- the Authority's prior position, set out in the Rate of Return Guidelines, which accounted for stakeholder input and a range of consultants' reports, among other things;
- ATCO's submission on gamma;
- Lally's November 2013 report to the AER;[782]
- Lally's November 2013 report to the QCA, and his responses to submissions to the QCA on that report;[783]
- the conclusions of the AER in responding to Lally's report, set out in its rate of return guidelines;[784]
- a 2013 report on tax statistics by Hathaway commissioned by the Energy Networks Association;[785]
- the conclusions of the Queensland Competition Authority (**QCA**) in its recent cost of capital determination, which also considered the foregoing material, as well as additional material with regard to the estimation of gamma.[786]

1813. In addition, in reaching this Final Decision, the Authority has had regard to:

- ATCO's submission on the Draft Decision, including the report by its consultant, SFG;
- a report for the Queensland Resources Council by McKenzie and Partington;[787]
- a report on gamma by Associate Professor John Handley for the Australian Energy Regulator.[788]

---

781 Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, 12 May 2011, paragraph 45.

782 M. Lally, *The estimation of gamma*, 23 November 2013.

783 M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014.

784 Australian Energy Regulation, *Explanatory Statement – Rate of Return Guideline*, December 2013.

785 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

786 Queensland Competition Authority, *Final decision: cost of capital: market parameters*, August 2014.

787 M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013.

788 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014.

1814. The Authority notes that experts differ in their interpretation of the best approach to estimating gamma in the regulatory setting. This is particularly the case with regard to the value of the utilisation rate.

1815. ATCO has raised a range of issues with regard to the Authority's position set out in the Draft Decision. These are considered in what follows.

Definition of the domestic capital market

1816. In reconsidering its estimate of gamma, the Authority takes account of the definition of the capital market used for determining the allowed rate of return, which was set out in the Rate of Return Guidelines. In particular, the Authority has adopted a domestic CAPM, while allowing for the presence of foreign investors:[789]

> In summary, the Authority's position is that the boundary should account for the full domestic data set, including any direct influences on the cost of capital for Australian domiciled firms. This may include the influence of international investors in Australian markets for equity, or the influence of international lenders supplying debt finance directly to Australian firms.

1817. Therefore, to maintain internal consistency, the Authority considers that the estimate of gamma needs to take into account the presence of international investors in the Australian domestic capital market.

1818. ATCO does not disagree with this requirement for consistency. However, ATCO considers that the estimate for the utilisation rate based on the conceptual goalposts approach is not consistent with this definition. This view is considered further in the section on the conceptual goal posts.

Interpretation of gamma

1819. The equation set out in paragraph 1773 interprets the value of franking credits in the context of the Officer CAPM framework, as extended by Monkhouse to cover a non-perpetuity setting.[790] The Authority concluded in the Draft Decision that the benefit

---

789 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules*, www.erawa.com.au, December 2013, p. 30.

790 Officer assumes all dividends and imputation credits are fully paid out each period. Monkhouse allows some retained earnings and imputation credits (R.R. Officer, The Cost of Capital of a Company under an Imputation Tax System, *Accounting and Finance*, May 1994; P.H.L. Monkhouse, The Valuation of Projects Under the Dividend Imputation Tax System, *Accounting and Finance*, 36, 1996.) Handley notes that this assumption is unrealistic, such that any estimate of gamma that ignores retained credits will be an underestimate (J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 13):

> It is well understood that the value of a retained imputation credit is less than the value of a distributed imputation credit due to the delay in distribution – but the difficult question is how much less. Unfortunately the answer is we just don't know as there is currently no empirical evidence on the value of a retained credit. Any value attributable to credits retained in a period would be reflected in the observed capital for that period but there no known method to identify that component. I continue to find the suggestion that retained imputation credits are worthless to be implausible.
>
> … Estimates of gamma using the traditional approach will therefore be downward biased to the extent that retained imputation credits have value. Although it is not possible to reasonably estimate the magnitude of the bias, its direction is clear.

arising from imputation credits can be interpreted as the proportion of franking credits received that are utilised by the representative investor.[791]

1820. The Draft Decision noted that the utilisation rate is a market-level parameter, meaning that the same value applies to all firms.[792] Individual investors have differing utilisation rates; investors who are able to fully use tax credits are assigned a value of one whilst investors who cannot are assigned a value of zero. Individual utilisation rates may be weighted to produce the required market-level utilisation rate. Therefore the utilisation rate 'is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion'.[793,794] The utilisation rate is then the value to investors in the market per dollar of imputation credits distributed.[795]

1821. ATCO's consultant SFG considers this interpretation to be misplaced. SFG states that the Authority 'has now abandoned its "value" interpretation of gamma in favour or the AER's redemption rate approach'.[796] SFG bases this view on the Authority's definition of the utilisation rate, as being the proportion of imputation credits that are redeemed – the utilisation rate of the representative investor – which the Authority determined was a complex weighted average of the utilisation rates of all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion utilisation rates.[797]

1822. SFG considers that the Authority has committed two errors:

> a) It has misinterpreted the advice provided in the Lally (2013) report to the AER. The ERA interprets that report as supporting its conceptual definition of theta and its use of the equity ownership approach and tax statistic redemption rates to estimate theta. However, as set out in detail in Section 10 below, Lally (2013 AER) provides no such support. That is the ERA has erred in its interpretation of the Lally (2013 AER) report; and
>
> b) Irrespective of what might be contained in the Lally (2013) report to the AER, the regulatory task requires theta to be estimated as the value of distributed credits – as explained in Sections 2 and 5 of this report. The ERA now proposes to perform a different task and has erred in that respect.[798]

1823. The key challenge to the Authority's estimate set out in the Draft Decision therefore relates to the estimate of the utilisation rate. The Authority deals with this first, in

---

791 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 210.

792 M. Lally, *The Estimation of Gamma*, November 2013, p. 11.

793 M. Lally, *The Estimation of Gamma*, November 2013, p. 11.

794 M. Lally. and T. van Zijl, 'Capital Gains Tax and the Capital Asset Pricing Model', *Accounting and Finance*, vol.43, 2003, pp. 187-210.

795 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 13.

796 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 14.

797 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 19.

798 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 16.

what follows, then discusses the distribution rate, before drawing the material together to provide for an overall estimate of gamma.

Utilisation rate

1824. As noted, the Authority in its Draft Decision considered that the benefit of imputation credits will rely on the proportion, theta, of franking credits received that are utilised by the representative investor:[799]

> The utilisation rate is a market-level parameter, meaning that the same value applies to all firms.[800] Individual investors have differing utilisation rates; investors who are able to fully use tax credits are assigned a value of one whilst investors who cannot are assigned a value of zero. These individual utilisation rates may be weighted to produce the required market-level utilisation rate θ. Therefore θ 'is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion'.[801,802]

1825. To this end, the Authority observed that its previous estimation approach for estimating theta – using DDO studies – may not correctly estimate the required utilisation rate required, as, among other things:

- The required utilisation rate is a complex weighted average determined by the value of equity that investors hold and their relative wealth and risk aversion.
- Dividend drop off studies only estimate the value weighted utilisation rate around just two days, the cum-dividend and ex-dividend dates. As a consequence, they provide an estimate of the utilisation rate with a value weighting that reflects the composition of investors around the cum and ex dividend dates, not the weighted average across the entire market over an entire year, as required.
- There are significant econometric challenges in estimating the utilisation rate from dividend drop off studies. Trading around the ex-dividend date reflects a variety of different incentives and price movements. Dividend drop off studies may not accurately separate out the effect of the taxation incentive associated with imputation credits on the share price change.

1826. For these reasons, the Authority determined to place limited weight on the DDO estimates, and on the range of applied market value estimates more generally.

1827. The Authority instead considered other approaches to estimating the utilisation rate.[803]

1828. In responding to the Draft Decision, SFG argues that the Authority is in error in interpreting theta (and hence gamma) as the utilisation rate, rather than in terms of the value to the representative investor.

---

799 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 431.

800 M. Lally, *The Estimation of Gamma,* Report for the AER*,* November 2013, p. 11.

801 M. Lally, *The Estimation of Gamma,* Report for the AER*,* November 2013, p. 11.

802 M. Lally. and T. van Zijl, 'Capital Gains Tax and the Capital Asset Pricing Model', *Accounting and Finance,* vol.43, 2003, pp. 187-210.

803 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, Appendix 8.

1829. First, SFG points to the revised language of NGR 87A, which states that 'gamma is the value of imputation credits', rather than the previous term 'utilisation of imputation credits'. SFG acknowledges that the Australian Energy Market Commission did not provide a detailed explanation about the changed language in its Final Determination, but considers that its apparent intention was to be clear that imputation credits did not rely on utilisation.[804] The Authority notes that the AER sought clarification from the AEMC on the reason for the change, which was unable to provide 'any further insight'.[805]

1830. Second, SFG argues that the parameter *U* in the following equation – reproduced by the Authority in the Draft Decision – within the term IC_1U, is defined as the *value* that investors attribute to imputation credits:[806]

$$S_0 = \frac{Y_1 - Tax_1 + IC_1U + S_1}{(1 + E[\widehat{R}])} \qquad (29)$$

Where

U is the utilisation rate or value that investors attribute to imputation credits;

Y_1 is the expected cash flows over the first year to equity holders (net of all deductions except company taxes);

Tax_1 is the expected company taxes over the first year;

S_0 is the current value of equity;

S_1 is the expected value in one year;

$E[\widehat{R}]$ is the equilibrium expected rate of return on equity;

IC_1 is the distributed imputation credits over the first year.

1831. However, the Authority notes that the equation above is drawn from Lally, who quite clearly states in context:[807]

> So, relative to the standard form of the CAPM, the Officer CAPM and the associated cash flows requires three additional parameters: the ratio of market-level imputation credits to the value of the market portfolio (ICm/Sm), the ratio of firm-level imputation credits to firm level company tax payments (IC/TAX) and the utilisation rate (U). The second of these parameters is called the "distribution rate" and the product of the last two is called "gamma".
>
> The utilisation rate referred to here is a market-level parameter, i.e., the same value applies to each firm. Individual investors also have utilisation rates: one for those who can fully use the credits and zero for those who can't. Consequently it might be

---

804 ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Appendix 10, pp. 20-21.

805 Australian Energy Regulator, *Draft Decision on Jemena Gas Network 2015–20 Access Arrangement*, Attachment 4 Value of imputation credits, p. 4-37.

806 M.Lally, *The Estimation of Gamma,* Report for the AER, November 2013, p. 9.

807 M. Lally, *The Estimation of Gamma,* Report for the AER, November 2013, p. 10.

> presumed that U is some type of weighted average over investors. Although Officer (1994) provides no clarification on this matter, because his derivation of the model is intuitive rather than formal, Lally and van Zijl (2003, section 3) provide a formal derivation of a generalisation of Officer's model (with the Officer model being a special case), in which variation of utilisation rates across investors is recognised. In this derivation, they show that U is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion. Individual investors' levels of risk aversion are not observable. Accordingly it is necessary to (reasonably) act as if risk aversion is uncorrelated with utilisation rate at the investor level, in which case the weights reduce to investors' relative investments in risky assets, i.e., U is a value-weighted average over the utilisation rates of individual investors.

1832. Third, SFG considers that 'there is a material difference between the utilisation rate (the proportion of credits that are redeemed at the tax office) and the value of those credits to shareholders'.[808,809]

1833. In this context, SFG contends that DDO method is only useful for measuring the *value* of distributed credits, not the value of the utilisation rate, and hence is 'irrelevant' for estimating the proportion of distributed credits that are redeemed.[810]

1834. SFG's core argument is that there is a cost for an investor to obtain and redeem a credit.[811] SFG considers that:[812]

- some credits that are distributed are never redeemed, for example because;
  - the investors are non-residents;
  - the 45 day rule precludes it;
- record keeping creates administrative costs;
- there is a time delay in obtaining the benefit;
- imputation credits are taxed at their face value;
- as resident investors adjust their portfolio to hold domestic shares for imputation, their portfolios will become less diversified, at a cost;

---

808 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 19.

809 SFG consider that it would be a clear error to conclude that theta should be interpreted as a redemption rate because of econometric issues involved in estimating the value of distributed credits (ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 17). The Authority notes that its interpretation does not turn on issues associated with DDO studies.

810 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 17.

811 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 21.

812 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 22.

- a rational investor would increase the concentration of domestic shares in their portfolio until the marginal benefit of imputation is zero.

1835. The Authority notes these points, but considers:

- analysis by the Australian Energy Regulator of tax statistics demonstrates that the amount of credits utilised is very close to the amount of credits that have been received;[813]
- the effects of the time value of money are likely to be minimal, given the period of delay;
- there is no empirical evidence on the diversification effect of imputation credits, and no clear theoretical position for the effect either.[814]

1836. In addition, transactions and other costs are unlikely to materially affect redemption of imputation credits, as investors are required to report franked dividends and eligible imputation credits, such that the incremental cost to that of shareholding is likely to be small. Most importantly, the Authority notes in this context Handley's view that the correct estimate of an after-company-before-personal-tax value of a distributed imputation credit should value credits before administrative costs, personal taxes and diversification costs.[815]

1837. The Authority's view then is that these points do not detract from the fact that some investors will redeem credits, and thus have a utilisation rate of 1, and other investors in the Australian share market will not redeem credits, and will thus have a utilisation rate of 0. In the Authority's view, there is no case here that the utilisation rate is not a complex weighted average across all investors, both domestic and international. That complex weighted average depends on risk aversion, wealth, and given the foregoing, the cost of redeeming credits. Therefore the Authority remains of the view that approaches that directly inform the degree of utilisation of imputation credits will provide relevant information. Those approaches include the domestic ownership share of equity, and taxation statistics on the proportion of redeemed imputation credits.

1838. SFG's further argument is that the complex weighted average interpretation can only be consistent with perfectly segmented or perfectly integrated capital markets – and that this is not consistent with the Authority's definition of a domestic capital market with the presence of foreign investors:[816,817]

> However, the ERA's definition of theta in terms of the proportion of credits that are redeemed is not consistent with any theoretical model. The theoretical models that involve "a complex weighted average over all investors" only apply to two special cases:

---

813 Australian Energy Regulator, *Draft Decision on Jemena Gas Network's 2015-20 Access Arrangement*, November 2014, p. 4-46.

814 The Authority notes that diversification will depend on investor's wealth and risk preferences. It may be that investors respond to the presence of imputation by holding more, less or the same value of Australian equities, depending on preferences.

815 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 46.

816 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 26.

817 The Rate of Return Guidelines stated that 'the Authority's position is that the boundary should accou8nt for the full domestic data set, including any direct influences on the cost of capital for Australian domiciled firms. This may include the influence of international investors in Australian markets for equity…' (Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 30).

a) The case where Australia is perfectly segmented from world capital markets; and

b) The case where Australia is perfectly integrated into world capital markets.

1839. SFG argues that there is no theoretical model that is consistent with the Authority's definition of the boundaries of the domestic market for estimation purposes, which include the presence of foreign investors to the extent that they invest domestically. In this context, SFG considers that the Authority's definition of the market is not a 'closed system', citing Lally in support:

> Lally (2013 AER) notes that there is a special case in which the proportion of imputation credits that are redeemed would be an appropriate estimate of the value of imputation credits that is reflected in the share price. He considers a class of models that includes Monkhouse (1993) and Lally and van Zijl (2003). These models all consider a setting in which there is a single market in which the m investors jointly own all of the n assets. In these models there is a closed system – there are no assets outside the market that are available to the m investors inside the market and there are no investors outside the market who can buy any of the n assets inside the market. That is, these models only apply in a closed system where the m investors collectively own all of the n assets and nothing else.
>
> The models then derive an equilibrium by solving a market clearing condition. This involves noting that: a) All of the m investors must invest all of their wealth across the n assets and nothing else; and b) All of the n assets must be owned entirely by the m investors and no one else
>
> Each of the m investors will hold a different amount of each of the n assets according to their wealth, their risk aversion and their tax status. Other things equal, wealthy investors will hold more of each asset than poor investors, highly risk averse investors will tend to hold safer portfolios, and investors who are eligible to redeem imputation credits will hold relatively more of the stocks that distribute larger amounts of those credits.
>
> Because there is a closed system in which the m investors collectively own all of the n assets and nothing else, it is possible to derive the relative amount of each asset that each investor will want to hold. This will be a function of the investor's relative wealth, risk aversion and tax status. The relative demand for each asset will determine its equilibrium price and the equilibrium return that investors will require for holding it. Again, it is very important to emphasise that none of these equilibrium calculations can be performed unless the system is closed such that the m investors collectively own all of the n assets and nothing else.
>
> These models also make the assumption that a dollar of redeemed credits has the same value as a dollar of cash dividends.[818]

1840. This is a pivotal issue, as evinced by the last paragraph above. SFG acknowledges that:

> In this [closed system] case, there is equality between:
>
> a) The extent to which imputation credits are capitalised into stock prices; and
>
> b) The weighted-average redemption rate.
>
> That is, there are two equivalent ways of determining the value of imputation credits, but only if the pre-requisite conditions and assumptions of the model hold. Importantly, under these special assumptions value and redemption will be equal. That is, redemption rates can be used to estimate value under these special assumptions. That

[818] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 27.

> is, these models do not say that redemption is the right interpretation and value is the wrong interpretation – the value interpretation is always the correct one. The only contribution of these models is to identify the special cases in which the redemption rate would provide an estimate of value.[819]

1841. Contrary to SFG's position, the Authority considers that there is no ambiguity regarding the presence of foreign investors, or that the Australian market is anything other than a system of *n* assets with *m* investors. The interpretation is that some of the *m* investors in that system are foreigners. To assume somehow that we cannot draw a boundary around the full Australian capital market, reflecting the actual situation with regard to the *n* assets and *m* investors in that market, and then derive a wealth and risk weighted average of those investors' redemption of credits, seems odd. SFG appears to be saying that the Australian capital market will not be able to find equilibrium prices because foreign investors are present in that market.

1842. Handley concurs with this view. Importantly, he rejects the idea that the CAPM requires that the *m* investors hold no other assets in any other market, only that they price domestic assets in isolation of other assets. He puts it thus:[820]

> The starting point for a CAPM is a given set of *n* assets and a given set of *m* investors who hold them. It is then assumed that this set of investors will trade this set of assets among themselves in order to form their optimal portfolios – with the decision criteria of each investor being to maximize his utility of end-of-period wealth, which in turn is defined over the set of *n* assets. The CAPM makes no explicit assumption about any other assets or any other investors but if there are other assets or investors then it is implicitly assumed that these do not matter for the purposes of determining the prices of the *n* assets under consideration (otherwise they should be in the model). This means that other assets held by other investors do not matter. It also means that other assets held by the *m* investors do not matter. This is just a form of market segmentation. By definition the system is closed because what matters for pricing purposes – the *n* assets and *m* investors – are in the model and any other assets or investors being outside the model are ignored.
>
> This is precisely the assumption that one implicitly makes when using the CAPM in practice. Once you choose a benchmark market then you define the set of assets and investors that are relevant for pricing purposes – in other words, by choosing a particular proxy for the market, one is saying that this is the best model for estimating expected returns on assets within this market. The model is closed in the sense that it is implicitly assumed to be segmented. If one disagrees with this assumption then the solution is to bring the other assets and investors into the model.
>
> … SFG's comments are based on a faulty premise – that the *m* investors can own no other assets. This is an assumption of SFG but is not an assumption of the CAPM. In the current context, it is not assumed that investors in the domestic market hold no other assets but rather it is assumed that investors in the domestic market price domestic assets in isolation of any other assets they may or may not hold. For this purpose, investors in the domestic market consist of domestic investors to the extent that they hold domestic assets and foreign investors to the extent that they hold domestic assets – this is the set of *n* assets and the set of *m* investors who hold those *n* assets. Foreign assets held by these domestic investors, foreign assets held by these foreign investors and foreign assets held by other foreign investors are outside the model.[821]

---

819 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 28.

820 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 22.

821 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, pp. 22-23.

1843. This position is opposed by Lally, in the context of the Officer model, who notes that regulators include foreign investors, to the extent that they invest in the Australian market, to reflect the empirical reality of their existence, but that:

> …this involves use of a model (the Officer CAPM) that assumes that national markets for risky assets are segmented along with the definition for a parameter (*U*) that is inconsistent with this model. Expressed more technically, the Officer model arises from the portfolio choices of a group of investors whose portfolio choices are limited to the Australian risk free asset (whose rate is determined exogenously) and Australian risky assets, and their portfolio choices determine the prices and hence the expected rates of return on these risky assets. Thus foreign investors, who by definition can hold both Australian and foreign risky assets, have no place in such a model. In addition, if Australian investors have access to foreign assets, the appropriate CAPM will reflect that fact and the equilibrium prices of Australian assets will differ.[822]

1844. But Handley points out:

> Lally (2013) adopts an unnecessarily narrow interpretation of segmentation in suggesting that foreign investors should be excluded completely. But once you choose a proxy for the market portfolio you define not only the set of assets that are relevant for pricing purposes but you also define the set of investors that are relevant for pricing purposes – in other words, it is a joint assumption. Lally's suggestion that we include the full set of *n* assets but only a subset of the of *m* investors not only contradicts the starting point of the CAPM but also does not accord with the reality that foreign investors are present in and influence the pricing of assets in the domestic market. This notion of (complete) segmentation – that only domestic assets are held by domestic investors – is an assumption of Lally but is not an assumption of the CAPM.[823]

1845. The Authority considers that Handley's views relating to segmentation in the CAPM model is sensible. While it is reasonable to consider that Australian and foreign investors' holdings of Australian assets may be influenced by the prices of assets in overseas markets, a globally integrated market is not used for estimating the rate of return in this Final Decision.[824] The Authority explicitly rejected such an approach in the Rate of Return Guidelines.[825] While utilisation rates may change as investors in Australian capital markets change their portfolio holdings and the proportion of foreign investors changes, *at any given point in time* the utilisation rate will be a complex weighted average of the *m* investors' utilisation rates.[826]

---

822 M. Lally, *The Estimation of Gamma,* Report for the AER*,* November 2013, p. 14.

823 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 22.

824 The Authority notes that the observed rate of return in a globally integrated capital market is lower than that of the partially segmented domestic capital market – indeed this is a key point of Lally's analysis for the 'conceptual goal posts'. In a full globally integrated market, the value of imputation credits would continue to be a complex weighted average over all investors, but clearly very close to zero. For a detailed discussion of this issue, and Lally's analysis with regard to the relationship between observed rates of return and the value of imputation credits, see Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 448.

825 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 28.

826 Handley further notes in this context that (J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 8):

> An implication of SFG's assertion is that one could validly use a "domestic" version of the CAPM say to price U.S. stocks only if you assume that investors in the U.S. stock market hold no other assets except U.S. stocks. Such an assumption would be clearly implausible.

1846. It becomes clear then – consistent with SFG's view noted in paragraph 1840 – that the term '*value* of franking credits' and '*proportion* of the tax paid at the company level [which] is really a withholding of personal tax' are interchangeable terms for gamma.[827] From the shareholders' point of view 'distributed imputation credits are valuable to the extent that they can be used (or utilised or redeemed) to reduce personal taxes and/or have credits refunded'. Officer described gamma in both ways. Handley considers that Officer's central idea is the identification of personal tax component of the company tax paid.[828] The relevant value of an imputation credit is the after-company-before-personal-tax value.[829]

1847. Handley notes that the debate about value and utilisation is a largely sterile one:

> …the relevant measure of utilisation value is that value as determined by the market – in other words it is not the utilisation value of a credit to any single investor or the utilisation value to any single class of investors that we want but rather the utilisation value to the market as a whole. In contrast, much of the current debate appears to incorrectly suggest that market value and utilisation value are alternative concepts for this purpose.

1848. Handley observes that Officer concluded that the grossed up return to a company would include returns for capital accumulation, dividends and imputation. The returns to imputation may be expressed as $\frac{\gamma C_t}{p_{t-1}}$ where C_t is imputation credits distributed during the period and the share price p_{t-1} is the price at the start of the period. Handley quotes Officer as defining this component as the 'value of tax credits expressed as a rate or proportion of the initial value of the share'.[830] With Monkhouse's extension to a non-perpetuity setting, set out at paragraph 1773, then 'γ continues to be used to refer to the personal tax proportion of company tax paid – equivalently the utilisation value of generated imputation credits while theta, is used to refer to the utilisation value of distributed imputation credits and is commonly called the utilisation rate'.[831]

1849. Handley notes that the utilisation rate will reflect the value of imputation credits to the market as a whole, which may be difficult to observe. In this context, Handley reiterates the key messages made by Lally, discussed at length in the Draft Decision, that:[832]

- the per dollar utilisation value of imputation credits embedded in equilibrium asset prices, theta, is common across all assets in the market; and
- theta may be interpreted as a complex weighted average of investor utilisation rates.

---

827 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 9.

828 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 9.

829 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 7.

830 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 10.

831 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 11.

832 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 20.

1850. The Authority endorses Handley's view that use of the CAPM and interpretation of theta as the utilisation rate (equivalent to the value of imputation credits) is entirely consistent with its definition of the domestic capital market.

1851. The Authority considers that, consistent with this interpretation, the 'most important approaches to estimation in order of importance to be the equity ownership approach, the historic credit utilisation rate approach and dividend drop-off studies (being the most relevant within the class of implied market value studies)'.[833] However, the Authority agrees that 'all approaches are subject to substantial uncertainty and so the estimate of theta is imprecise'.[834]

1852. The Authority agrees that there is considerable uncertainty surrounding the estimation of the utilisation rate. The Authority therefore considers that a range of approaches is desirable to determine the estimate.

1853. The Authority agrees with Handley that the equity ownership and tax statistics on utilisation of imputation credits provide key evidence for the utilisation rate. The Authority also considered DDO estimates and the 'conceptual goal posts' of Lally in the Draft Decision. In what follows, these estimates are revisited for this Final Decision.

Equity share ownership

1854. In the Draft Decision, the Authority placed most weight on the equity ownership approach for estimating the value of the utilisation rate.

1855. The Authority noted that the equity ownership approach can provide for an estimate of the utilisation rate that is consistent with Officer CAPM. This is because the majority of domestic investors will be eligible to redeem imputation credits (and therefore have an implied utilisation rate of 1), while foreign investors will not be eligible (with an implied utilisation rate of 0). The proportion of domestic ownership of capital investments therefore provides a simple and transparent estimate of the utilisation rate.

1856. The Authority noted that the resulting estimate does not account for the required risk weighting of utilisation rates. However, the Authority is not aware of any means to incorporate such a consideration.[835] Therefore, the Authority accepted that current estimates of domestic investors' equity ownership share provide relevant information for determining the value of the utilisation rate.[836]

---

833 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 31.

834 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 32.

835 Lally observes that ignoring risk weighting may be reasonable if it is assumed that individual investors' risk aversion is uncorrelated with their utilisation rate (see M. Lally, *The Estimation of Gamma*, Report for the AER, 23 November 2013, p. 11).

836 Queensland Competition Authority, *Final Decision: cost of capital: market parameters*, August 2014, p. 98. The Authority notes that Hathaway has recently examined this data, finding figures closer to 0.8. However, as noted by the AER: 'Given they are the primary authors of this data, the ABS reported figures might be considered more reliable.' (Australian Energy Regulator, *Explanatory Statement – Rate of Return Guideline*, December 2013, p. 172).

1857. In the Draft Decision, the Authority adopted a domestic equity share ownership proportion that was based on all equity – both listed and unlisted – as it was consistent with its approach used to estimate the distribution rate.[837]

1858. The Authority in the Draft Decision rejected using an estimation approach based on listed equity ownership only, as it considered that the resulting estimate was not consistent with its preferred approach to estimating the distribution rate, which is based on all equity.

All equity – listed and unlisted

1859. The Authority estimated the domestic equity share ownership proportion of listed and unlisted equity at 0.7 in the Draft Decision. That estimate was based on:

- evidence from the AER, based on 2007 evidence from the Australian Bureau of Statistics (**ABS**), that 71 per cent of Australian equity is held by domestic investors;[838]
- updated ABS evidence from the QCA support a foreign ownership share (listed and unlisted) of around 30 per cent, depending on the period chosen.[839]

1860. SFG cautions that the estimates in unlisted equity may be unreliable, quoting the original Australian Bureau of Statistics (**ABS**) feature article from June 1992 to this effect.[840] However, the Authority notes that:

- SFG omitted to include a sentence in the ABS quote that 'Alternative information sources and methodologies for deriving these estimates are being investigated.'[841] The feature article is more than 20 years old, and the ABS has continued to refine the data in the relevant catalogue over the years.
- The ABS has continued to publish the data, so it is reasonable to consider it relevant.
- The data quality warning was not repeated in the ABS feature article from 2007.

1861. The Authority is therefore not persuaded that the equity ownership estimates are undermined by data quality issues.

1862. ATCO's consultant SFG also noted the use of 2007 ABS data, suggesting that updated estimates based on current ABS data should be used. SFG also suggests that any equity share ownership estimate should be restricted to privately owned equity, else the inclusion of government owned equity will cause a systematic bias in the estimate of foreign ownership.[842] The Authority has noted these points and

---

837 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 214.

838 Australian Bureau of Statistics, *Feature article: Foreign ownership of equity,* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/featurearticlesbytitle/EDEB646A92BF2BFBCA2579B8000DF20B?OpenDocument

839 Queensland Competition Authority, *Final Decision: cost of capital: market parameters*, August 2014, p. 98.

840 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 33.

841 Australian Bureau of Statistics, *International Investment Position Australia*, June 1992, Section 4.

842 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 53.

derived an updated series of equity share ownership that excludes government entities.

1863. The Authority has also refined the equity share ownership estimates consistent with the method set out by the AER (Figure 19). The method:

- excludes from the calculation entities that are wholly owned by the public sector – including equity issued by the 'central bank', 'central borrowing authorities', 'national public non-financial corporations' and 'state and local public non-financial corporations';
- sums the equity held by those classes of domestic investor that are eligible to utilise imputation credits – 'households', 'pension funds' and 'life insurance corporations';
- sums the equity held by those classes of domestic investor that are not eligible to utilise imputation credits – 'state and local general government', 'national general government' and the rest of the world';
- determines the share of equity held by domestic investors eligible to utilise imputation credits as a proportion of the equity held by domestic investors that either use or waste imputation credits.[843]

1864. The resulting domestic ownership for listed and unlisted equity has tended to lie in the range between 55 and 65 per cent much of the time (Figure 19). The most recent share in December 2014 was 59 per cent.

1865. The Authority considers that the most relevant period for making an estimate is that since July 2000, when the current regime allowing refunds of excess credits for eligible investors came into effect. Over that period the share of domestic ownership in all equity has averaged 59 per cent.

1866. The Authority notes that the estimate has fluctuated over time. The Authority therefore is of the view that it is reasonable to infer an estimate around 59 per cent for domestic ownership of listed and unlisted equity, based on the average since 2000. That estimate also happens to coincide with the most recent observation.

Listed equity

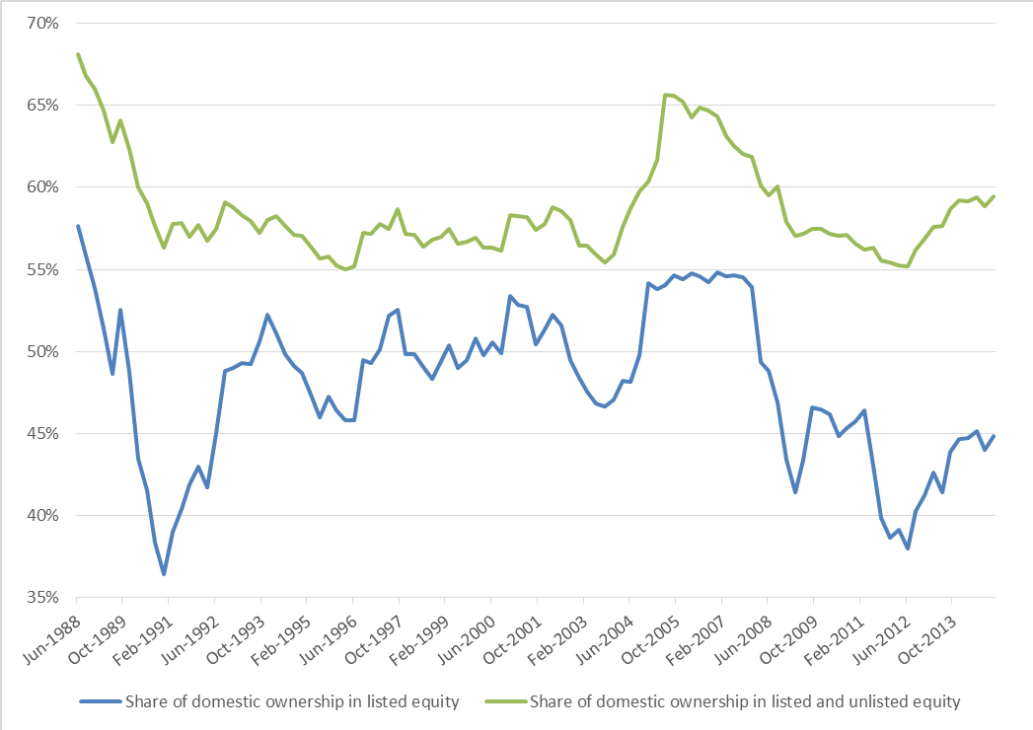
1867. The listed equity share has fluctuated around 50 per cent much of the time, moving in a range between 37 and 54 per cent in the observed data. The listed equity share is currently 45 per cent (based on the most recent ABS data for December 2014), and the average value since June 2000 has been 48 per cent (Figure 19).

1868. The Authority therefore is of the view that it is reasonable to infer an estimate of around 48 per cent for domestic ownership of listed equity, based on the average since June 2000.

---

843 Australian Energy Regulator, *Draft Decision, Jemena Gas Network's 2015–20 Access Arrangement*, Attachment 4 Value of imputation credits, p. 4-55. The AER observes that the case for assuming that governments 'waste' the imputation credits they receive is not clear, but that the effect of the exclusion is immaterial on the final result.

Figure 19 Share of domestic ownership in listed and unlisted equities – excluding government ownership and refined to account for use of imputation credits



Source: Australian Bureau of Statistics*, Australian National Accounts: Finance and Wealth,* Catalogue 5232.0, Tables 47 and 48, December 2014; ERA analysis.

Equity share ownership estimate of the utilisation rate

1869. The Authority estimates the utilisation rate of imputation credits as being in the range of 0.48 to 0.59 at the current time (based on the most recent ABS data for December 2014, and using the 'refined' approach), depending on whether the estimate is based on listed or all equity respectively.

1870. The Authority notes that this is somewhat lower than Handley's estimate, which is that the corresponding range is 0.5 to 0.7, depending on whether listed or all equity is used.[844] The Authority notes that Handley's estimate is based on earlier ABS data (March 2014), and also took account of the estimate of Hathaway, that 'domestic investors held between 75 per cent and 81 per cent of Australian equity between 1988 and 2012'.[845] The Authority has not accounted for Hathaway's data, given its preference to focus on the estimates for the post-2000 period.

Taxation statistics

1871. Taxation statistics estimate the utilisation of imputation credits, which is a measure of the imputation credits redeemed by shareholders. The method uses Australian Taxation Office (**ATO**) statistics to observe the proportion of distributed imputation credits that have been used by investors to reduce their personal taxation liabilities.

844 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 36.

845 J.C. Handley, *Advice on the Value of Imputation Credits*, 29 September 2014, p. 35.

The approach implicitly assumes that the value of a redeemed franking credit is equal to its face value, whilst an unredeemed franking credit has no value. It follows that the average value of a franking credit is equal to the proportion of franking credits redeemed.[846]

1872. The Authority noted in the Rate of Return Guidelines that two studies – performed by Hathaway and Officer (2004) and Handley and Maheswaran (2008) – have been considered by regulators in the past to estimate the required utilisation rate.[847]

1873. Hathaway and Officer (2004) examined national tax statistics in order to estimate the average value of redeemed imputation credits from 1988 to 2002.[848] They calculated that 71 per cent of company tax payments had been distributed as imputation credits on average and estimated that 40 to 50 per cent of the distributed credits were redeemed by taxable investors. Taking these two factors into account indicated to the authors that the statutory company tax rate is reduced by a proportion of 28 to 36 per cent. This suggested that the effective rate of company taxation is around 19 to 21 per cent. They estimated a value of gamma within a range of 0.38 to 0.44. However, they noted that some of their data is not reliable.[849]

1874. Handley and Maheswaran (2008) examined the reduction in individual tax liabilities due to imputation credits from 1988 to 2004.[850] Their study found that 67 per cent of distributed imputation credits were used to reduce personal taxes between 1990 and 2000, and this increased to 81 per cent over 2001-2004.

1875. In his advice to the AER, Lally observed that SFG Consulting has previously argued that taxation statistics can only provide an upper bound on the utilisation rate, as opposed to a point estimate.[851,852] This argument was also previously accepted by the Authority as a consequence of the ACT decision.[853] Lally notes that as people who receive franking credits utilise them fully, this is incorrect and redemption rates can be used to provide a point estimate of the utilisation rate (which Lally refers to as *U*). Lally demonstrates this by defining u_i as the utilisation rate of investor i, and t_i to denote their marginal taxation rate.

---

846 NERA Economic Consulting, *The Value of Imputation Credits*, A report for the ENA, Grid Australia and APIA, 11 September 2008, p. 23.

847 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules*, 16 December 2013, p. 212.

848 N.J. Hathaway & R.R. Officer, *The Value of Imputation Tax Credits,* working paper, Melbourne Business School, 2004, p. 14.

849 N.J. Hathaway & R.R. Officer, *The Value of Imputation Tax Credits,* working paper, Melbourne Business School, 2004, p. 14

850 J. Handley and K. Maheswaran, "A Measure of the Efficacy of the Australian Imputation Tax System", *The Economic Record*, Vol. 84, No. 264, 2008, pp. 82-94.

851 SFG Consulting, *Estimating Gamma,* Report prepared for QR National, 2012, p. 7.

852 M. Lally, *The Estimation of Gamma,* Report for the AER, November 2013, p. 18.

853 Economic Regulation Authority, Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules, 16 December 2013, p. 212.

1876. Lally identifies that the personal tax obligation of that investor due to dividends paid, after the taxes already paid by the company is as follows:[854]

$$Tax_i = (DIV + u_i IC)t_i - u_i IC \quad (30)$$

Where

DIV is the value of the dividend; and

IC is is the imputation credits for that company in the relevant period.

1877. Lally notes that Australian investors can be assigned to two groups, those who can and cannot utilise franking credits. Given that the taxation for those who can utilise franking credits is as follows:

$$Tax_i = (DIV + IC)t_i - IC \quad (31)$$

1878. It follows that u_i = 1 for these investors.

1879. Therefore, as the utilisation rate is not less than 1 for these investors, taxation statistics can provide an accurate point estimate of U. Implicit in this analysis is the assumption that franking credits cannot be transferred between investors. Lally continues by observing the evidence presented by McKenzie and Partington, which indicates that even though legislation exists to prevent this, it can be overcome in some cases.[855] Lally further notes that if this practice is extensive, it may result in tax statistics overestimating the utilisation rate. The Authority considers that as the legislation to transfer the credits exists to prevent this, it is likely to considerably constrain this activity and as a consequence this is not considered a significant issue.

1880. Lally considered that the tax statistics approach lacks precision, but still preferred it as an estimate over implied market value studies.[856]

1881. The Authority notes that Hathaway has observed that large discrepancies exist in relation to franking credits when comparing ATO taxation data to that of ATO company financial data.[857] Hathaway urges caution in using ATO statistics for any estimates of parameters concerned with franking credits, until a reconciliation related to the actions of state owned enterprises is conducted, which may provide an explanation.

---

854 M. Lally, *The estimation of gamma*, 23 November 2013, p. 18.

855 M. McKenzie, and G. Partington, *Evidence and Submissions on Gamma,* report prepared for the AER, 2010.

856 M. Lally, *The estimation of gamma*, 23 November 2013, p. 4.

857 N. Hathaway, *Imputation credit redemption ATO data 1988-2011, Where have all the credits gone?*, September 2013, p. 5.

1882. Both the AER, and Lally observe that using taxation statistics may be inconsistent with the interpretation of gamma under the Officer framework, where the utilisation rate is required to satisfy the complex weighted average.[858] Taxation statistics produce an estimate of the utilisation rate that is weighted by the amount of imputation credits received, not by equity ownership or risk aversion. On balance, the AER noted that it considers taxation statistics have merit in informing the required utilisation rate, but given these criticisms, it does not propose relying solely on this in informing its judgement. The Authority agrees with these conclusions.

1883. The Authority considered in the Draft Decision that taxation statistics can be used to empirically estimate the utilisation rate, concluding that tax statistics provide an estimate for the utilisation rate of 0.4 to 0.8.

1884. However, given the concerns of Hathaway, Lally and the AER, the Authority did not consider that this methodology can be given much weight in determining the utilisation rate.[859]

1885. ATCO in its response to the Draft Decision did not question the accuracy of the tax statistics estimate, but rather the relevance of the resulting estimate for the utilisation rate, based on the views of its consultant SFG, as discussed above.

1886. The Authority notes that in the period since the Draft Decision the AER has set out a further review the evidence for the estimate based on tax statistics, drawing on and further considering views from the experts:[860]

- evidence assembled by Hathaway points to a range of 0.4 to 0.6 for the utilisation rate;
- based on the observation that the post-2004 taxation statistics data is more reliable than prior to that date:

> In this current work I only consider franking credit flows for the period for 2004 onwards and can provide a much more detailed insight into the flows and utilisations of franking credits for that period
>
> I would caution anyone, including the AER, against relying on those parts of my earlier reports which focussed on ATO statistics [up to 2004]. The data was then not as clear as it is today. I had to rely on separate analyses of ATO tax data and the ATO financial data. As I am now aware with the new data, there is an extremely large discrepancy between these two subsets of data. The missing link was the data on the flows of credits between companies which is now visible after the changes of 1 July 2002. I would recommend that the AER do not rely on that earlier report.[861]

- informed by two estimates for the period 2004 to 2011: 0.43 and 0.61, which reflect two alternative measures of the value of credits distributed, and two alternative estimates of the distribution rate;

---

858 Australian Energy Regulator, Better Regulation Explanatory Statement for the Rate of Return Guidelines, www.aer.gov.au, December 2013, p. 175.

859 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 441.

860 Australian Energy Regulator, *Draft Decision, Jemena Gas Network's 2015–20 Access Arrangement*, Attachment 4 Value of imputation credits, pp. 4-58 to 4-59.

861 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, p. 6.

- the 0.43 estimate of the utilisation rate corresponds to estimates of the distribution rate of around 0.7;
- the 0.61 estimate of the utilisation rate corresponds to estimates of the distribution rate of around 0.5 respectively;
- with Hathaway's estimate of 0.43 based on post-2004 data being preferred as reasonable as it is consistent with an estimate of the distribution rate for 'all equity' of 0.7;[862]
- Handley considered that tax statistics provide a relevant estimate for the utilisation rate, concluding that a range of 0.4 to 0.6 is appropriate, based on the Hathaway material.[863]

1887. The Authority has reviewed this evidence and considers that the Hathaway study provides the best estimate of the utilisation rate derived from taxation statistics. On that basis, the Authority considers that a revised range of 0.4 to 0.6 is appropriate, and that a point estimate of 0.43 should be applied given the Authority's preference to base its estimates on 'all equity', with a distribution rate of 0.7.

1888. However, the Authority remains mindful of Hathaway's concerns with the ATO data, and the pointed caution about relying on it for estimating utilisation rates:

> Unfortunately, there are too many unreconciled problems with the ATO data for reliable estimates to be made about the utilisation of franking credits. The utilisation rate of franking credits is based on dividend data (from the tax office) and I have demonstrated that this data is questionable.[864]

Implied market value studies

1889. Implied market value studies include:

- simultaneous price studies; and
- dividend drop off (**DDO**) studies.

1890. In the Guidelines and the Draft Decision, the Authority concluded that simultaneous price studies cannot be used to estimate the utilisation rate.[865] The Authority notes that ATCO has not contested this point.

1891. The range of DDO studies were considered at length in the Guidelines. The Authority considered the set of existing DDO studies. The Authority in the Guidelines adopted a range for the utilisation rate of 0.35 to 0.55, based on the results of studies by SFG and by the Economic Regulation Authority Secretariat.

1892. The Authority in the Draft Decision retained the range developed in the Rate of Return Guidelines – of 0.35 to 0.55 – but determined to adjust the estimates to reflect Lally's

---

862 Australian Energy Regulator, *Jemena Gas Network's 2015-20 Access Arrangement Draft Decision*, Attachment 4, p. 4-20.

863 J. Handley, *Advice on the value of imputation credits*, 29 September 2014, p. 31.

864 N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, p. 39.

865 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 448.

advice that the regression coefficient on franking credits estimated in dividend drop off studies may not necessarily equate to the utilisation rate theta, given that the tax rate on gross dividends diverges from capital gains. Rather, Lally argues that the regression coefficient on franking credits may be constituted as a product of the utilisation rate theta and the regression coefficient on the value of the dividend in determining the resulting share price drop off.[866]

1893. Adjusting the estimates utilised for the Rate of Return Guidelines to account for this issue – by dividing the estimated regression coefficient on the franking credit by the estimated regression coefficient of the cash dividend – results in an estimate of theta of 0.4 from the SFG analysis,[867] and a range of 0.38 – 0.69 from the results of the Authority's own analysis.[868]

1894. The Authority's resulting range in the Draft Decision for theta derived from dividend drop off studies was 0.3 to 0.7. The broad range reflected the Authority's concern with the quality of DDO estimates, and encompassed both the rounded adjusted and unadjusted estimates.

1895. The Authority in the Draft Decision determined to place limited weight on the DDO estimates, due to issues associated with the econometric estimation, and also its concern that the studies do not estimate the complex weighted average utilisation rate over all equities.[869] The Authority considered that dividend drop off studies are only useful to the extent that they confirm that investors place value on franking credits, however, due to the econometric issues associated with them, their exact market value cannot precisely be determined.[870]

1896. ATCO's consultant SFG provides the following response to the Authority's Draft Decision with regard to DDO estimates:[871]

- econometric issues are not significant as to preclude use of DDO studies;
- DDO estimates measure the utilisation rate directly; no adjustment is required for the coefficient on dividends;
- the composition of investors around ex-dividend dates is representative of the long term providers of equity capital;

---

866 Note that Lally refers to θ by the equivalent symbol *U* (see M. Lally, *Estimating Gamma*, Report for the QCA, 25 November 2013, p. 21).

867 SFG Consulting, *Dividend drop-off estimate of theta*, Final Report, 21 March 2011.

868 The upper bound of 0.69 is the division of the upper bound utilisation estimate of 0.53 (which was rounded up to 0.55) by the coefficient on the corresponding estimate of the cash dividend of 0.77 (see Table 5 in D. Vo, B. Gellard, S. Mero. 'Estimating the Market Value of Franking Credits, Empirical Evidence from Australia' Conference Paper, Australian Conference of Economists 2013).

869 SFG observes that it was unclear in the Draft Decision as to whether Authority disregarded or gave limited weight to DDO estimates – depending on which part of the document was read. The Authority notes that the section in Appendix 8 of the Draft Decision which referred to DDO estimates being disregarded was an oversight in the drafting process and was incorrect. It should have stated the Authority gave limited weight to the DDO studies. On the other hand, the reference to limited weight being placed on the DDO estimates – set out in the main body at p. 213 – was correct.

870 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 212.

871 ATCO, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 34.

- greater reliance should be placed on the SFG DDO studies.

Econometric issues

1897. SFG notes that:

> The ATCO Gas Draft Decision raises a number of general econometric issues in relation to dividend drop-off analysis. Most of these issues have previously been considered by the ERA, with the ERA determining that they are not so severe as to impact on its total reliance on drop-off analysis for estimating theta.[872]

1898. The Authority agrees that econometric issues did not preclude it giving limited weight to the DDO studies. However, the Authority remains of the view that:

- The required utilisation rate under the Officer framework is a complex weighted average determined by the value of equity that investor's hold and their relative risk aversion. Dividend drop off studies, however, only estimate the value weighted utilisation rate around just two days, the cum-dividend and ex dividend dates. As a consequence, they provide an estimate of the utilisation rate with a value weighting that reflects the composition of investors around the cum and ex dividend dates, not the weighted average across the entire market, as required.
- There are significant econometric challenges in estimating the utilisation rate from dividend drop off studies. Trading around the ex-dividend date reflects a variety of different incentives and price movements. Dividend drop off studies may not accurately separate out the effect of the taxation incentive associated with imputation credits on the share price change.

1899. The Authority notes that both Handley and Lally agree that the composition of investors around ex-dividend dates may not be representative of long term investors.[873] Lally also points out that ex-dividend movements can reflect a range of factors, including tax, transactions costs and preferences, such that it is not clear that tax arbitrage would necessarily exacerbate share price differentials around ex-dividend dates. The corollary is that it is not clear that DDO studies necessarily over-estimate the utilisation rate. For the same reasons, there remain valid concerns as to what exactly DDO studies are measuring.

1900. The Authority therefore considers that this is a contentious area. It adds to the caution the Authority has in relying too much on DDO studies for estimating the utilisation rate.

DDO coefficient adjustment

1901. The Draft Decision set out that the estimate of the utilisation rate is defined relative to a representative investor's ability to use each franking credit to reduce personal

---

872 ATCO, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 35.

873 M. Lally, *The estimation of gamma*, 23 November 2013, p. 29; J. Handley, *Advice on the value of imputation credits*, 29 September 2014, p. 15.

tax. However, as trading around the ex-dividend date represents a variety of different incentives, it may not accurately reflect the taxation incentive.[874,875]

1902. Econometric problems that exist with dividend drop off studies have been well explored by the Authority,[876] which has previously noted that this is the reason for the large divergence in empirical estimates of the utilisation rate using dividend drop off studies.[877] The Authority noted that any estimate of theta is essentially a function of the most influential observations, due to the extreme multicollinearity present in the data.

1903. This conclusion is supported by the AER, which has noted:

> Further, even if implied market value estimates were conceptually appropriate, there are significant limitations with the accuracy and robustness of such studies.[878]

1904. Lally further notes:

> The AER does not consider that these estimates are useful for a number of reasons. In respect of dividend drop off studies, these include evidence that trading activity around dividend ex-days is abnormal, that correction is required for market movements, and the sensitivity of results to data, outliers and model choices. More generally these problems include the difficulties in separating the values of franking credits and dividends in these studies, the wide range of empirical results from such studies, the possibility of bias from 'bid-ask bound', and the exposure of such estimates to the tax circumstance and transaction costs of tax arbitrageurs. Many of these problems are manifest in high standard errors in the estimates of the coefficients. I concur with all of these concerns, and I have additional concerns about these studies or their interpretation.[879]

1905. Lally also provides evidence that Australian regulators (including the Authority) and the ACT have consistently misinterpreted the results of dividend drop off studies for estimating the required utilisation rate. Lally observes that the coefficient of the regression equation in dividend drop off studies is generally assumed to be the utilisation rate, which Lally suggests is incorrect. Lally demonstrates this by first outlining the dividend drop off equation as follows:

$$P_{i,t-1} - P_{i,t}^{*} = \delta \mathrm{D}_i + \theta \mathrm{FC}_i + u_i \qquad (32)$$

Where

---

874 Influences on investors' incentives include their transaction costs, tax situation and trading strategies.

875 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 443.

876 D. Vo, B. Gellard, S. Mero. 'Estimating the Market Value of Franking Credits, Empirical Evidence from Australia', Conference Paper, Australian Conference of Economists 2013.

877 The Authority explored in the explanatory statement of the Rate of Return Guidelines the econometric issues encountered in dividend drop off studies, for a detailed discussion see: Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules,* Dec 2013, p. 216 and Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines* Dec 2013, Appendix 28.

878 Australian Energy Regulator, *Better Regulation Explanatory Statement for the Rate of Return Guidelines*, Dec 2013, p. 177.

879 M. Lally, '*The Estimation of Gamma,* Report for the AER', November 2013, p. 20.

$P_{i,t-1}$ is the cum-dividend price;

$P^*_{i,t}$ is the ex-dividend price corrected for the market movement;

D_i is the cash dividend;

FC_i is the franking credit; and

u_i is the regression residual.

1906. Lally begins by noting that no distinction should be made regarding the cash dividend and franking credit if the franking credit can be fully utilised, e.g. a cash dividend of $10 and a franking credit of $2 is equivalent to a cash dividend of $12. That is, an investor should be indifferent between the decomposition of any gross dividend received to the extent the franking credit can be utilised.[880] Lally further observes that if all investors can utilise imputation credits, the required regression equation would be as follows:

$$P_{i,t-1} - P^*_{i,t} = \delta[\mathrm{D}_i + \mathrm{FC}_i] + u_i \qquad (33)$$

1907. In this circumstance, δ, recognises that the expected price change can differ from the paid out gross dividend,[881] as in reality, the tax rate applicable on the gross dividend can diverge from that of capital gains.[882] In order to incorporate the empirical reality of not all investors being able to utilise franking credits, Lally notes that the franking credit covariate should be multiplied by the coefficient U, to represent the average utilisation rate. The required equation is then as follows:

$$\begin{aligned} P_{i,t-1} - P^*_{i,t} &= \delta[\mathrm{D}_i + U.\mathrm{FC}_i] + u_i \\ &= \delta\mathrm{D}_i + U.\delta\mathrm{FC}_i + u_i \end{aligned} \qquad (34)$$

---

880 Gross dividend refers to the sum of the cash dividend and the franking credit, $\mathrm{G}_i = \mathrm{D}_i + \mathrm{FC}_i$

881 The coefficient δ, is the gross drop-off ratio, see: Beggs D., and Skeels, C., 2006, 'Market Arbitrage of Cash Dividends and Franking Credits', *Australian Economic Papers,* vol 82, pp. 239 252. The estimated coefficient, $\hat{\delta}$, therefore measures the average change in stock price that occurs due to payment of $1 of gross dividend.

882 The Authority notes that the theoretical model underlying dividend drop off studies is based on Elton, E.J and Gruber, M.J (1970), 'Marginal Stock Holder Tax Rates and the Clientele Effect', *Review of Economics and Statistics,* 52, 68-74. Under the assumptions of no stochastic uncertainty, no time value of money and no transaction costs, it can be shown that $\delta = \frac{(1-\mathrm{T}_d)}{(1-T_g)}$ where T_d is the tax rate applicable to the gross dividend, whilst T_g is the tax rate applicable on capital gains. It follows that $\hat{\delta}$ measures the divergence in tax rates applicable to the gross dividend and capital gains of the representative investor.

1908. Based on this analysis, it is apparent that $\theta = U.\delta$. Therefore, in order to derive the required utilisation rate, U, from dividend drop off studies, the estimated coefficient of the franking credit, θ, must be divided by the estimated coefficient of the cash dividend, δ, as follows, $U = \frac{\theta}{\delta}$.

1909. The Authority in the Draft Decision accepted the criticism that it had misinterpreted the required utilisation rate in previous regulatory decisions, in addition to the Rate of Return Guidelines. Re-interpreting the required utilisation rate from the previously considered relevant dividend drop off studies results in a utilisation rate of 0.4 from the SFG analysis,[883] and an upper bound of 0.69 from the ERA Secretariat's analysis.[884]

1910. However, SFG considers that the DDO coefficient does not need to be adjusted:

> In our view, this adjustment is not appropriate when estimating theta as the value of distributed imputation credits. When theta takes a value interpretation within the regulatory framework, what is required is an estimate of the price that investors would be prepared to pay for an imputation credit. This is because the allowed return for an investor will be reduced by theta for every dollar of imputation credits that is distributed to them. To preserve the appropriate return to investors, the regulatory framework must reduce the return to investors by an amount that is equivalent to the price investors would be prepared to pay for the credit. Dividend drop-off analysis is specifically designed to estimate the price that investors would be prepared to pay for imputation credits. It directly estimates the extent to which imputation credits are capitalised into the stock price. This is an estimate of how much the stock price has been bid up in relation to the imputation credit that is to be received. The standard dividend drop-off estimate of theta provides a direct estimate of the value of distributed credits.[885]

1911. SFG considers that the proposed adjustment leads to perverse outcomes. To illustrate, SFG sets up a hypothetical example comparing two different outcomes with $\delta = 1$ and $\delta < 1$, while requiring shareholders to be equally well off. Where $\delta < 1$, investors do not value dividends as highly as $\delta = 1$. SFG argues that to be equally well off with $\delta < 1$, the value for theta would have to fall, but that this would not be the outcome dividing through by a lower $\delta < 1$.[886]

1912. However, the Authority is not convinced by this argument, as it sets up a 'straw man'. It is not clear to the Authority why, if investors do not value dividends as highly, they would necessarily have exactly the same preferences and requirements of utility. It may be that they do not require to be as well off if $\delta < 1$, given that they do not value dividends as highly.

---

883 SFG Consulting, *Dividend drop-off estimate of theta, Final Report*, 21 March 2011, p. 32. SFG's estimate is 0.35, which is 'paired with an estimate of the value of cash dividends in the range of 0.85 to 0.90'. Dividing 0.35 by 0.875 gives 0.4.

884 Based on adjusting the range of 0.35 to 0.55 (using robust techniques) set out in D. Vo, B. Gellard, S. Mero. 'Estimating the Market Value of Franking Credits, Empirical Evidence from Australia' Conference Paper, Australian Conference of Economists 2013, final paragraph. The corresponding value of δ in that study for the upper bound (unrounded) value with no market correction of 0.53 was 0.77 (Table 5). Dividing 0.53 by 0.77 gives 0.69.

885 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 36.

886 ATCO, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 36.

1913. SFG also considers that such an adjustment would be required throughout the regulatory process, as it is implicit in the Sharpe-Lintner CAPM that $\delta = 1$. SFG notes that Lally and van Zijl develop a more complex version of the CAPM with $\delta < 1$.

1914. On this point, the Authority notes that both Handley and Lally have recommended such an adjustment. Handley for example observes:

> The key message here is that other stuff (such as taxes and risk) may need to be taken into account in interpreting dividend drop-off studies…
>
> Importantly, the regression coefficients δ and θ can be interpreted in this way only if there are no other factors such as differential personal taxes and risk reflected in the estimates. But the results of SFG clearly tell us that this is not the case. SFG estimate the value of cash dividends δ to be in the range of 0.85 to 0.90 but one would expect a coefficient of $\delta = 1$ in the absence of differential personal taxes and risk, since by definition the (after-company-before-personal-tax) value of one dollar of dividends is one dollar. This means that the coefficient of $\theta = 0.35$ does not represent the (after-company-before-personal-tax) value of one dollar of imputation credits but rather it represents the (after-company-before-personal-tax) value of one dollar of imputation credits and the impact of other factors, such as differential personal taxes and risk. We don't really need to concern ourselves with precisely identifying what these other factors are – it is sufficient to know that collectively they have reduced the estimates of the (after-company-before-personal-tax) values of one dollar of dividends and one dollar of imputation credits by 10 – 15% . Accordingly, we need to gross-up the SFG estimates of θ by 10 – 15% to correctly interpret the results of the study. In other words, the SFG studies suggest a utilisation rate of 0.39 – 0.41 rather than the 0.35 as claimed. This approach is equivalent to the "Lally Adjustment"… [887]

1915. The Authority therefore considers that it is appropriate to retain the *adjusted upper bound* for the estimate of the utilisation rate, based on applying the Lally adjustment to the upper bound of its own study, but no longer rounded to one significant figure. That gives an upper bound of 0.69. The Authority will also adopt the unrounded lower bound of 0.35, which reflects the results from the Authority's unadjusted estimates and also SFG's unadjusted finding.[888]

1916. The resulting range is 0.35 to 0.69. This range is reasonably wide, reflecting the uncertainty surrounding the estimates, and the conflicting views of the experts.

Composition of investors

1917. SFG questions the Authority's concern with the composition of investors around ex-dividend days. SFG considers that the Energy Networks Association:[889]

> …demonstrated that the empirical evidence shows that the increase in trading volume around ex-dividend dates is driven by a subset of investors who value imputation credits highly. These investors purchase shares to capture the dividend and imputation credit, causing a run-up in the cum-dividend price.[890]
>
> To the extent that this effect is material, it results in the dividend drop-off being higher than it would otherwise be, which in turn results in the estimate of theta being higher than it would otherwise be. That is, to the extent that the increase in trading volume

887 J. Handley, *Advice on the value of imputation credits*, 29 September 2014, p. 43.

888 The Authority has adopted the unrounded range as it will apply the distribution rate for listed equity, of 0.8 (see paragraph 1942 below).

889 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 37.

890 The same point is made by McKenzie and Partington (2011), pp. 9-10.

around the ex-dividend date has an effect, it is likely to result in an over-estimate of theta.

1918. This point is addressed in paragraph 1899 above. The Authority considers that there remain valid concerns as to what exactly DDO studies are measuring, and that this is a contentious area. It adds to the caution the Authority has in relying too much on DDO studies for estimating the utilisation rate.

1919. In addition, SFG suggests that the Authority implied in the Draft Decision that a partially segmented domestic capital market, which includes the presence of foreign investors, means that any estimate of the utilisation rate using the DDO method is incompatible with the Officer CAPM framework and by extension the NGR. However, the Authority considers that this suggestion is incorrect, as it is taken out of context. SFG omits the full quote, which is:

> A key assumption of the Officer CAPM framework employed by Australian regulators is that it assumes a segmented domestic capital market in addition to tax invariance between capital gains and dividends. DDO studies, however, reflect the empirical reality of foreign investors and differential taxation rates between capital gains and dividends. Therefore, any estimate of the utilisation rate using the dividend drop off method is incompatible with the Officer CAPM framework and by extension the NGR.[891]

1920. The Authority was reporting Lally's views.[892] However, as noted above at paragraph 1845, the Authority does not agree with Lally's view that only a fully segmented market is consistent with the CAPM. In line with Handley's view, a partially segmented market may be defined for the purpose of the CAPM. It remains relevant, however, that the results of DDO studies may incorrectly estimate the value of the utilisation rate, given the potential influence on the estimates of other factors such as differential personal taxes and risk.

Relevance of the Authority's study

1921. SFG considers that the SFG DDO estimates are superior to the Authority's estimates, on the grounds that:[893]

- The Authority's estimates do not apply the 'standard market adjustment' to account for the overall movement of the market on the ex-dividend day. When the market correction is applied to the Authority's results, the outcome is very close to the SFG estimate of 0.35 for the market value of imputation credits.
- The mid-point of the Authority's range of 0.35 to 0.55 does not represent the best estimate, as the majority of estimates are below 0.45 – SFG considers that 0.4 is a better representation of the Authority's results;
- The SFG studies have been subject to intense scrutiny, including by the Australian Competition Tribunal, whereas the Authority's study has not.

---

891 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 442.

892 Paragraphs 89 – 91 of Appendix 8 are attributed to the AER (see the statement to this effect at paragraph 90), but should have been attributed to Lally.

893 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, pp. 40-41.

- The SFG theta estimates 'have been shown to be stable and reliable in the face of a battery of stability and robustness checks, whereas the ERA expresses concerns about the stability and reliability of its own results'.

1922. The Authority considers that its studies have been subject to extensive scrutiny, including by regulators, experts, and ATCO and SFG itself.[894]

1923. SFG considers that the ERA's study produces a theta estimate of 0.34 – when the same 'ex-day market correction is applied' as is undertaken by SFG in its study.[895] ATCO considers that this 'supports the SFG estimate'.[896]

1924. SFG also disagrees with the Authority's contention that DDO studies have resulted in a wide range of estimates, and are sensitive to particular data observations.

1925. However, Lally has considered both studies in depth, noting:

> …despite using the same methodology and data filtering rules to data from an almost identical period (July 2001 to July 2012 versus July 2001 to October 2012), Vo et al (2013) and SFG (2013a) generate some quite dramatic differences in results. In particular, for models 3 and 4 with OLS, SFG estimate U at 0.15 and 0.33 respectively whilst Vo et al estimates it at 0.60 and -0.08 respectively. In addition Vo et al's standard errors on the franking credit coefficient are on average 50% larger than SFG's. In addition, using different (but reasonable) approaches to investigating the effect of removing outliers, the effect on the parameter estimates is quite different. For example, in respect of SFG's preferred approach involving model 4 and "robust regression", the effect on Vo et al's estimate of the franking credit coefficient from progressively removing the 30 most extreme observations (in absolute terms), and rerunning the model after each deletion, is to generate estimates of this coefficient that (largely) progressively increase from 0.32 to 0.53 (ibid, Table 8 and Figure 15). The associated coefficients on cash dividends are not given but it could be presumed that the range in estimates for U would be at least as great as that for the coefficient on franking credits. Importantly, these 30 observations represent less than 1% of the total set of observations. By contrast, SFG progressively remove the 20 most extreme pairs of observations (the one that exerts the most upward effect on the franking credit coefficient and the one exerting the most downward effect) and find only trivial effect on the coefficient (SFG, 2013a, Figure 4).
>
> …in respect of the robust regression models used by both SFG and Vo et al, the latter authors rerun the models with various values of the "tuning constant" in the model, and obtain significantly different estimates of the coefficient on franking credits across the range of values for the tuning coefficient, for each of SFG's four models. For example, in respect of SFG's model 4, the estimated coefficient varies from 0.32 to 0.64 (Vo et al, 2013, Table 11 and Figure 19). Again, the associated coefficients on cash dividends are not given but it could be presumed that the range in estimates for U would be at least as great as that for the coefficient on franking credits.[897]

---

894 See for example, Australian Energy Regulator, Draft Decision: Jemena Gas Networks 2015-20, November 2014, Attachment 4, p.4-23.

895 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 41.

896 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 219.

897 M. Lally, '*The Estimation of Gamma,* Report for the AER', November 2013, p. 25.

1926. The Authority has also been concerned about such differences, and agrees with Lally when he states that 'these differences undermine the credibility of results from all such studies'.[898] This is an important further reason why the Authority concluded that DDO studies of the utilisation rate are vulnerable to the dividend sample, parametric form of the regression equation and regression technique used, and is a further reason why the Authority places only limited weight on the estimated range.[899]

The Lally conceptual test

1927. A summary of the Authority's consideration of this approach may be found in Appendix 8 of the Draft Decision.[900] The Authority in the Draft Decision concluded that Lally's conceptual test indicated that the utilisation rate should lie in the range of 0.6 to 1.

1928. The Authority's range is broader than that of Lally, who considered that the test should lie in the range of 0.8 to 1. Lally's key point is that moving from complete domestic market segmentation to incorporate the presence of foreign investors requires an internally consistent change in the parameters employed in the CAPM:

> …as one moves from a world of complete segmentation to complete integration, the model used should also change and this is not done. Instead regulators are using a model that presumes complete segmentation and populating it with an estimate for U that reflects partial segmentation. The result is regulatory estimates of the cost of equity that lie outside the bounds of complete segmentation and complete integration. Given the use of the Officer model by regulators, and an MRP estimate that can reasonably be presumed to lie between the two extreme cases, the only values for U that produce sensible estimates for the cost of equity are those from 0.80 to 1.[901]

1929. The Authority noted in the Draft Decision that the lower bound of Lally's estimated range of 0.8 depends on the assumptions used for the fully integrated (Solnik) model. The estimate of what is 'sensible' also depends on the assumptions used for the regulator's estimate of the partially segmented domestic MRP.

1930. It is possible that varying these assumptions would broaden the permissible range of what is potentially 'sensible'. Lally conducts sensitivity analyses, demonstrating that some combinations of the parameters provide sensible estimates for a value for U as low as 0.625.[902]

1931. Accordingly, the Authority considered it reasonable to infer a range for the utilisation rate of 0.6 to 1, as conceptual goal posts. The Authority recognised that there is uncertainty as to the exact lower bound, and that values approaching 0.6 require combinations of less likely parameter values.

1932. However, the conceptual goal posts approach has not found much support:

---

898 M. Lally, '*The Estimation of Gamma,* Report for the AER', November 2013, p. 25.

899 D. Vo, B. Gellard, S. Mero. 'Estimating the Market Value of Franking Credits, Empirical Evidence from Australia' Conference Paper, Australian Conference of Economists 2013.

900 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 442.

901 M. Lally, *The Estimation of Gamma,* Report for the AER, November 2013, p. 44.

902 M. Lally, *The Estimation of Gamma,* Report for the AER, November 2013, Table 3, p. 45.

- SFG considers that the conceptual text is based on 'an implausible and inherently contradictory foundation' such that it should be afforded no weight.[903]
- Handley does 'not consider the conceptual goalpost approach to be a reasonable approach to estimation as first, it is motivated by a faulty premise – that the CAPM suggested by Officer implicitly assumes that national markets for risky assets are completely segmented in the sense that all domestic assets are held by domestic investors only and all foreign assets are held by foreign investors only – and second, that it seeks to sure up one uncertain estimate by reference to two other estimates (the "goalposts") which themselves are subject to substantial uncertainty.[904]
- The AER, which placed a degree of reliance on the approach in its Guidelines, no long relies on it, 'mainly to be consistent with Handley's advice on the conceptual framework'.[905]

1933. The Authority considers that, in line with Handley's advice, it is reasonable to adopt a partially segmented capital market for the application of the CAPM. The Authority also considers that Lally makes a case as to the potential for internally inconsistent estimates to arise when moving away from the assumption of a completely segmented market, towards a more globally integrated market. The Authority considers that this provides a caution against adopting estimates of gamma that are at the lower end of estimated ranges.

1934. That said, the Authority accepts that there is a general concern about the validity of the range implied by the approach. Given the broad acceptance by the Authority of Handley's interpretation of gamma, and his concern over the uncertainty of the estimates for the range of the conceptual goal posts approach, noted above, the Authority will no longer place any weight on estimates from the method in determining the value of the utilisation rate.

1935. For these reasons, the Authority does not rely on the conceptual goal posts estimates for this Final Decision.

Distribution rate

1936. The Rate of Return Guidelines adopted an estimate for the distribution rate, F, of 0.7. The estimate was based on data for the cumulative payout ratio from Australian Tax Office (**ATO**) franking account balances, and related to listed and unlisted equity. The estimate has been widely accepted in recent times; the Australian Competition Tribunal (**ACT**) for example concluded that a distribution ratio of 0.7 was supported by a range of evidence and submissions.[906]

---

903 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 45.

904 J. Handley, *Advice on the value of imputation credits*, 29 September 2014, p. 31.

905 Australian Energy Regulator, *Jemena Gas Network's 2015-20 Access Arrangement Draft Decision*, Attachment 4, p. 4-69.

906 Australian Competition Tribunal, Application by Energex Limited (Distribution Ratio (Gamma)) (No 3) [2010] ACompT9, October 2010.

Listed and unlisted equity

1937. In its Draft Decision, the Authority noted that there is considerable variation in estimates based on diverse ATO data.

1938. For example, estimates of the cumulative distribution rate from *franking account balances* in the tax statistics – from 1987 to 2011 – is 0.7.[907] However, a five year average of recent annual estimates constructed from net tax and *franked dividends distributed* is estimated by NERA to be 0.53.

1939. Hathaway finds similar variation in results. Hathaway identifies a large discrepancy between the franking account balance and the franked dividends data as a potential contributor.[908]

1940. However, it is generally accepted that the cumulative distribution rate provides a reasonable estimate. Handley summarises the position with regard to these studies as follows:

> ...the cumulative payout approach… has been used by NERA (2013) and Hathaway (2013) and is reasonably uncontroversial. SFG (2014 p.57) also supports this estimation methodology. Using data from the start of the imputation tax system on 1 July 1987 and covering the twenty-four tax years from 1988 to 2011, NERA estimates the cumulative payout ratio to be 0.69. Hathaway (2013) provides an estimate of 0.71 based on the eight year period from 2004 to 2011.[909]

1941. On this basis, the Authority considers it reasonable to conclude that the ATO data supports an estimate for the distribution rate across all equity, listed and unlisted, of around 0.7.

Listed equity

1942. Following the same cumulative payout ratio approach used by Hathaway and NERA for all equity, Handley developed an estimate for only listed equity, based on ATO tax data, of 0.8.[910]

1943. The Draft Decision also noted that Lally has developed an alternative estimate of the distribution rate, based on the financial reports of the top 20 ASX200 firms, of 0.84.[911] SFG, however, is critical of this estimate, suggesting that it does not measure the distribution rate appropriately.

1944. In particular, SFG considers that:

- the regulatory framework and the Post Tax Revenue Model requires a distribution rate that is defined as the ratio of distributed credits to *corporate tax paid*; but that

---

907 Based on tax statistics estimates updated by NERA in 2013 and submitted by the Energy Networks Association as part of the Rate of Return Guidelines process (see NERA, *The Payout Ratio*, June 2013). In addition, a five year average of the most recent annual estimates, constructed by NERA from net tax and the change in the *franking account balance*, is 0.7.

908 N. Hathaway, *Imputation Credit Redemption: ATO data 1988-2011: Where have all the credits gone?*, September 2013, pp. 38-39.

909 J. Handley, *Advice on the value of imputation credits*, 29 September 2014, p. 27.

910 J. Handley, *Advice on the value of imputation credits*, 29 September 2014, p. 28.

911 M. Lally, *Estimating Gamma*, Report for the QCA, 25 November 2013.

- Lally has estimated the ratio of distributed credits to *imputation credits created*.[912]

1945. SFG suggests that large ASX firms pay a considerable amount of corporate tax overseas, which sets up a significant difference between the denominators of the two ratios.

1946. The Authority notes SFG's concerns. For that reason, the Authority has determined to rely on the Handley estimate alone, concluding that a reasonable estimate of the distribution rate for listed equity is 0.8.

Conclusions with regard to the distribution rate

1947. It is desirable to have an estimate of gamma that is internally consistent. The Authority notes that its preferred measures of the utilisation rate (refer below), are based on estimates derived using all listed and unlisted equity. As noted, the ATO data covers both listed and unlisted firms, giving estimates for listed equity and all equity.

1948. Therefore, the Authority will adopt a distribution rate of 0.7, consistent with the broad definition of all equity. Where it is required to adopt a distribution rate for listed equity, to allow consistency, the Authority will adopt a distribution rate of 0.8.

Estimate of gamma

1949. The Authority considers that three different approaches to estimating gamma are appropriate, based on the following methods for estimating the utilisation rate:

- the equity share approach;
- the taxation statistics approach;
- the DDO method.

1950. As noted above, the Authority will no longer take into account the conceptual goal posts for determining the estimate of gamma.

The equity share ownership estimate

1951. The Authority's estimate of the utilisation rate based on the equity share ownership approach is either 0.48 (listed equity) or 0.59 (all equity – both listed and unlisted).

1952. Combining the utilisation rate estimate for listed equity, of 0.48, with the estimate of the distribution rate for listed equity, of 0.8, gives an estimate of gamma of 0.38.

1953. Combining the utilisation rate estimate for all equity, of 0.59, with the estimate of the distribution rate of all equity, of 0.7, gives an estimate of gamma of 0.41.

1954. The resulting range for gamma from the equity share ownership approach is 0.38 to 0.41.

---

[912] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 10, p. 9.

1955. Rounding that range to one significant figure gives a point estimate of 0.4 for gamma – with both listed and all equity supporting the point estimate.

The taxation statistics estimate

1956. The Authority's estimate of the utilisation rate based on the taxation statistics approach is 0.43. Combining that estimate with the relevant estimate of the distribution rate of 0.7 (all equity) gives a point estimate of gamma of 0.3, at one significant figure.

The dividend drop off estimate

1957. As discussed above, the Authority's estimate of the utilisation rate from DDO studies is fairly broad, at 0.35 to 0.69, reflecting concerns with the robustness of the method.

1958. That range for the utilisation rate combines with an estimate of the distribution rate for listed equity of 0.8.[913] The resulting range for gamma is 0.3 to 0.5, rounded to one significant figure.

Estimate of gamma

1959. The Authority bases its estimate of gamma on the following, with estimates given most weight ranked first:

- the equity share ownership approach gives an estimate of gamma of 0.4;
- the taxation statistics approach gives an estimate of gamma of 0.3;
- the DDO approach gives a range for the estimate of gamma of 0.3 to 0.5.

1960. The resulting range for the Authority's estimate of gamma is 0.3 to 0.5.

1961. Consistent with its approach set out in the Draft Decision, the Authority places most reliance on the equity share ownership approach. It suggests a point estimate for gamma of 0.4.

1962. Taxation statistics suggest that the estimate of gamma could be lower, at 0.3. However, the Authority does not place much weight on the estimate, or on its ability to inform a point estimate of the utilisation rate, given concerns about the robustness of the taxation data used for estimating the utilisation rate.

1963. Similarly, the DDO estimate suggests that the estimate of gamma could be higher or lower than 0.4, although the mid-point of the estimate range supports an estimate of 0.4. The Authority gives only limited weight to the estimated range, and to the point estimate, given its concerns with regard to the sensitivity of the estimates to the dividend sample, parametric form of the regression equation and regression technique used.

1964. Based on the foregoing, the Authority considers that the evidence supports a point estimate of the value of imputation credits of 0.4. Therefore, the Authority does not accept the value of 0.25 put forward by ATCO.

---

[913] The Authority considers that it was in error in the Guidelines and Draft Decision in applying an estimate of the distribution rate that was based on all equity. As the DDO estimates are (listed) market based estimates, they should be paired with an estimate of the distribution rate that is based on listed equity.

1965. The Authority considers that the resulting estimate of 0.4 is consistent with its approach used elsewhere in this Final Decision, and in particular the use of the value of imputation credits within the building block framework. The estimate is supported by a range of evidence, including relevant academic literature, and also the views of academic experts:

- the estimate is within the range set out by Handley for his preferred estimate of gamma, of 0.4 to 0.5;[914]
- the estimate is primarily based on the equity share ownership approach, which is Lally's second preference as a method for estimating gamma (after a strict Officer CAPM approach, which gives a value of 0.7 based on a utilisation rate of 1).[915]

1966. The Authority therefore considers that its estimate is fit for purpose, notwithstanding concerns with the data and the resulting robustness of the estimates. Importantly, the use of a range of approaches for estimating gamma assists in overcoming limitations associated with any particular study. This helps to ensure that the estimation method is consistent with accepted economic and financial principles, informed by sound empirical analysis. For these reasons, the Authority considers that its estimates meet the requirements of the National Gas Law and the National Gas Rules.

1967. In contrast, the Authority notes that ATCO's proposed estimate was based on a single study, of questionable robustness. The Authority considers that ATCO's proposed estimate does not provide the best estimate for the purposes of the National Gas Rules, and therefore requires that ATCO amend its value for use in the building block model.

Required Amendment 8

A gamma of 0.4 must be adopted.

Depreciation

Regulatory Requirements

1968. Rule 88(1) of the NGR provides that the 'depreciation schedule sets out the basis on which the pipeline assets constituting the capital base are to be depreciated for the purpose of determining a reference tariff'. Rule 88(2) of the NGR provides that the 'depreciation schedule may consist of a number of separate schedules, each relating to a particular asset or class of assets'.

1969. Rules 89 and 90 of the NGR specify particular depreciation criteria and requirements for the calculation of depreciation for establishing the opening capital base for the subsequent access arrangement.

1970. Rule 89 criteria are as follows:

914 J. Handley, *Advice on the value of imputation credits*, 29 September 2014, p. 3.

915 M. Lally, *The Estimation of Gamma,* Report for the AER, 23 November 2013, p. 5.

89. Depreciation criteria

1) The depreciation schedule should be designed:

   (a) so that reference tariffs will vary, over time, in a way that promotes efficient growth in the market for reference services; and

   (b) so that each asset or group of assets is depreciated over the economic life of that asset or group of assets; and

   (c) so as to allow, as far as reasonably practicable, for adjustment reflecting changes in the expected economic life of a particular asset, or a particular group of assets; and

   (d) so that (subject to the rules about capital redundancy), an asset is depreciated only once (ie that the amount by which the asset is depreciated over its economic life does not exceed the value of the asset at the time of its inclusion in the capital base (adjusted, if the accounting method approved by the [Authority] permits, for inflation)); and

   (e) so as to allow for the service provider's reasonable needs for cash flow to meet financing, non-capital and other costs.

2) Compliance with subrule (1)(a) may involve deferral of a substantial proportion of the depreciation, particularly where:

   (a) the present market for pipeline services is relatively immature; and

   (b) the reference tariffs have been calculated on the assumption of significant market growth; and

   (c) the pipeline has been designed and constructed so as to accommodate future growth in demand.

3) The [Authority's] discretion under this rule is limited.

1971. The Authority's discretion is limited under rule 89 of the NGR. Rule 40(2) of the NGR sets out the Authority's limited discretion powers, which effectively states that, where a provision of the NGL or NGR states that the Authority's discretion is limited, the Authority must not withhold its approval of an element of an access arrangement proposal if it is satisfied that the element complies with the applicable requirements of the NGL and the NGR and is consistent with applicable criteria (if any) prescribed by the NGL and the NGR.

1972. Rule 40(2) of the NGR provides the following example:

> The [Authority] has limited discretion under rule 89. (See rule 89(3)). This rule governs the design of a depreciation schedule. In dealing with a full access arrangement submitted for its approval, the [Authority] cannot, in its draft decision, insist on change to an aspect of a depreciation schedule governed by rule 89 unless the [Authority] considers change necessary to correct non-compliance with a provision of the Law or an inconsistency between the schedule and the applicable criteria. Even though the [Authority] might consider change desirable to achieve more complete conformity between the schedule and the principles and objectives of the Law, it would not be entitled to give effect to that view in the decision making process.

1973. Rule 90 of the NGR specifies that a full access arrangement must contain provisions governing the calculation of depreciation for establishing the opening capital base for the next access arrangement period after the one to which the access arrangement currently relates. The provisions must resolve whether depreciation of the capital base is to be based on forecast or actual capital expenditure.

ATCO's Proposed Changes

1974. ATCO proposed to transition its RAB depreciation from a Current Cost Accounting (**CCA**) approach to a Historic Cost Accounting (**HCA**) approach over two access arrangement periods.

1975. GDS access arrangements to date have implicitly applied the CCA approach, given the previous real pre-revenue model used to derive the allowed total revenue.[916] The CCA approach indexes the written down value of the previous year's asset base, each year, to account for inflation, thereby maintaining the written down historic value in *real* terms (giving the so-called 'current cost'). Annual depreciation is then calculated on the current cost, given the effective life of the asset.

1976. Under its proposed approach, ATCO seeks to apply straight line depreciation in nominal terms to the historic cost of the asset. The HCA approach is based on the historic values of the assets at the time of expenditure. Under HCA, the historic cost values are not indexed year to year for inflation. Annual depreciation is calculated by dividing the historic (book) value of the asset by its effective life. The resulting value in nominal terms for each year is then included as the depreciation building block in the cost of service.

1977. ATCO considers that adopting a HCA depreciation methodology, with a depreciation allowance calculated on a straight line basis, minimises the gap between Long Run Marginal Cost (**LRMC**) and the average revenue per unit, avoids double counting of inflation and reduces the costs to be recovered from customers in the future. ATCO also considers that the HCA method is simpler, better understood than CCA and is more widely used in competitive markets.

1978. ATCO accepts that the change from CCA to HCA will result in a short term price increase to customers. Therefore, ATCO proposed a transition to the new method by first applying HCA to all capital expenditure additions that occur from 1 July 2014, and then progressively applying HCA to the past capital base over the next two regulatory periods.

1979. ATCO engaged NERA consultants to provide an opinion on rule 89(1) of the NGR and its proposed transition method.[917]

1980. ATCO proposed a fixed principle to give effect to the transition. ATCO's proposed fixed principle is discussed in the fixed principles section.

1981. Table 95 shows ATCO's proposed calculation method and transitional depreciation amount for the fourth access arrangement period.

---

916 Straight line depreciation in a real revenue model is consistent with applying the indexed CCA method in a nominal revenue model.

917 NERA Economic Consultants, *Depreciation Options for ATCO Gas*, 13 March 2014. (Gregory Houston the author of the document published this report whilst working for NERA. He is now a partner in HoustonKemp. ATCO submitted a further report by Gregory Houston on depreciation in response to the draft decision under HoustonKemp).

Table 95 ATCO's Initial Proposed Forecast Depreciation Calculation: 2014 to 2019

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019	Total
Forecast depreciation on opening capital base 1 July 2014 (straight line depreciation on CCA capital base less double counting of inflation)	4.83	12.83	13.46	13.56	13.32	12.20	70.19
Forecast depreciation on forecast capital expenditure (straight line depreciation on HCA capital)	-	2.69	7.00	11.31	15.59	20.54	57.13
Total	**4.83**	**15.52**	**20.45**	**24.86**	**28.91**	**32.74**	**127.33**

Source: ATCO Gas Australia, Tariff Model, September 2014.

1982. ATCO also proposes to reduce the economic asset lives of its high pressure steel and plastic pipelines and has added a new asset class for vehicles or fleet.

Submissions

1983. Kleenheat Gas expressed concern with the short to medium term impact of the proposed transition from CCA to HCA. Kleenheat Gas states that higher tariffs in the short term will create a barrier to entry for some customers connecting to natural gas and that this is counterintuitive to promoting efficient growth in the natural gas market.

Draft Decision

1984. The Authority in the Draft Decision required ATCO to adopt the CCA approach for its depreciation schedule for the RAB. The Authority required ATCO to apply straight line depreciation to the indexed value of the regulated asset base.

1985. The Authority did not approve ATCO's proposed HCA transition approach for depreciation, as it considered ATCO's proposed HCA transition approach:

- is not consistent with rule 89(1)(a) of the NGR;
- does not comply with the National Gas Objective under the NGL; and
- does not comply with the Revenue and Pricing Principles under the NGL.

1986. Importantly, the Authority considered that the HCA approach leads to subsidies from current to future consumers, which is not in the long term interests of all consumers.

1987. In contrast, the Authority considered that the CCA approach is consistent with the applicable criteria under rule 89(1) of the NGR, and complies with the NGL. Unlike the HCA, the CCA approach has advantages in:

- signalling efficient use of the GDS both now and in the future, thereby achieving efficient growth in the market for reference services;
- encouraging efficient production and investment decisions by the service provider, as well as by upstream and downstream consumers;
- avoiding price shocks for consumers, both for the forthcoming access arrangement, and also at the end of the economic lives of major assets; and

- avoiding subsidies between current and future consumers, thereby ensuring outcomes that are in the long term interests of consumers with respect to price.

NGR 89(1)(a) - promoting efficient market growth

1988. The Authority considered that ATCO's proposed HCA approach, combined with the proposed transition approach, is not consistent with the criteria in rule 89(1)(a) of the NGR.

1989. The Authority did not accept ATCO's argument that the HCA approach minimises the extent of departure from the purported LRMC trend. This was despite ATCO's consultant maintaining that nominal HCA depreciation will be more 'flat' than CCA – leaving less of a gap to an argued declining LRMC over the longer term.

1990. The Authority examined the revenue and LRMC claims made by NERA associated with the HCA and CCA depreciation approaches for ATCO's network. The Authority concluded that NERA's analysis was flawed, and therefore that NERA's claims with regard to the CCA approach are not supported, because:

- a realistic portrayal of future revenue shows that the average revenue per GJ is declining over time under both depreciation approaches, implying that the long run marginal revenue must also be declining under both approaches; and
- evidence relating to the trend for the LRMC of gas services does not support the conclusion that it will decline strongly in future, but is likely to remain close to flat in real terms.

Other considerations

Price shocks

1991. The Authority considered that the HCA method would lead to an unnecessary price shock in the near term (and potential price shocks in the future as significant assets are replaced), thereby unnecessarily discouraging demand due to the resulting relatively higher prices.

Discourage efficient management of pipeline assets

1992. The Authority considered that the proposed HCA approach unnecessarily discourages demand early in an asset's life (due to the relatively higher prices at this time) and then encourages greater use near the end of its life (due to relatively lower prices). The Authority is therefore of the view that the proposed HCA approach may discourage efficient gas usage, as well as upstream and downstream investment at the current time, given the higher tariffs that result.

1993. The Authority considered – as ATCO's assets near the end of their useful lives – overutilisation might be encouraged through inefficiently low prices associated with HCA. This may also lead to inefficient overinvestment in their own assets by upstream and downstream users of the pipeline. Overutilisation of ATCO's assets may result in inefficient replacement being required sooner than otherwise necessary.

1994. ATCO's proposed HCA approach leads to a lower depreciated historical cost valuation of the capital base relative to the CCA approach. This may create an incentive for ATCO to replace assets sooner than may otherwise be the case, so as to be able to earn a higher return on the replacement cost of a new asset.

1995. The steeper recovery profile of revenues under ATCO's approach also means that all future capital expenditure will be recovered more quickly. Any step up in capital expenditure will cause a greater step up in revenues than would be the case under the CCA approach. The Authority considers the resulting incentives under the HCA approach are not consistent with efficient development of the market.

Treatment of inflationary Gain

1996. A further issue relates to the 'inflationary gain' element of CCA depreciation (that is, the index component of applying CCA in a nominal model). The Authority did not consider that the inflationary gain should be offset from the nominal depreciation, as occurs in the AER's PTRM. The Authority considered that the inflationary gain relates to the return on assets rather than nominal depreciation, as a nominal return is applied to a nominal indexed asset base under CCA.

1997. Accordingly, the Authority treated the inflationary gain as a separate item in the revenue building block, rather than deducting it from the depreciation value (as is done in the AER's PTRM) or the return on asset. This had the benefit of clearly identifying the component, and ensuring that it did not lead to anomalies, such as negative depreciation of land.

Authority's Draft Decision

1998. Table 96 shows the Authority's approved forecast depreciation amount for the fourth access arrangement period using the CCA approach.

Table 96 Authority's Draft Decision Approved Forecast Depreciation Calculation: 2014 to 2019

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019	Total
Forecast depreciation on indexed capital base 1 July 2014 (straight line depreciation on indexed CCA capital base)	15.06	36.23	39.98	43.22	46.80	50.58	231.87

Source: ERA, GDS Tariff Model, October 2014.

ATCO's Response to the Draft Decision

1999. ATCO did not accept the Authority's requirement in the Draft Decision to apply straight line depreciation to the indexed value of the regulated asset base (the CCA approach).

NGR 89(1)(a) - Promoting efficient market growth

2000. ATCO remains of the view that the preferred depreciation methodology is to apply straight line depreciation in nominal terms to the historic cost of the asset (the HCA approach). ATCO maintains that it's initially proposed depreciation schedule results in tariffs varying over time in a way that promotes efficient growth in the market for reference services, whereas the approach required in the Draft Decision does not. ATCO has resubmitted its transition method so that the change in methodology occurs over more than one access arrangement period.

2001. ATCO maintains that the non-indexed HCA approach will, over the longer term, be less divergent from LRMC than an indexed CCA approach. ATCO's consultant Houston Kemp revised the earlier analysis by NERA, but maintains that the non-indexed approach still minimises the gap between the change in unit price per GJ and the indicative LRMC trend, in constant prices.

2002. ATCO considers that the Authority's approach falls into error from the commencement of the fourth access arrangement period onwards. NERA believes that the Authority's model is in need of revision such that the volume forecast used to derive average prices is commensurate with the level of capital expenditure used to derive the annual revenue requirement in each year.

Other considerations

Price Shocks

2003. In its response to the Authority's Draft Decision, ATCO proposed that its prices to customers will decline in real terms over the fourth access arrangement period. ATCO states that under the transition to a non-indexed approach, the contribution of the depreciation amount to the price path in the future will also decline. Under the indexed approach, prices will fall more during the fourth access arrangement period but the contribution of depreciation to future prices will increase, thereby putting upward pressure on the price.

2004. ATCO's consultant NERA originally modelled the average prices (expressed in revenue per GJ) under ATCO's transitional HCA approach and under the indexed asset base with indexed CCA depreciation. ATCO's second consultant HoustenKemp then revised the NERA modelling, and concluded that both HCA and CCA give rise to broadly similar prices for the period 2014-2024, as is the intention of the transitional approach.

Discourage efficient management of pipeline assets

2005. ATCO disagrees with the Authority's view that ATCO would inefficiently invest in replacing assets before the end of their assumed lives as this inefficient investment would not be accepted by the Authority. ATCO's consultant NERA outlined that the most appropriate long term incentives for both pipeline owners and users will be created when the gap between best estimates of longer term prices and long term LRMC is minimised.

2006. ATCO claims that the incentive for a business to invest in inefficient assets is that they expect to earn a reasonable return over the life of the asset. ATCO says that under the NGR the criteria to be met before an investment is added to the RAB and the return are the same under both indexation (CCA) and non-indexation (HCA) approaches.

2007. ATCO considers that assuming the tariff structure is efficient, non-indexation will only result in inefficient use of the assets or distort incentives for investment where the long term price trend is rising. Therefore, the recovery of capital more quickly under a non-indexed approach will only be inefficient if the price trend is rising over the longer term. ATCO states that the Authority has found that the price trend is not rising over the longer term.

Inflationary gain

2008. ATCO submits that the Authority's approach of making an inflationary adjustment to total revenue does not comply with rule 76 of the NGR, as rule 76 sets out a complete listing of the revenue building blocks and does not provide for a new or further building block to be added. ATCO considers that the only correct way to remove a double counting of inflation is to remove it in the calculation of the depreciation building block. ATCO notes this is because the NGR requires a nominal rate of return to be applied (so the double count cannot be removed from the return on capital because the effect of doing so would be that the return would be real) and no other building blocks are allowed. ATCO considers that if transparency is desired, the removal of inflation from the depreciation building block can be expressly acknowledged and shown.

ATCO's revised proposal

2009. Table 97 shows ATCO's proposed calculation method and transitional depreciation amount for the fourth access arrangement period.

Table 97 ATCO's Revised Proposed Forecast Depreciation Calculation: 2014 to 2019

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019	Total
Forecast depreciation on opening capital base 1 July 2014	4.84	12.72	13.52	13.65	13.43	12.72	70.89
Straight line depreciation on CCA capital base	17.36	37.80	38.28	38.07	37.51	36.47	205.49
Less: Inflationary Gain	(12.52)	(25.08)	(24.76)	(24.42)	(24.08)	(23.74)	(134.60)
Forecast depreciation on forecast capital expenditure (straight line depreciation on HCA capital)	-	2.63	7.02	11.29	15.57	20.29	56.79
ATCO's Proposed Depreciation of Projected Capital Base	**4.84**	**15.35**	**20.54**	**24.94**	**29.00**	**33.01**	**127.68**

Source: ATCO Gas Australia, Tariff Model, November 2014.

Considerations of the Authority

2010. Australian regulators generally adopt an indexed straight-line depreciation of the regulatory asset base. In line with the National Gas Objective (**NGO**), this 'standard' regulatory approach can be considered to be in the long term interests of consumers. This is because it results in a more even allocation of the return on and of capital in real terms over time, thereby:

- promoting efficient growth in the market for reference services over time in line with the requirements of rule 89(1)(a) of the NGR;
- providing efficient signals for efficient investment in and operation and use of assets used in the provision of reference services over the whole of their economic life, thereby further contributing to the achievement of the NGO and to the Revenue and Pricing Principles;

- taking account of the interests of current and future customers over the economic lives of the assets;
- avoiding subsidies from current customers to future customers; and
- avoiding price shocks for customers when major assets reach the end of their effective life and are replaced.

2011. The Authority notes that it has limited discretion under rule 89 of the NGR. However, under NGR 89 and 40(2), the Authority can reject ATCO's proposed depreciation approach if:

- it is not consistent with the applicable criteria listed under rule 89(1) of the NGR which includes ensuring that the depreciation schedule should be designed:
  - so that reference tariffs will vary, over time, in a way that promotes efficient growth in the market for reference services; and
  - so that each asset or group of assets is depreciated over their economic lives (see paragraph 1969 for other applicable criteria); or
- it does not comply with the applicable requirements of the NGL.

2012. ATCO remains of the view that the correct approach to avoid a double count of inflation is to not index the capital base. ATCO's proposed approach is to apply straight-line depreciation in nominal terms to the non-indexed historical costs of the RAB assets (the HCA approach). ATCO has resubmitted its transition method so that the change in methodology occurs over more than one access arrangement period.

2013. The Authority evaluates ATCO's further proposal in terms of the requirements of the NGR and NGL in the following paragraphs.

NGR 89(1)(a) - promoting efficient market growth

2014. In the Draft Decision, the Authority did not accept ATCO's argument that the HCA approach minimises the extent of departure from the purported LRMC trend. This was despite ATCO's consultant NERA maintaining that nominal HCA depreciation will be more 'flat' than CCA – leaving less of a gap to an argued declining LRMC over the longer term. The Authority considered that, on the contrary, CCA depreciation delivered average revenue closer to marginal costs, over the long run from 2020 to 2080.

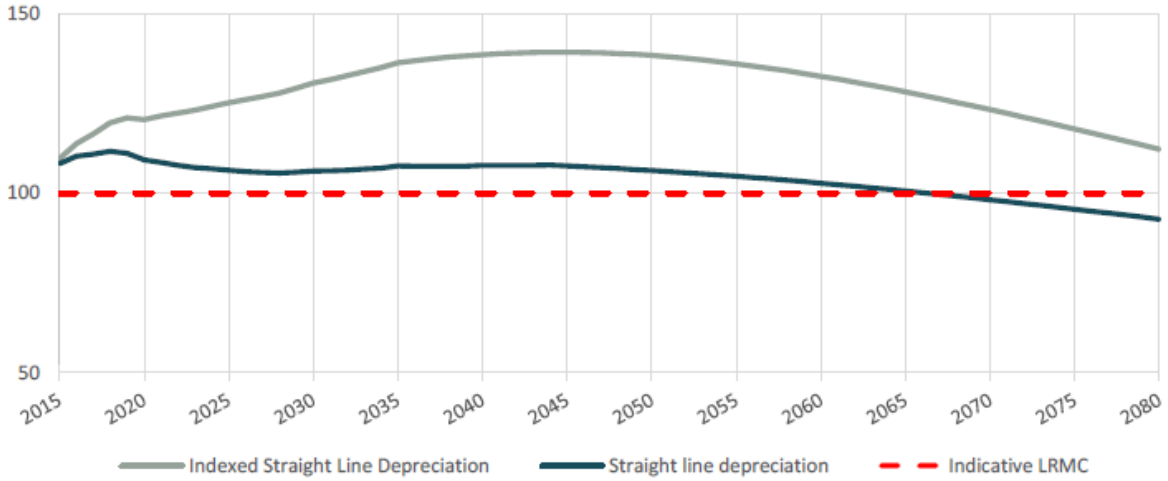
2015. In the Draft Decision, the Authority concluded that NERA's analysis was flawed, because:

- evidence relating to the trend for the LRMC of gas services does not support the conclusion that it will decline strongly in future, but is likely to remain close to flat in real terms; and
- average revenue per GJ is declining over time under both depreciation approaches, implying that the long run marginal revenue must be declining under both approaches.

2016. ATCO in its response to the Draft Decision continues to maintain that the non-indexed HCA approach will result, over the longer term, in average revenue that is less divergent from LRMC than an indexed CCA approach. ATCO's response contains further analysis from HoustonKemp that re-estimates the extent of the divergence,

while responding to the ERA's criticisms set out in the Draft Decision.[918,919] The HoustonKemp analysis maintains that – over the period to 2080 (which is consistent with the life of ATCO's long lived assets that have been installed in recent years) – the departure of the average unit price per GJ over time (constant prices) from even a flat trend for LRMC is minimised when HCA straight-line depreciation is applied (Figure 20).[920] ATCO, therefore, considers that the non-indexed HCA approach best promotes efficient growth in the market for reference services.

Figure 20 Houston Kemp's change in unit price per GJ and indicative LRMC tend, constant prices



Source: ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 11.1, p. 24.

Long run marginal cost and average prices

2017. The Authority considers that it is an accepted principle that economic efficiency will be achieved when users of a good or service face the marginal costs of use. The implication is that in competitive markets prices (average and marginal revenue) are set equal to marginal costs (and in the long run, average costs). However, in a natural monopoly, marginal costs at any point in time for any given capital allocation are declining, and hence are always below average costs. Pricing at marginal cost will therefore not allow full recovery of the (average) costs of the service provider. As a consequence, economic theory suggests that users should face the marginal costs of use, with the 'residual' to efficient average costs recouped through some charging scheme, such as a framework of fixed charges. Ideally, that charging scheme should not distort consumption choices.

---

918 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, Appendix 11.1, 27 November 2014.

919 ATCO submitted further analysis on depreciation in a report from HoustonKemp. Gregory Houston is the author of the HoustonKemp report. Gregory Houston previously submitted a depreciation report for ATCO when he worked for NERA.

920 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 11.1, p. 24.

2018. Assuming that, in the long run, marginal costs bear a (constant) proportional relationship to average costs, then average costs can signal efficient future trends in efficient pricing, signifying that the gap to long run marginal cost is minimised. This is the contention originally made by NERA:[921]

> The explicit reference in the NGO to three aspects of efficiency, being investment in, operation and use of natural gas services correspond, respectively, to the dynamic, productive and allocative dimensions of efficiency, as used and understood by economists.
>
> My interpretation of rule 89(1)(a) as giving rise to an allocative efficiency criterion for selecting between alternative depreciation schedules, and its consistency with the requirements of rule 94, therefore aligns with the requirements of the NGO.
>
> …It follows from the above discussion that the depreciation schedule that best promotes efficient growth in the market for reference services (as required by rule 89(1)(a)) will be that which minimises the extent of departure from LRMC pricing caused by the need to recover sufficient revenues.
>
> I note that rule 94(5) requires that this residual is to be recovered from the tariff element (generally, being the fixed component) that minimises the distortion to efficient patterns of consumption. Nevertheless, since the existence of any residual revenue requirement gives rise to the risk of distortion to efficient patterns of consumption (as recognised under rule 94(5)), the depreciation schedule should be designed to minimise the gap between LRMC and the revenue per unit to be recovered over the life of the asset. Applying this principle is an empirical task that requires an estimate of the future time profile of:
>
> - the LRMC of providing the reference service;
> - the revenue per unit associated with each depreciation methodology; and
> - the difference between them.

2019. These observations establish the general desirability of aligning trends in long run marginal costs with long run marginal revenue, and also long run average revenue.

2020. Consistent with this view, in ATCO's initial proposal, NERA sought to establish that HCA depreciation will deliver long run average revenue per GJ that is closer to long run marginal costs.[922] NERA's analysis was considered in the Authority's Draft Decision. The Authority did not accept this analysis, considering that CCA depreciation delivered average revenue closer to marginal costs, over the long run from 2020 to 2080.

2021. HoustonKemp's further analysis in ATCO's response to the Draft Decision re-estimates the extent of the divergence, while responding to the Authority's criticisms set out in the Draft Decision.[923]

---

921 ATCO Gas Australia, *Access Arrangement Information*, March 2014, Appendix 13, p. 11.

922 ATCO Gas Australia, *Access Arrangement Information*, March 2014, Appendix 13, p. 35.

923 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, Appendix 11.1, 27 November 2014.

2022. First, with regard to trends in LRMC over the period to 2080, HoustonKemp accepts for the purposes of the analysis that LRMC could remain flat into the future in real terms over the period to 2080.[924]

2023. Second, HoustonKemp contends that:

- The Authority's analysis in the Draft Decision 'assumes the same growth in gas volumes' as NERA's original analysis, but that this 'will be delivered from a substantially lower capital expenditure program'.[925]
- As a consequence, the Authority's pricing model assumes average consumption per B1, B2 and B3 tariff class customer increases from 19.7 GJ/year in 2012/13 to 33.1 GJ/year in 2080.[926]

2024. The Authority considers that the HoustonKemp average consumption outcomes are incorrect. They arise because HoustonKemp adjusts down the customer numbers over the period 2014 to 2019 to reflect the Authority's Draft Decision.[927] Inexplicably though, HoustonKemp omits to commensurately adjust the related gas volumes.

2025. HoustonKemp proceeds to retain these customer and volume numbers in its revised modelling. HoustonKemp states:

> I calculate volume for customers in tariff classes B1, B2 and B3 by:
>
> - using the 2015 to 2019 B1, B2 and B3 customer numbers in the draft decision; and
> - increasing the number of new B1, B2 and B3 customers in 2020 onwards, in accordance with the ERA's assumed rate of growth in capital expenditure.
>
> I find that deriving a volume forecast in this way gives rise to an internally consistent, and more realistic, level of consumption per customer over the 2020 to 2080 period. Figure 8 below illustrates that, correcting the volume forecast in the ERA's pricing model results in average consumption per customer in tariff classes B1, B2 and B3 remaining constant at approximately 20 GJ/year from 2020 to 2080, which is slightly higher than that assumed in my earlier modelled analysis.

2026. The resulting trend in the adjusted model produced by HoustonKemp is for average gas consumption in the B3 tariff class to *increase* over the 2014 to 2019 period, from 15.1 to 15.9 GJ per customer. That anomalous trend is then carried forward automatically. It results in a large increase in average consumption, and relative gas volumes, over the forecast period to 2080, reaching 18.4 GJ per customer by 2029.

---

924 HoustonKemp agrees that the ERA's analysis shows flat historic capital costs per unit of output (aside from the one off productivity gains associated with microeconomic reform in the 1990s). The Authority maintains that this provides an indication of future trends in the price of capital inputs for gas pipeline services. HoustonKemp adopts this as 'highly conservative assumption' (ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, Appendix 11.1, 27 November 2014, p. 18).

925 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 11.1, p. 19.

926 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 11.1, p. 20.

927 The Authority considered that the original NERA spreadsheet was a heuristic, so chose not to make confounding changes that obscured rather than enlightened the analysis. Accordingly, the Authority left the 2014 to 2019 data relating to the volumes and customer numbers (as well as the WACC assumption) untouched. Rather, the Authority simply adjusted the unjustifiable claims in the HoustonKemp projections to 2080, relating to the overly optimistic capital growth assumptions.

2027. HoustonKemp also adjusts down customer numbers for the period 2020 to 2080, retaining the ratio of capital expenditure to new customer connections from its original modelling. This is discussed in more detail in the next section.

2028. The results are not in accord with reality, are spurious and are internally inconsistent.

Revenue per GJ over the long run to 2080

2029. The Authority does not agree with HoustonKemp's contentions regarding the Authority's modelling. As noted, HoustonKemp makes its claims based on an assumption that the number of customers that could connect under the Authority's pricing model should be reduced in line with the Authority's assumed reduced capital expenditure as a proportion of ATCO's original capital expenditure assumption for the period.[928] HoustonKemp states:

> By reducing capital expenditure, as compared with that used in the model underpinning my earlier work, but using the same new connection assumptions adopted in my earlier report (which relate to materially higher levels of capital expenditure), the ERA's analysis assumes that the same growth in gas volumes will be delivered from a substantially lower capital expenditure program.
>
> To evaluate the level of consistency within the ERA's analysis I have examined the average volume per customer in tariff class B1, B2 and B3 from 2020 to 2080 using the customer numbers in the ERA's draft decision, i.e., the customer numbers for those tariff classes to which the expenditure forecast in the ERA's pricing model relates. In particular, I:
>
> - use the July 2014 to 2019 customer numbers in the draft decision; and
> - from 2020 onwards, assume growth in customer numbers to be consistent with the ERA's capital expenditure growth assumption.

2030. The Authority considered that NERA's original capital expenditure numbers for the period 2020 to 2080 were extreme.

2031. The Authority noted in the Draft Decision that it:[929]

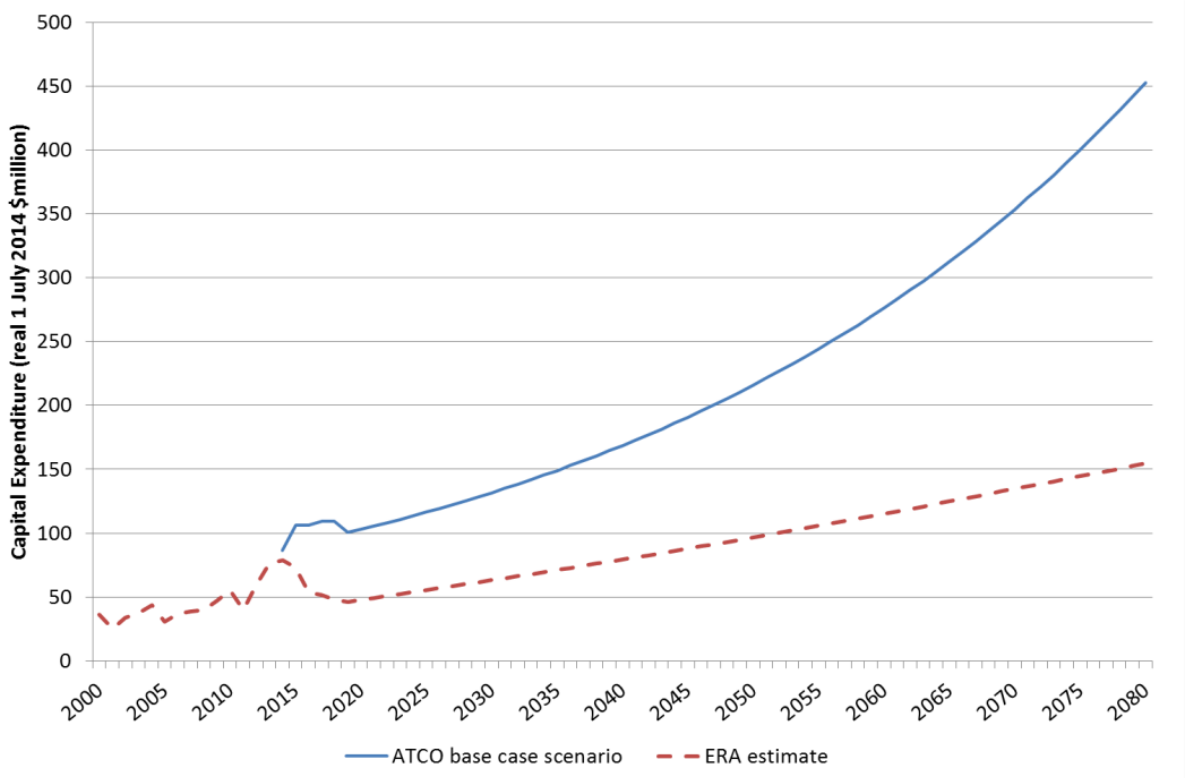
> …applied a lower growth assumption for capital expenditure for the period 2020 to 2080, to be consistent with NERA's assumed rate of new connections (that is, growth at an initial 2.5 per cent, tailing down to 2 per cent by 2030, and further to 1 per cent by 2080). The resulting difference between the Authority's capital expenditure path and that of NERA's base case is substantial.

---

928 ATCO Gas Australia, *ATCO Gas Australia's Response to the ERA's Draft Decision*, 22 December 2014, Appendix 11.1, p. 19.

929 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 227.

Figure 21 Capital expenditure: HoustonKemp base case and the Authority's scenarios compared (real $)



Source: ERA Draft Decision, Figure 35 Capital expenditure: NERA base case and ERA scenarios compared (real $), October 2014, p. 228.

The Authority considers that growing capital expenditure at the rate of new connections from 2020 on is justifiable. It provides for a steady linear increase in capital expenditure, which is consistent with the historic average trend (Figure 21).[930] It is also broadly consistent in trend terms with the expected population growth for Western Australia.[931]

This contrasts with the rapid growth rate for capital expenditure of 2.5 per cent in real terms that is assumed by NERA in its base case. The Authority considers that the NERA base case assumptions are internally inconsistent. First, the NERA assumed capital growth implies that real capital expenditure will increase by a factor of five over the period (Figure 35). Second, NERA considers that the LRMC of ATCO's pipeline services will decline by more than 50 per cent, driven by sharply decreasing costs per unit of capital installed (Figure 34). The implication is that the amount of new pipeline capital services installed annually will increase by a factor of more than 10 by 2080, as compared to the current capital expenditure levels. The Authority considers that this is unlikely. It implies unbroken growth in real pipeline services investment of 4 per cent per annum over the long period. This may be compared to the 3.7 per cent per annum growth rate over the period 2000 to 2009, which was a time of unprecedented boom in Western Australia. It was also a period prior to the significant decline in the average

930 The Authority notes that even this rate is optimistic, given the substantial slowing in the growth rate in new connections (see Table 8 in the Demand section). However, the results modelled here are somewhat less sensitive to the assumed future growth rate over 2020 to 2080, and more sensitive to the assumed starting base at 2019. For these reasons, the Authority has accepted HoustonKemp's connections growth rate for the period 2020 to 2080 for the illustrative purpose of this section.

931 See Australian Bureau of Statistics, Population projections, Australia, 2012 (base) to 2101, catalogue 3222.0.

annual consumption of B3 residential customers; that is, before the impact of improved housing standards and changes in energy preferences by consumers took full effect.

2032. HoustonKemp has not addressed these points; rather it has simply assumed that its capital expenditure *per connection* assumption is robust, and that therefore the Authority's connection numbers should be adjusted down to reflect the revised capital expenditure included by the Authority. The result is an even higher amount of capital expenditure per new connection than in NERA's original proposal.

2033. To show the sense of this, the Authority has examined the simple average real capital expenditure per new connection in the period up to 2014, and that assumed by HoustonKemp in the period post 2020 (Table 98).

Table 98 New capex and connections

	Historic 2001 – 2019	NERA (original base case) 2020 – 2080	ERA Draft Decision 2020 - 2080	HoustonKemp (revised) 2020 – 2080	ERA Amended Final Decision 2020 – 2080
New connections over period	342,691	1,129,275	1,130,606	321,878	1,055,781
Total capex over period ($m real 2014)	1,086	12,451	5,903	6,000	7,825
Average capex per new connection ($ real 2014)	3,168	11,026	5,221	18,641	7,412

Source: GDS access arrangements 2001-2005 and 2006-2010, ATCO Gas Australia, Access Arrangement Information, March 2014, Appendix 13.

2034. The Authority's analysis in the Draft Decision reduced long run capital expenditure growth to be commensurate with population growth over the period 2020 to 2080. The Authority considered that this approach remained generous in terms of capital expenditure per new connection compared to the period spanning AA1 to AA4, as can be observed by comparing the second (2001-2019) and fourth (ERA 2020-2080) columns in Table 98.

2035. NERA's original assumptions for capital expenditure, on the other hand, resulted in a near quadrupling of capital expenditure per new connection as compared to the period AA1 to AA4 (compare the second (2001-2019) and third columns (NERA 2020-2080) in Table 98). HoustonKemp's revised approach – which takes the Authority's capital expenditure analysis to 2080 but revises down customer numbers – results in an even higher ratio (column 5). No justification is made for this, and the Authority cannot accept this lack of reconciliation between customer numbers and capital expenditure.

2036. HoustonKemp also contends that the Authority's modelled analysis overlooked the need to revise its estimate of tax depreciation to account for the lower level of capital expenditure in its Draft Decision, and used to derive average prices in its pricing model.

2037. However, the Authority has examined this issue and notes that the conclusions in the Draft Decision were not sensitive to this (acknowledged) technical error. In reviewing

this capital expenditure related issue, the Authority also adjusted the debt shield to account for the revised capital expenditure assumptions, finding that the results were not sensitive to this correction either.

2038. Overall, the Authority is of the view that the NERA/HoustonKemp long run modelling to 2080 is highly speculative. The outcomes are very sensitive to input assumptions, particularly around the level of capital expenditure at 2020 – which provides the starting base for subsequent growth to 2080 – and to the associated assumptions for the growth rate off that base to 2080. For these reasons, the Authority considers that the long run modelling can only be considered as indicative.

2039. That said, the Authority has reviewed Houston Kemp's revised modelling and finds that it is internally inconsistent, leading to outcomes that are implausible.

2040. To address the errors in the HoustonKemp approach, the Authority has revised the indicative long run modelling to 2080 to account for the (base) AA4 outcomes from this Final Decision, and to incorporate connection, volume and capital expenditure growth assumptions to 2080 that are internally consistent and in accord with the Australian Bureau of Statistics projected Western Australian population growth (see Appendix 9 for the detailed modelling analysis).

2041. HoustonKemp provided a further response to the Authority's points above through ATCO's submission on the proposed changes to the Final Decision.[932] HoustonKemp now appears to accept that its claims with regard to capital expenditure were erroneous. HoustonKemp has accepted the Authority's modelling, albeit with one key change – it has adjusted the projected capital expenditure over the period to 2080 to be almost constant in real terms from 2020 (Figure 22). The Authority considers that given the indicative nature of the modelling to 2080, there are limited differences between the two estimates, with the exception perhaps past 2050 or so, where the HoustonKemp estimates appear low.

2042. The Authority remains of the view that the results of its revised indicative long run depreciation modelling provide support that CCA depreciation will closely equate rising average revenue per GJ with the sharply rising long run marginal cost per GJ over the period to 2035, whereas ATCO's proposed transition approach will not (refer Appendix 9). Given that, the Authority does not accept HoustonKemp's further response. However, the Authority has made some minor corrections to the modelling, in light of HoustonKemp's responses (refer Appendix 9). These have resulted in only slight changes to the numbers produced by the Authority's empirical modelling, and do not imply any changes in the Authority's overall conclusions.

2043. This empirical support accords with the conceptual view that trends in the real long run marginal costs of service delivery are likely to be closely aligned with trends in long run average revenue. This is because – under the building block approach – long run average revenue is equal to long run average cost.[933] When long run

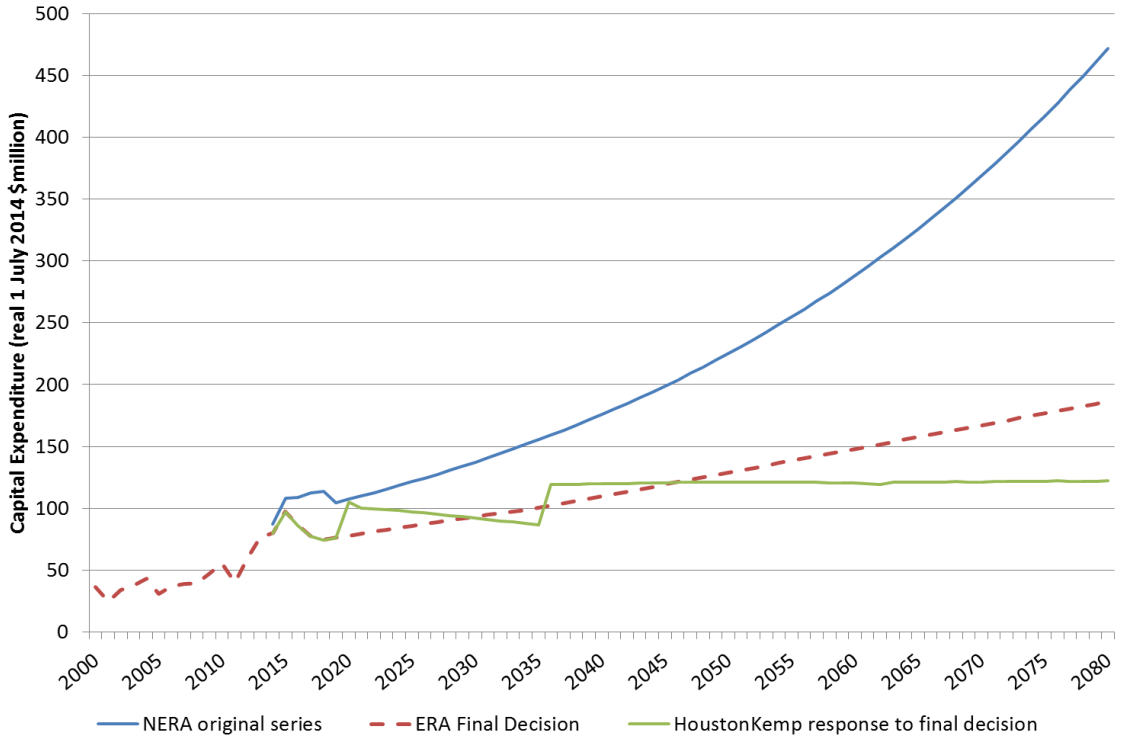
---

932 ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision, 31 August 2015*, Attachment.

933 This follows, because under the Revenue and Pricing Principles the service provider may recover at least the efficient costs incurred in providing reference services. The Authority notes that Houston Kemp has not responded to this point in its response to the Final Decision (see ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision*, 31 August 2015, Attachment).

average cost is rising, as is occurring, it follows from first principles that long run marginal cost is above it, and also is highly likely to be rising.[934]

Figure 22 NERA/HoustonKemp forward capital expenditure



Source ERA and HoustonKemp analysis

Revenue per connection over the long run to 2080

2044. The Authority also examined the concordance between trends in the long run average revenue per connection to 2080 and the long run marginal costs of connection (see Appendix 9 for detail). Aligning the trend in prices (average revenue) with long run marginal costs is important for effective long term capital planning by the utility.

2045. The revised indicative modelling demonstrates that CCA depreciation delivers average revenue per connection that is closely aligned with the flat to rising long run marginal cost per connection in real terms (Appendix 9).

2046. The HCA depreciation approach, on the other hand, delivers a trend in average revenue which does not match the trend in long run marginal cost for connections. The HCA depreciation approach drags forward revenue from the future to the present, leading to a declining trend in average revenue per connection over time, which is not consistent with the flat to rising long run marginal cost of connections.

2047. The increasing gap may dissuade efficient capital investment in the medium to long term, given the trends in long run marginal cost. Depreciation cash flow dragged forward to the current time may not be available to cover the cost of future expansions in the network, which may then become uneconomic. The HCA depreciation approach, therefore, is not consistent with the requirements of the NGR 89, as it is

[934] The long run marginal cost may be estimated by means of the average incremental cost approach (see Appendix 9).

less likely to achieve efficient growth in the market for reference services than the CCA approach.

Conclusions with regard to NGR 89(1)(a)

2048. Given the analysis summarised above, the Authority is of the view that its position to reject HCA and ATCO's transition approach remains reasonable. This position is based on the fact that HCA drags forward revenue from the future to the present in real terms, such that the trend in average revenue per unit is less likely to reflect trends in long run marginal costs.

2049. The revised indicative modelling analysis set out in Appendix 9 supports this view; the CCA approach aligns trends in average revenue more closely with long run marginal costs over the longer term, as compared to HCA. It follows that any gap between average revenue and long run marginal cost is minimised, leading to better investment decisions by the service provider. The CCA depreciation approach will therefore better promote efficient growth in the market for reference services as compared to HCA.

2050. In contrast, the both the HCA and ATCO's transition approach to calculating depreciation do not meet the requirements of rule 89(1)(a), as these methods do not align trends in average revenue and long run marginal costs. These approaches therefore do not promote efficient investment by the service provider, or as a corollary, efficient growth in the market for reference services.

NGR 89(1)(b) – (e) – consistency of HCA approach with applicable criteria

2051. The Authority considers that generally both the HCA and CCA depreciation approaches meet the requirements of NGR 89(1)(b) to (d), as both approaches:

- enable assets to be depreciated over their economic lives (NGR 89(1)(b));
- allow for adjustments reflecting changes in the expected economic lives of particular assets (NGR 89(1)(c));
- allow for assets to be depreciated only once (NGR 89(1)(d)); and
- allow for the service provider's reasonable needs for cash flow to meeting financing, non-capital and other costs (NGR 89(1)(e)).

Impact of HCA approach on consumers

2052. The Authority considers that the objective of the NGO, which is to ensure efficient investment in and use of pipeline services for the long-term interest of consumers, should guide the evaluation of ATCO's depreciation approach. The Authority considers that ATCO's HCA transition approach leads to subsidies from current to future consumers, which is not in the long term interests of all consumers, and is therefore not consistent with the NGO.[935] The Authority considers that the CCA approach allocates costs more evenly than the HCA approach between current and future customers, particularly residual costs.

[935] Rule 40(2) of the NGR notes that the Authority may insist on a change to an aspect of a depreciation schedule governed by rule 89 if it considers change necessary to correct non-compliance with a provision of the Law or an inconsistency between the schedule and the applicable criteria.

2053. In particular, analysis by the Authority suggests that the pure HCA approach increases the AA4 revenue requirement – and therefore average tariffs over the period – by around 11 per cent as compared to the CCA approach. While ATCO's proposed transition approach ameliorates this AA4 impact to 3 per cent, the effect of the proposed transition is simply to defer large tariff increases.[936] The Authority estimates that under the ATCO transition approach, the revenue requirement in AA5 and AA6 is increased by close to 10 per cent as compared to the CCA approach. In subsequent access arrangement periods (AA7 and beyond), the revenue requirement under the ATCO transition approach is less than the CCA approach, which reflects the resulting subsidy from current to future customers. These quantitative impacts are entirely consistent with the real revenue per GJ impacts illustrated in Figure 38 contained in Appendix 9.

2054. A further important consideration for the Authority in this context is the requirement under Part 2 of the *National Gas Access (WA) (Local Provisions) Regulations 2009*, (which are subsidiary to the *National Gas Access (WA) Act 2009*), to take into account the impact on consumers. Part 2 r.7 states:[937]

> **7. Impact on small use customers and retailers to be taken into account**
>
> (1) When exercising a discretion in approving or making an access arrangement for a distribution pipeline the ERA must take into account the possible impact of the proposed reference tariffs, the method of determining the tariffs and the reference tariff variation mechanisms on —
>
> (a) users to whom gas is or might be delivered by means of a small delivery service provided for in the access arrangement; and
>
> (b) small use customers to whom gas is or might be delivered by those users.
>
> (2) In subregulation (1) a reference to the impact of something is not limited to the economic impact of that thing.
>
> (3) A requirement under this regulation to take a matter into account applies —
>
> (a) despite anything in the National Gas Law or Rules that would otherwise prevent the matter being taken into account; and
>
> (b) in addition to any requirement under the National Gas Law or Rules —
>
> (i) for any other matter to be taken into account; or
>
> (ii) as to the content of the access arrangement.

2055. The Authority considers that it is clear that the adverse impact on consumers of moving to the HCA approach, even with ATCO's proposed transition, would be significant.

2056. For the reasons stated in the above paragraphs, taking into account the impact on gas consumers and small use customers, the Authority cannot accept ATCO's proposed approach. It would have a clear detrimental impact on the incomes of Western Australian small use customers over the next decade or more, making this approach contrary to regulation 7 of the *National Gas Access (WA) (Local Provisions) Regulations 2009*. It is also contrary to the requirements of the NGO, in terms the

---

936 The Authority considers that an impact of 3 per cent during the fourth access arrangement period is material and significant. Further, the Authority considers that it is irrelevant whether overall tariffs are rising or falling when this impact is considered. Removing an additional decrease of 3 per cent at a time when tariffs are declining would have the effect of making small use customers, and gas consumers more generally, worse off in financial terms.

937 *National Gas Access (WA) (Local Provisions) Regulations 2009,* Part 2, reg. 7.

long term interests of all consumers. The Authority considers that the smoother revenue path over time in real terms – delivered by the CCA approach – is consistent with its obligations under both the NGO, the NGR and the *National Gas Access (WA) (Local Provisions) Regulations 2009.*

Price shocks

2057. ATCO submits that its transition approach alleviates price shocks whilst still providing for the efficiency benefits associated with an unindexed capital base.

2058. In the Draft Decision the Authority did not consider that the increase in revenues in the short term arising from HCA depreciation was in the long term interests of all consumers, as current consumers would be paying significantly higher tariffs, all other things being equal, while future consumers would pay lower tariffs. In effect, there would be a subsidy from current consumers to future consumers.

2059. ATCO's overall tariffs are now declining in real terms. Despite this, the Authority remains of the view that an increase in revenue because of a transition to HCA is not in the long term interests of consumers, irrespective of whether overall tariffs are increasing or decreasing. As demonstrated in the previous section, the HCA approach results in an inefficient and inequitable allocation of the cost of capital to current and future consumers on the network.

2060. This concern was shared by the Australian Competition Tribunal (**ACT**) in its decision on APA GasNet's access arrangement. The ACT considered the impact of the depreciation method on the stability of the tariff path, and hence on the efficient growth in the market for reference services, separately from the impacts of other factors influencing tariffs.[938]

2061. The Authority considered in the Draft Decision that, even if the additional revenues from the change of approach are offset to a degree by falls in other building block components, the price impact cannot be ignored. Customers would be entitled to expect prices to fall if the other cost components are reduced. The regulatory regime is not intended to shield a service provider from such reductions.

2062. Kleenheat Gas in its submission to the Authority expressed concern with the short to medium term impact of the proposed transition from CCA to HCA. Kleenheat Gas stated that higher tariffs in the short term will create a barrier to entry for some customers connecting to natural gas and that this is counterintuitive to promoting efficient growth in the natural gas market.

2063. The Authority notes the following in relation to HCA:

- HCA leads to subsidies from current consumers to future consumers, which is not in the long term interests of (all) consumers.
- HCA depreciation schedules provide for price paths that discourage efficient connections, thereby encouraging inefficient utilisation of network assets, that is, under or over utilisation of the asset at different times in its life cycle.
- HCA may result in unnecessarily high prices in the short to medium term – these could discourage connections, gas usage and downstream investment.

---

938 Australian Competition Tribunal, *Application by APA GasNet Australia (Operations) Pty Limited (No 2) [2013] ACT 8*, 19 September 2013, p. 51.

- HCA may result in an inefficient management of assets, as it creates incentives to manage assets based on reasons other than the efficient provision of reference services.

Further impacts of the HCA approach

2064. The Authority considers that ATCO's proposed HCA depreciation approach does not comply with the Revenue and Pricing Principles under the NGL as it increases the risk of potential under or over utilisation of the pipeline at particular points in time, with attendant economic costs.

Discourage efficient management of pipeline assets

2065. In the Draft Decision the Authority rejected ATCO's proposed change of approach. The Authority considers the resulting incentives under the HCA approach are not consistent with efficient development of the market.

2066. The Authority considered:

- that the proposed HCA approach could discourage efficient gas usage and upstream and downstream investment at the current time, given the higher tariffs that result;
- over utilisation of ATCO's assets near the end of their useful lives as a result of low prices may result in the replacement being required sooner than otherwise necessary;
- ATCO's proposed HCA approach leads to a lower depreciated historical cost valuation of the capital base which may create an incentive for ATCO to replace assets sooner than may otherwise be the case, so as to be able to earn a higher return on the replacement cost of a new asset; and
- a steeper recovery profile of revenues under ATCO's approach also means that all future capital expenditure will be recovered more quickly. Any step up in capital expenditure will cause a greater step up in revenues than would be the case under the CCA approach.

2067. In its response to the Draft Decision, ATCO disagrees with the Authority's decision to reject its proposed change. ATCO stated that:

- it would not be able to inefficiently invest in replacing assets before the end of their assumed lives as this inefficient investment would not be accepted by the Authority.
- HoustonKemp suggests that the most appropriate long term incentives for both pipeline owners and users will be created when the gap between best estimates of longer term prices and long term LRMC is minimised.
- the incentive for a business to invest in inefficient assets is that they expect to earn a reasonable return over the life of the asset. ATCO states that under the NGR the criteria to be met before an investment is added to the RAB and the return are the same under both indexation and non-indexation.
- assuming the tariff structure is efficient, non-indexation will only result in inefficient use of the assets or distort incentives for investment where the long term price trend is rising. Therefore, the recovery of capital more quickly under a non-indexed approach will only be inefficient if the price trend is rising over the longer term. ATCO claims that the Authority has found that the price trend is not rising over the longer term.

2068. However, as noted above, the Authority considers that ATCO's proposed HCA transition method will drag forward revenue in the short term and therefore will discourage efficient gas usage and upstream and downstream investment at the current time, given the higher tariffs that result. The Authority has assessed HoustonKemp's analysis regarding the change in average revenue per GJ and average revenue per connection and rejects its conclusion that both the HCA and CCA approaches result in substantially the same prices from 2015 to 2020.

2069. The Authority has carried out its own analysis on change in prices and revenue. In light of this analysis, the Authority remains of the view that ATCO's proposed HCA transition approach will drag forward revenue in the short term, both in terms of revenue per GJ, as shown in Figure 38 in Appendix 9 and in terms of the revenue per connection, as shown in Figure 43 in Appendix 9.

2070. Neither HCA nor CCA will have much influence on the short run marginal cost per GJ, as this is dependent on variable costs (which are independent of the capital costs) and the structure of tariffs.

2071. That said, as noted above, the HCA transition approach is likely to discourage ATCO from undertaking efficient investments in the medium to long term, given steady average revenues going forward even as the LRMC of capital expenditure is rising sharply.

2072. The Authority also considers that under the HCA approach there may be an incentive for a service provider to dispose of assets near the end of the useful life because the return on and of this asset would be relatively small and considerably lower at that time than under the CCA approach. The HCA method would give the service provider an incentive to replace this asset with a new asset and therefore get a higher return on and of the asset than it was getting on the previous asset, particularly if the access arrangement does not have a mechanism for redundant assets as is the case for ATCO.

2073. The Authority acknowledges that under the NGR inefficient investments would not be accepted by the Authority and that this assessment is the same under both indexation and non-indexation. However, the Authority does not have the ability to check the degree of utilisation of every asset in the asset base under the NGR. No rule in the NGR prevents the Authority from approving capital expenditure in respect of the replacement of assets which have reached the end of their economic life but which continue to be functional.

Conclusion

2074. The Authority does not approve ATCO's proposed HCA transition approach for depreciation, as ATCO's proposed HCA transition approach:

- is not consistent with rule 89(1)(a) of the NGR;
- does not comply with the National Gas Objective under the NGL; and
- does not comply with the Revenue and Pricing Principles under the NGL.

2075. Based on the NGO, the Authority is required to take into account the long term interests of consumers, which includes current as well as future consumers. The Authority notes the following in relation to HCA:

- HCA leads to subsidies from current consumers to future consumers, which is not in the long term interests of (all) consumers.

- HCA may result in unnecessarily high prices in the short to medium term – these could discourage gas usage and upstream and downstream investment.
- HCA depreciation schedules provide for price paths that encourage inefficient utilisation of assets, that is, under or over utilisation of the asset at different times in its life cycle.
- HCA may result in an inefficient management of assets, as it reduces revenue at a time when expansion costs are increasing, and as it creates incentives to manage assets based on reasons other than the efficient provision of reference services.

2076. The Authority requires that ATCO adopt the CCA approach for its depreciation schedule for the regulatory asset base. The Authority considers that the CCA approach is consistent with the applicable criteria under rule 89(1) of the NGR, and complies with the NGO and RPP under the NGL because it:

- allows for efficient use of the GDS by upstream and downstream consumers both now and in the future, thereby contributing to the efficient growth in the market of reference services;
- encourages efficient production and investment decisions by the service provider, thereby contributing to the efficient growth in the market of reference services;
- avoids price shocks for consumers, both for the forthcoming access arrangement period, and also at the end of the economic lives of major assets; and
- avoids subsidies between current and future consumers, thereby ensuring outcomes that are in the long term interests of consumers with respect to price.

Treatment of inflationary gain

2077. A further issue relates to the 'inflationary gain' element of CCA depreciation (that is, the index component of applying CCA in a nominal model). In the Draft Decision, the Authority did not consider that the inflationary gain should be offset from the nominal depreciation, as occurs in the AER's PTRM. The Authority considered that the inflationary gain relates to the return on assets rather than nominal depreciation, as we apply a nominal return to a nominal indexed asset base under CCA.

2078. Accordingly, the Authority treated the inflationary gain as a separate item in the revenue building block, rather than deducting it from the depreciation value (as is done by the AER) or the return on asset. This had the benefit of clearly identifying the component, and ensuring that it did not lead to anomalies, such as negative depreciation of land.

2079. ATCO submits that the ERA's approach of making an inflationary adjustment to total revenue does not comply with rule 76 of the NGR. ATCO considers the only correct way to remove a double counting of inflation is to remove it in the calculation of the depreciation building block. ATCO considers that if transparency is desired, the removal of inflation from the depreciation building block can be expressly acknowledged and shown.

2080. The Authority recognises that rule 76 of the NGR is specific about the allowable building blocks and there is no provision for such a building block under the NGR. The Authority therefore accepts that the inflationary gain cannot be made a separate building block.

2081. Accordingly, the Authority will move the inflationary gain component – relating to the indexing of the capital base under CCA – back to the depreciation building block. However, the Authority will identify the inflationary gain as a separate sub-component. Deprecation will then become the net sum of the CCA straight-line depreciation, less the inflationary gain, as per the AER PTRM.

Depreciation for rolling forward capital base

2082. The Authority required ATCO to amend clause 9.1 of its access arrangement in required amendment 11 of its Draft Decision. The Authority required that ATCO adopt the CCA approach to depreciation, based on the indexed value of the calculated real depreciation and amend clause 9 (Depreciation) to ensure that it is consistent with the CCA approach.

2083. ATCO has not implemented this amendment because ATCO remains of the view that the correct approach to avoid a double count of inflation is to not index the capital base.

2084. The Authority does not accept ATCO's proposals in clause 9.1(b) and 9.1(c). As discussed in paragraphs 2010 to 2076 the Authority does not approve ATCO's proposed transitional HCA depreciation method and therefore rejects ATCO's proposal to only index the capital assets in existence at 30 June 2014 in clauses 9.1(b) and 9.1(c).

2085. The Authority requires ATCO to calculate the opening capital base for the GDS for the Next Access Arrangement Period by escalating it at the rate of inflation as measured by the CPI All Groups, Weighted Average of Eight Capital Cities.

Asset lives

2086. The Authority required ATCO to justify why changing the asset life for vehicles from 10 to 5 years is consistent with rule 89 of the NGR. ATCO submitted that it has adopted an asset life for vehicles of five years consistent with expected use of the vehicles, the assumptions adopted in the business case supporting the change to owning rather than leasing fleet, the asset lives adopted for statutory accounting purposes and accepted business practice.

2087. The Authority has assessed ATCO's reasons for adopting a five year economic asset life for vehicles as stated in paragraph 2086 and compared ATCO's economic life of vehicles against its tax asset life.

2088. The Authority can confirm that ATCO's statutory accounts state that plant and equipment have a useful life of 10 to 20 years and vehicles have a useful life of four to eight years. The Authority notes that ATCO proposed to sell its vehicles after five years in its business case to purchase fleet vehicles. The Authority also notes that ATCO has not provided any evidence that five years is accepted business practice.

2089. The Authority does not accept ATCO's proposal that the economic life for vehicles should be five years. ATCO accepted the Authority's decision to have a 10 year tax asset life for vehicles in its response to the Draft Decision. The Authority determined a TAB life for vehicles to be 10 years in its Draft Decision based on available taxation legislation and ATO rulings for the different types of vehicles. ATCO provided some information regarding tax lives and the written down values for certain asset classes

which revised the TAB effective lives to 13 years for vehicles.[939] The Authority has reviewed the economic asset lives for vehicles in other gas distribution networks in Australia and does not accept ATCO's statement that five years is accepted business practice.

2090. The Authority requires ATCO to change its economic asset life for vehicles to 10 years in line with the tax asset life for vehicles.

Final Decision

2091. The Authority notes that the CCA approach may be achieved in a nominal building block model by using the AER's PTRM approach to depreciation. Table 99 sets out the Authority's required depreciation amounts for the fourth access arrangement period, derived using the CCA approach.

Table 99 Authority's Final Decision Approved Forecast Depreciation Calculation: 2014 to 2019

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019	Total
Regulatory Depreciation	**7.02**	**17.66**	**21.00**	**23.47**	**26.04**	**29.09**	**124.28**
Straight line CCA depreciation	16.61	37.37	42.26	46.02	49.70	53.78	245.74
Less: Inflationary Gain	(9.58)	(19.71)	(21.26)	(22.55)	(23.66)	(24.69)	(121.46)

Source: ERA, GDS Tariff Model, September 2015.

939 ATCO Gas Australia, *Response to ERA06*, date.

Required Amendment 9

For the calculation of the nominal Opening Capital Base for the GDS for the Next Access Arrangement Period, for the purposes of rule 77(2)(d) of the NGR, depreciation over the Current Access Arrangement Period is to be calculated in accordance with the current cost accounting depreciation method, consistent with the Australian Energy Regulator's Post Tax Revenue Model method – where first, the real opening capital base in any year is divided by the remaining asset life to calculate the real depreciation for the regulatory year, second, indexation is applied to the real depreciation to convert it to nominal terms, and third, the nominal depreciation is adjusted for the resulting double count of inflation by subtracting the value ascribed to inflation from the opening regulatory asset base for that regulatory year, and is to be the sum of:

(i) depreciation on the Opening Capital Base over the Current Access Arrangement Period;

(ii) depreciation of the forecast Capital Expenditure for the Current Access Arrangement Period (being the amount of forecast Capital Expenditure used for the purpose of determining Haulage Tariffs for the Current Access Arrangement Period); and

(iii) depreciation of any unanticipated Regulatory Capital Expenditure for the Current Access Arrangement Period (being depreciation calculated in accordance with Clause 3 of Annexure B of this Access Arrangement).

Consistent with the above, clause 9 (Depreciation) must be amended to ensure that it is consistent with the current cost accounting approach. In particular, clause 9.1 (b) and (c) of the proposed revised access arrangement must be replaced with:

(b) indexing and adjustment for inflation should be calculated consistent with the rate of inflation as measured by the CPI All Groups, Weighted Average of Eight Capital Cities as at 31 December of each regulatory period.

Taxation

Regulatory Requirements

2092. Rule 76(c) of the NGR provides for the estimated cost of corporate income tax as a building block for total revenue.

2093. Rule 87A of the NGR elaborates on how to calculate the estimated cost of corporate income tax:

> 87A. Estimated cost of corporate income tax
>
> (1) The estimated cost of corporate income tax of a service provider for each regulatory year of an access arrangement period (ETC_t) is to be estimated in accordance with the following formula:
>
> $ETC_t = (ETI_t \times r_t)\ (1-\gamma)$
>
> Where
>
> ETI_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of reference services if such an entity, rather than the service provider, operated the business of the service provider;
>
> r_t is the expected statutory income tax rate for that regulatory year as determined by the [ERA]; and
>
> γ is the value of imputation credits.

2094. The National Gas Objective is defined in section 23 of the NGL(WA) as:

> 23. National gas objective
>
> The objective of this Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.

ATCO's Proposed Revisions

2095. ATCO proposed estimating the cost of corporate income tax directly by multiplying its estimated taxable income by an assumed statutory income tax rate of 30 per cent. ATCO carried forward estimated tax losses to offset against taxable income. ATCO reduced its estimated amount of tax payable by the value of imputation credits.

2096. ATCO calculated taxable income as follows:[940]

- Net cost of service.
- *plus* Capital contributions.
- *minus* Forecast operating expenditure.
- *minus* Proposed depreciation of the Tax Asset Base (**TAB**), which includes capital contributions and depreciation of customer contributed commercial meter sets. ATCO calculated proposed tax depreciation on a straight-line basis.

[940] ATCO Gas Australia, *Tariff Model*, September 2014.

- *minus* Debt servicing costs, which ATCO calculated by multiplying the debt portion of the opening capital base by the debt to equity ratio (assumed at 60 per cent) and ATCO's proposed nominal cost of debt (cost of debt risk margin plus nominal risk free rate)[941].
- *equals* Estimated taxable income[942].

2097. ATCO initially proposed a corporate income tax building block of $40.47 million over the fourth access arrangement period.[943] Table 100 shows ATCO's initial proposed estimated corporate income tax by year for the fourth access arrangement period.

Table 100 ATCO's Initial Proposed Estimated Cost of Corporate Income Tax (AA4)

Real $ million at June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Estimated Cost of Corporate Income Tax	2.61	7.17	7.77	10.19	12.67	13.56	53.95
Value of Imputation Credits	(0.65)	(1.79)	(1.94)	(2.55)	(3.17)	(3.39)	(13.49)
ATCO's Proposed Estimated Cost of Corporate Income Tax Net of Imputation Credits	**1.95**	**5.38**	**5.83**	**7.64**	**9.50**	**10.17**	**40.47**

Source: ATCO Gas Australia, Tariff Model, September 2014.

2098. Ernst & Young was engaged by ATCO to estimate the opening TAB as at 1 July 2014 by taking into account the following:

- the date the business was first subject to tax;
- tax value of assets at that date, separating between the Regulatory Asset Base (**RAB**) and non-RAB;
- profile of RAB when first subject to tax, including any capital expenditure that took place before the business was first regulated; and
- rolling forward of the TAB from when it was first subjected to tax to the commencement of the post-tax approach, taking into account tax depreciation, actual capital expenditure and asset disposals.

2099. Ernst & Young calculated the opening TAB as at 1 July 2014 as $495,305,697.[944] This TAB is calculated on the following basis; it:[945]

- excludes unregulated assets;
- includes commercial meters in the initial capital base;

---

941 ATCO has used a different opening capital base to the RAB based on applying an historical cost accounting depreciation approach to the RAB in nominal dollars to derive an opening capital base for the debt servicing cost calculation in the tax module

942 ATCO also accounts for carried forward tax losses in this calculation.

943 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Table 82, p. 263.

944 This value is in nominal dollars.

945 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Appendix 26: Review of regulated tax asset base for regulated revenue purposes, p. 8.

- excludes land on the basis that it is not depreciable for tax purposes;
- incorporates contributed and gifted assets, which Ernst & Young states is required by the income tax legislation; and
- uses the prime cost method of depreciation.[946]

2100. ATCO rolled forward the TAB for the fourth access arrangement period from 1 July 2014 to 31 December 2019 by adding capital expenditure (including capital contributions) and deducting depreciation.

2101. Table 101 presents ATCO's initial calculation of the closing TAB for the fourth access arrangement period.

Table 101 ATCO's Initial Proposed Closing Tax Asset Base (AA4)

$ million nominal	July to Dec 2014	2015	2016	2017	2018	2019
Opening Tax Asset Base	497.49	518.82	573.90	633.84	696.91	761.33
ATCO's Forecast Capital Expenditure	46.51	109.73	121.23	126.50	129.09	134.53
ATCO's Forecast Depreciation	25.18	54.65	61.29	63.43	64.67	69.91
ATCO's Proposed Closing Tax Asset Base	**518.82**	**573.90**	**633.84**	**696.91**	**761.33**	**825.96**

Source: ATCO Gas Australia, Tariff Model, September 2014.

Draft Decision

2102. The Authority assessed ATCO's proposed opening TAB and estimated cost of corporate income tax. The Authority reviewed the following:

- ATCO's inclusion of capital contributions in the TAB;
- ATCO's inclusion of commercial meters in the TAB, and depreciation of commercial meters in its calculated tax depreciation;
- tax asset lives that ATCO has proposed for calculating tax depreciation;
- whether ATCO has included uncommissioned assets in the TAB;
- ATCO's tax depreciation methodology; and
- ATCO's proposed cost of debt risk margin and nominal risk free margin for the calculation of debt servicing costs.

946 Ernst & Young state (ATCO Gas Australia 2014, *Access Arrangement Information: 1 July 2014 – 31 December 2019 (AA4)*, www.erawa.com.au, March, Appendix 26: Review of regulated tax asset base for regulated revenue purposes, p. 8):

…the prime cost method of depreciation is an election which is generally available under the provisions of the ITAA97. This method appears reasonable for the purposes of this exercise, as prime cost depreciation provides a consistent annual deduction over the life of an asset and it also appears to be consistent with the approach used by other regulatory authorities where a post-tax WACC is adopted.

2103. The Authority also revised ATCO's proposed taxable income in light of the Draft Decision's updated forecast operating expenditure and opening and projected capital base.

2104. The Authority accepted that capital contributions may lead to a tax liability, but did not consider that this tax liability should be included for the purpose of calculating ATCO's regulated revenue. The Authority did not approve ATCO's proposal to include capital contributions and gifted assets in the TAB for the purpose of calculating tax depreciation. The Authority considered that:[947]

- Tax costs associated with capital contributions may not necessarily be associated with efficient costs - capital contributions are not included in the RAB, and thus are not evaluated in terms of rule 79 of the NGR, which sets out the criteria for conforming capital expenditure as that incurred by a prudent service provider acting efficiently, and justified on economic, safety or regulatory grounds.
- Allowing tax costs that are not associated with efficient costs to be charged to all customers would be inconsistent with the NGO and rule 87A of the NGR.
- It is unlikely that existing customers gain any benefit from contributed or gifted assets.
- The service provider does have a tax liability associated with a contribution, but given the objective of economic efficiency and the associated principle of 'user pays', this should be recovered from the contributor – to do otherwise would lead to a subsidy from the existing customer base to the contributing entity and the user of the asset.
- The service provider and the contributor are best placed to work out the commercial terms of the tax implications of any contribution, taking into account their business interests and tax positions.

2105. The Authority did not accept ATCO's proposed inclusion of commercial meters in the TAB, and depreciation of commercial meters in tax depreciation, on the following basis:

- tax costs associated with commercial meters may not necessarily be associated with efficient costs;
- to allow tax costs that are not associated with efficient costs to be charged to all customers would be inconsistent with the NGO; and
- the service provider does have a tax liability associated with the commercial meter charge, but given the objective of economic efficiency and the associated principle of 'user pays', this should be recovered from the user – to do otherwise would lead to a subsidy from the existing customer base to the user.

2106. Table 102 lists the asset lives that the Authority determined to be appropriate for the TAB.

947 For a detailed assessment of each of these points, see Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network*, 5 September 2012, pp. 243-251.

Table 102 Authority's Draft Decision Determined Tax Asset Lives

Asset Category	ATCO Proposed Asset Life for TAB	Authority Determined Asset Life for TAB
High pressure mains - Steel	20	20
High pressure mains - PE	20	20
Medium pressure mains	20	20
Medium/low pressure mains	20	20
Low pressure mains	20	20
Regulators	40	40
Secondary gas stations	40	40
Buildings	**100**	**40**
Meter and service pipes to 31 December 2007	25	25
Meter and service pipes from 1 January 2008	15	15
Equipment and vehicles	**20**	**10**
Vehicles	**20**	**10**
Information Technology	4	4
Full retail contestability	**20**	**4**

Source: ATCO Gas Australia, Access Arrangement Information, Table 80. ATCO Gas Australia, Tariff Model, September 2014.

2107. The Authority considered that the rolled forward TAB should include commissioned assets only. The Authority updated ATCO's tax depreciation calculation by maintaining a one-year lag between spending capital expenditure and commissioning the relevant asset.

2108. In implementing the NGR requirement to move to a post-tax model consistent with the requirements of rule 87A, the Authority considered that ATCO's tax liabilities going forward should align with the tax liabilities of a benchmark efficient entity. The Authority considered that a benchmark efficient entity would seek to minimise its tax liabilities. Accordingly, the Authority decided to require ATCO to apply the diminishing value method to calculate tax depreciation for capital expenditure over the fourth access arrangement period.

2109. The Authority amended ATCO's forecast debt servicing costs to reflect its revised decision on the opening RAB, and revised cost of debt risk margin and nominal risk free rate as per the Draft Decision. The Authority also required that ATCO use the RAB derived using the CCA depreciation method for determining the debt service costs used in the taxation calculations.

2110. The Authority based ATCO's taxable income on smoothed tariff revenue, as being the closest estimate to actual accounting revenue that tax would be based on.[948]

[948] Authority notes that AER bases taxable income on the net cost of service, as does ATCO's proposal.

2111. Table 103 shows the Authority's estimated cost of corporate income tax for the fourth access arrangement period as per the Draft Decision.

Table 103 Authority's Draft Decision Approved Estimated Cost of Corporate Income Tax (AA4)

Real $ million at June 2014	July to Dec 2014	2015	2016	2017	2018	2019	Total
Estimated Cost of Corporate Income Tax	8.04	-	-	-	-	-	8.04
Value of Imputation Credits	(4.02)	-	-	-	-	-	(4.02)
Authority Approved Estimated Cost of Corporate Income Tax Net of Imputation Credits	**4.02**	**-**	**-**	**-**	**-**	**-**	**4.02**

Source: ERA, GDS Tariff Model, October 2014.

ATCO's Response to the Draft Decision

2112. ATCO has calculated taxable income as follows:[949]

- Smoothed tariff revenue.
- *plus* Revenues from prudent discounts.
- *plus* Ancillary service revenues.
- *plus* Capital contributions.
- *plus* Revenue from additional user charges.
- *minus* Forecast operating expenditure.
- minus Proposed depreciation of the Tax Asset Base (TAB), which includes capital contributions, and depreciation of customer commercial meter sets. ATCO calculated proposed tax depreciation on a straight-line basis.
- *minus* Debt servicing costs, which ATCO calculated by multiplying the debt portion of the opening capital base[950] by the debt to equity ratio (assumed at 60 per cent) and ATCO's proposed nominal cost of debt (cost of debt risk margin plus nominal risk free rate).
- *equals* Estimated taxable income.[951]

2113. Table 104 breaks down ATCO's calculated cost of corporate income tax net of imputation credits using the estimated taxable income as per the above paragraph.

---

949 ATCO Gas Australia, *Tariff Model*, September 2014.

950 ATCO has used a different opening capital base to the RAB based on applying an historical cost accounting depreciation approach to the RAB in nominal dollars to derive an opening capital base for the debt servicing cost calculation in the tax module.

951 ATCO also accounts for carried forward tax losses in this calculation, although its calculation does not produce any carried forward losses.

Table 104 ATCO's Proposed Revised Estimated Cost of Corporate Income Tax Net of Imputation Credits (AA4)

Nominal $	July to Dec 2014	2015	2016	2017	2018	2019	Total
Revenue							
Tariff Revenue (smoothed)	94.55	186.25	195.50	203.30	210.69	217.36	1,107.66
Prudent Discount Revenue	0.68	1.35	0.84	0.56	0.62	0.68	4.73
Ancillary Service Revenue	0.36	0.67	0.63	0.66	0.70	0.73	3.74
Capital Contributions	0.79	1.31	1.39	1.48	1.50	1.62	8.09
Revenues from additional user charges	1.51	2.57	2.46	2.31	2.16	2.00	13.01
Total - Revenue	97.90	192.15	200.82	208.31	215.66	222.39	1,137.23
Expenses							
operating expenditure	(32.61)	(74.82)	(77.71)	(81.21)	(85.47)	(90.20)	(442.02)
Depreciation of the TAB	(24.24)	(51.34)	(57.71)	(60.26)	(61.98)	(67.47)	(323.01)
Debt servicing costs	(17.23)	(35.99)	(39.31)	(42.69)	(46.17)	(49.41)	(230.79)
Total - Expenses	(74.08)	(162.15)	(174.73)	(184.16)	(193.62)	(207.08)	(995.83)
Tax							
Net Income	23.82	30.00	26.09	24.14	22.05	15.31	
Tax loss carried forward	-	-	-	-	-	-	
Estimated taxable income	23.82	30.00	26.09	24.14	22.05	15.31	
Income tax expense (30%)	9.22	11.61	10.10	9.35	8.53	5.93	54.74
Value of Imputation Credits	(2.30)	(2.90)	(2.52)	(2.34)	(2.13)	(1.48)	(13.68)
ATCO Estimated Cost of Corporate Income Tax Net of Imputation Credits	**6.91**	**8.71**	**7.57**	**7.01**	**6.40**	**4.45**	**41.05**

Source: ATCO Gas Australia, Tariff Model, December 2014.

2114. ATCO has not accepted the Authority's requirement to exclude capital contributions and gifted assets from the TAB for the purpose of calculating tax depreciation, for the following reasons:[952]

[952] ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, pp. 233-237.

- capital contributions represent efficient costs that are an integral part of providing the GDS reference services; and
- capital contributions benefit all customers by widening the customer base and lowering costs per customer.

2115. ATCO has not accepted the Authority's requirement to exclude commercial meters from the TAB, and depreciation of commercial meters from tax depreciation, on the basis that these costs are efficient.[953]

2116. Moreover, ATCO has proposed to include revenue from user specific charges in the taxable income. ATCO has stated that it mistakenly did not include this revenue in the taxable income calculation in its initial proposal, but should have included it as it relates to the provision of reference services. [954]

2117. ATCO accepted the Authority's determined asset lives for the TAB.

2118. ATCO has accepted the Authority's requirement that the rolled forward TAB include commissioned assets only. In its response, ATCO has updated its tax depreciation calculation by maintaining a one-year lag between incurring capital expenditure and commissioning the relevant asset.

2119. ATCO has agreed with the Authority that ATCO's tax liabilities going forward should align with the tax liabilities of a benchmark efficient entity and that a benchmark efficient entity would seek to minimise its tax liabilities. However, ATCO considers that its proposed application of straight line depreciation would be consistent with this objective, on the following basis:[955]

- ATCO uses straight line depreciation in its tax returns, and has used it since the pre-tax regime;
- ATCO considers that diminishing value depreciation results in an undeducted amount until the asset is disposed of and that it cannot dispose of the majority of its assets;
- diminishing value depreciation defers tax payments to future periods, whose efficiency is not confirmed by market characteristics; and
- ATCO can only apply diminishing value to new assets as the ATO does not allow a change in tax depreciation methodology for the same asset during its life.

2120. ATCO has forecast debt servicing costs to reflect its proposed opening RAB, cost of debt risk margin and nominal risk free rate as per its response to the Draft Decision. ATCO has accepted the Authority's requirement to use the RAB derived using the CCA depreciation method to determine the debt service costs used in the taxation calculations.

2121. ATCO has also accepted the Draft Decision's requirement to base taxable income on smoothed tariff revenue.

---

953 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 237.

954 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 237.

955 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, pp. 237-238.

2122. Table 105 shows ATCO's revised proposed tax asset base.

Table 105 ATCO's Revised Proposed Closing Tax Asset Base (AA4)

$ million nominal	July to Dec 2014	2015	2016	2017	2018	2019
Opening Tax Asset Base	497.42	518.00	577.47	643.65	711.75	775.18
ATCO's Forecast Capital Expenditure	44.82	110.81	123.90	128.37	125.41	120.92
ATCO's Forecast Depreciation	24.24	51.34	57.71	60.26	61.98	67.47
ATCO's Proposed Closing Tax Asset Base	**518.00**	**577.47**	**643.65**	**711.75**	**775.18**	**828.63**

Source: ATCO Gas Australia, Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 12-7

Submissions

2123. The Authority did not receive submissions in relation to ATCO's estimated cost of corporate income tax in the GDS access arrangement revision proposal.

2124. However, the Authority did receive submissions from Western Australian Local Government Association (**WALGA**) and the Energy Networks Association (**ENA**) which argued that tax on capital contributions should not be recovered from contributing entities but rather as a cost of business from all ATCO customers.

2125. WALGA noted that generally it supports the use of upfront charges for the cost of infrastructure as it ensures the application of the user pays principle. However, WALGA considered that the imposition of tax recovery charges on capital contributions leads to inefficient outcomes and may mean that projects with significant community benefit do not proceed. ENA noted that ATCO must connect new customers according to its licence.

2126. Both WALGA and ENA noted that the AER allow capital contributions and gifted assets to be included in the tax building block.

Considerations of the Authority

Capital Contributions

2127. ATCO submits that capital contributions should be included in the tax asset base, on the basis that:

- capital contributions are an inevitable result of providing connections and reference services, which then must become subject to the requirements of NGR 87A (which sets out the approach to estimating the cost of corporate income tax):[956]

> ETI_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of reference services if such an entity, rather than the service provider, operated the business of the service provider.

[956] Rule 87A(1) of the NGR.

- even were NGR 87A not a key requirement with regard to capital contributions, it may still be recognised that other customers generally benefit from capital contributions, as costs per customer are lowered by the addition of new customers to the network. Therefore to allocate all costs to the contributing customers would be inefficient.
- ATCO cannot recoup capital contributions from past customers:[957]

  > The ERA recognises that the receipt of a capital contribution leads to a tax liability. ATCO cannot recover the tax liability arising from past contribution from particular customers. Customers that paid past contributions are now provided with and continue to have access to reference services at reference tariffs. Therefore, if the past capital contributions are excluded from the calculation of the tax liability, ATCO is not provided with an opportunity to recover its efficient costs.
  >
  > The ERA considers the contributor of the capital cost of the asset should pay for the tax liability rather than all users because it does not believe all users are likely to benefit from the contribution. ATCO submits all customers benefit from past capital contributions...

- Capital contributions are calculated by determining the amount required to ensure that the net present value (**NPV**) of the expenditure to connect the customer is zero after a period of 25 years:[958]

  > The entire expenditure required to connect the customer is assessed against rule 79(1)(a) of the NGR and then the amount required to be paid by the customer is assessed against rule 79(2) of the NGR. Therefore, the capital contribution amount satisfies rule 79 of the NGR.
  >
  > The above procedure and relevant objectives, requirements and assumptions relating to capital contributions are included in ATCO's Capital Contribution Policy and Capital Contribution Procedure provided at Appendix 12.1 and 12.2 of this document.
  >
  > Further, the capital contribution is the NPV of the difference between the cost of the connection and the revenue received. Therefore the revenue paid by the customer through haulage tariffs and the capital contribution is the total cost of connection, which will always be more than the avoidable cost of connection. Therefore, no subsidy is paid by existing customers to the new customer.

- ATCO acknowledges that it is difficult to estimate how charging the user the tax liability would impact the likelihood of a new customer choosing not to connect.[959] However, ATCO contends that even if one additional customer chooses not to connect as a result of the charge being greater than it is willing to pay, existing customers forgo the benefit, which would be inconsistent with the efficient use and utilisation of the gas network.[960]

---

957 Rule 87A(1) of the NGR.

958 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 231.

959 ATCO argues that no other Australian gas distribution businesses adopt the 'user pays' approach to recovering the tax liability, so it is not possible to observe the impact on connection rates. The AER's PTRM revenue approach incorporates the tax liability in the calculation of the tax building block. The ERA's user pays approach is only applied to electricity and water utilities, which are essential services, while gas is not (ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 232).

960 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 232.

2128. Each of these arguments is considered in turn.

Capital contributions and reference services

2129. ATCO has not sought to roll any capital contributions into the RAB. In consequence, in the Draft Decision, the Authority noted that it was not necessary for it to consider the application of ATCO's proposal in respect of rule 82 of the NGR.

2130. The Draft Decision also set out the Authority's view that the tax costs associated with capital contributions may not necessarily be associated with efficient costs – where capital contributions are not included in the RAB, they will not have been evaluated in terms of rule 79 of the NGR that sets out the criteria for conforming capital expenditure, as that incurred by a prudent service provider acting efficiently, and justified on economic, safety or regulatory grounds.[961]

2131. Such an outcome – the inclusion of non-conforming capital expenditure – would be a clear contravention of rule 87A of the NGR, as income earned from inefficient investments cannot be associated with the earnings of the benchmark efficient entity, or with its efficient tax liabilities.

2132. On the other hand, ATCO seeks to demonstrate that capital contributions are efficient when tested against the requirements of rule 79 of the NGR.

2133. First, ATCO submits that:[962]

> The capital contribution amount is the difference between the total efficient costs associated with the customer connection, and that which would be recovered by the tariff revenue as a result of the customer's consumption. The way rules 79 and 82 of the NGR work together is that the whole expenditure is assessed against rule 79(1)(a) then, if part of that expenditure is not justified under rule 79(1)(b) of the NGR, that part becomes a capital contribution. Therefore, the capital contribution amount represents a sub set of the efficient cost and satisfies rule 79(1)(a) of the NGR.

2134. Second, ATCO acknowledges that capital contributions and commercial meters are 'not included in the RAB'.[963] However, ATCO presents analyses which seek to demonstrate that such contributions would be found efficient when tested against the requirements of rule 79 of the NGR. This evidence is considered in the next section.

Benefit to other customers

2135. The Authority set out in the Draft Decision that it considered that including contributed and gifted assets in the TAB would increase the revenue requirement on other customers in the network:

> Including the capital contributions in the tax calculations for determining the regulated revenue would lead to all of ATCO's customers paying for a proportion of the contributed assets, to the extent that they generate a tax liability. This effect arises because if the value of a capital contribution is included in the regulatory

---

961 Economic Regulation Authority, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014, p. 96.

962 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 230.

963 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 230.

> taxation account, it would be counted as income for tax purposes in the year of receipt, resulting in a tax liability due in the same year. The related tax expense would then be passed through to all customers in that year, through the building block revenue calculations.[964]
>
> Ultimately, the tax expense paid by all customers may be less than the tax liability paid in the first year, as ATCO and thus its customers receive a reduction in the required tax cash flows over time, due to the depreciation of the contributed asset in the regulatory TAB.[965]
>
> Nonetheless, it is clear that including the contributed or gifted asset in the tax calculations increases the revenue requirement on all customers in the first year of the contribution. It is also clear that despite some net subsequent revenue reduction provided by the TAB depreciation, all customers ultimately end up paying a portion of the cost of the contributed asset. The cost paid by all the network customers is associated with the tax liability for the contributed asset, which would otherwise have been passed on to the user of the asset.

2136. The Draft Decision set out that the Authority considered that it is unlikely that existing customers gain any benefit from contributed or gifted assets.

2137. However, a key element in ATCO's response is that existing customers do benefit from the increase in the customer base that results from contributed assets, through lower tariffs, and should therefore contribute to the cost:[966]

> …the NGO requires that discretion is to be exercised so as to include capital contributions and meter sets in the tax asset base. Essentially this is because the customer base generally benefits from such contributions as costs per customer are lowered by the addition of new customers to the network. Therefore the long term interests of customers as to price, security and reliability of supply are promoted. Equally those interests are jeopardised by placing too great a cost on parties seeking connections. The assumption that a party seeking a connection should pay all costs, including tax costs, assumes that there is no benefit to other customers from the connection. Indeed as there are benefits to other customers as explained above, then it is contrary to economic efficiency and equity for the costs to be imposed solely on the party seeking the connection rather than not spread across the customer base.

2138. ATCO considers that:[967]

> The capital contribution amount is the difference between the total efficient costs associated with the customer connection, and that which would be recovered by the tariff revenue as a result of the customer's consumption. The way rules 79 and 82 of the NGR work together is that the whole expenditure is assessed against rule 79(1)(a) then, if part of that expenditure is not justified under rule 79(1)(b) of the NGR, that part

---

964 The initial tax liability would be 30 per cent of the contribution, due in the year that the contribution was made. Circularity – for example relating to the requirement to pay tax on the additional compensation in the tax building block for the initial tax liability – lifts the initial payment from 30 per cent to around 43 per cent. Taking account of imputation credits on the effective tax rate, the net tax cost reduces to a 'grossed up' tax expense of around 18 per cent of the initial capital contribution or gifted asset value (assuming gamma is 0.5). This tax expense would be added to the required tax cash flows that are compensated in ATCO's revenue in that year.

965 Subsequent depreciation of the contributed asset through the TAB reduces the initial 18 per cent tax expense in NPV terms. The extent of the reduction will depend on the assumed asset life of the contributed asset and the time value of money (given by the WACC). In this example, the NPV tax cost might fall to around 15 per cent, given typical asset lives and WACC values.

966 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 230.

967 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 230.

becomes a capital contribution. Therefore, the capital contribution amount represents a sub set of the efficient cost and satisfies rule 79(1)(a) of the NGR.

2139. As noted above, both the WALGA and the ENA also consider that tax on capital contributions should be recovered as a cost of business from all ATCO customers.

2140. In response, first, the Authority notes that rule 79(1)(a) of the NGR to which ATCO refers relates to the efficiency of the capital expenditure itself, as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services. The justification for capital expenditure is dealt with under rule 79(1)(b) of the NGR, which provides the test for conforming capital expenditure through explicit linkage to the criteria set out under rule 79(2) of the NGR.

2141. Second, the Authority notes that the part of any capital expenditure which is justified under rule 79(1)(b) of the NGR must either deliver additional economic value (rule 79(2)(a)), deliver positive net present value arising from expected incremental revenue (rule 79(2)(b)), be necessary to maintain the integrity and safety of services in meeting existing demand (rule 79(2)(c)), or some combination of rule 79(2)(b) and rule 79(2)(c) (rule 79(2)(d) of the NGR). In that case it could be rolled into the RAB, and no capital contribution would be required.

2142. To the extent that a capital expenditure is not rolled into the RAB, then it must follow that – from the point of view of the NGR – it does not deliver either additional economic value, or integrity and safety required to meet existing demand. In other words, capital contributions by definition relate solely to the interests of the capital contributor, and the treatment in the NGR reflects the user pays principles.[968,969] The contributor pays for the assets, receives the sole value from its use, and neither the contributor nor other users are required to pay any costs of that asset through tariffs, as it is not generally rolled into the RAB.

2143. Capital contributions are not generally included in the RAB for the above reason. In this context, rule 82(2) of the NGR allows that capital expenditure which conforms to the requirements of rule 79 of the NGR – even though associated with a component of capital contribution – may be rolled into the RAB. However, the associated capital contribution is required to be excluded. Alternatively, under rule 82(3) of the NGR, the Authority may approve the rolling in of the capital contribution (or a part of it), but

---

968 The Authority notes that retail connection charges are considered by the NGR in this way. Specifically NGR 119N specifies that:

119N Nature of connection charges

The component of a connection charge that recovers capital expenditure paid to a distributor by or on behalf of a retail customer is taken to be a capital contribution for the purposes of rule 82.

969 The Authority notes that WALGA 'supports the use of upfront charges for the costs of infrastructure built specifically for new developments… [which] ensures the application of the user pays principle and the achievement of efficient outcomes since development proponents will choose the most cost-effective areas for development' (Western Australian Local Government Association, WALGA interim submission: ERA access arrangement draft decision, 12 January 2015). That said, WALGA considers that many local government projects have significant public benefits, for example gas asset relocation to accommodate road upgrades, which then would not proceed if the tax contribution was allocated to the project. In response to this point, the Authority reiterates its view set out in the Final Decision for Western Power's access arrangement, where it noted 'the allocation of costs and benefits' associated with local government projects is a matter for local government (Economic Regulation Authority, Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network, 5 September 2012, p. 247).

only if there is a mechanism to prevent the service provider from benefiting through increased revenue associated with the capital contribution.[970] The principle is that other users, should not have to pay for, and reference tariffs should therefore not include, any element of the capital contribution.

2144. ATCO submitted net present value analysis to suggest that capital contributions for major expansions or cluster connections are NPV positive after a relatively short period of time, even inclusive of tax liabilities when the capital expenditure is rolled into the TAB.[971]

2145. The Authority notes that such positive NPV analysis should imply that there is no capital contributions at all. After all, the hospital connections appear to pay back fairly quickly, in less than 10 years, which seems to run counter to ATCO's statement in paragraph 2138 above.

2146. If the user is not prepared to pay for its connection costs, it becomes unlikely that the connection will be efficient.[972] To the extent that other users subsidise the fixed costs of connections, then the discounted weighted average tariff for all other users is likely to rise. This does not reflect an efficient expansion.

2147. Finally, ATCO argues that the connection benefits other users in lowering tariffs. However, the Authority considers that this is a spurious argument. In particular, the argument does not account for the more than offsetting benefits that other users provide to the new connection, in terms of lowering tariffs, which are also uncharged under the NGR. Taken to extremes, it means that any customer could be offered a lower tariff, as there would be more than offsetting benefits for other customers through the resulting increased use.

2148. In conclusion, the Authority considers that the NGR is clear that connection benefits the user, and that the connection charges should be paid by the user. The corollary is that it would be inappropriate to require other users to pay for tax liabilities associated with the contributed capital expenditure. To do so violates the clear principles set out in the NGR.

2149. As noted in the Draft Decision, the Authority considers that the service provider does have a tax liability associated with a contribution, but given the objective of economic efficiency and the associated principle of 'user pays', this should be recovered from the contributor – to do otherwise would lead to a subsidy from the existing customer base to the contributing entity and the user of the asset.

---

970 An example of such a mechanism is the 'Queensland Method', which treats the capital contribution as revenue in the year in which it is received, while amortising the costs over the life of the asset (the costs and revenues are included in the building block calculation and the revenue cap). The effect of the Queensland Method is therefore to reduce revenue requirements from network tariffs in the year of inclusion, but to require higher network tariffs in the future to compensate. The Queensland Method therefore ensures that the net present value of the capital contribution is zero in the RAB.

971 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 233.

972 The Authority notes the ENA's comment that 'ATCO Gas cannot refuse establishing new connection under its Gas Distribution Licence if the customer bears the cost' (Energy Networks Association, WA ERA Draft Decision for ATCO Gas, 12 January 2015, p. 5). The Authority considers this highlights why it is important that any capital contributor face the full costs of the contributed asset, otherwise there will be an economic distortion.

2150. In light of this, the Authority is of the view that the service provider and the contributor are best placed to work out the commercial terms of the tax implications of any contribution, taking into account their business interests and tax positions.

2151. WALGA noted that generally its supports the use of upfront charges for the cost of infrastructure as it ensures the application of the user pays principle. However, WALGA considered that the imposition of tax recovery charges on capital contributions leads to inefficient outcomes and may mean that projects with significant community benefit do not proceed. ENA noted that ATCO must connect new customers according to its licence.

2152. Both WALGA and ENA noted that the AER allow capital contributions and gifted assets to be included in the tax building block.

Inability to deduct taxes related to past capital contributions

2153. ATCO contends that disallowing capital contributions in the TAB will lead to unfunded tax liabilities related to past contributions from particular customers.[973]

2154. However, the Authority notes that capital contributions have never been included in the RAB, therefore there has never been an implicit tax liability allowed for them under the previous pre-tax approach. To the extent that ATCO has in the past accepted capital contributions, without accounting for the tax effects on its business, is a matter for ATCO.

Commercial Meter Sets and User Specific charges

2155. The Draft Decision required ATCO to exclude commercial meter sets from the TAB, and to exclude depreciation of commercial meter sets from tax depreciation.

2156. ATCO has not accepted the Authority's decision as it considers that the costs to install commercial meter sets are efficient and properly included in the tax asset base for the purpose of calculating the tax liability. Moreover, ATCO stated that it mistakenly did not include revenue received through user specific charges from the calculation of tax liability in its initial proposal. ATCO stated that it receives revenue through user specific charges under reference tariffs for A1, A2 and B1 Reference Services.

2157. The Authority maintains its position in the Draft Decision to require ATCO to exclude commercial meter sets from the initial capital base, and to exclude depreciation of commercial meter sets from tax depreciation.

2158. ATCO stated that commercial meter sets are not included in the regulated asset base as they are either paid for up front by the retailer or the cost is recovered by the user specific charge tariff.[974]

2159. The Authority considers that tax costs associated with commercial meter sets may not necessarily be associated with efficient costs as commercial meter sets are not included in the RAB and are not evaluated in terms of rule 79 of the NGR that sets out the criteria for conforming capital expenditure. The Authority considers that ATCO has not presented any evidence that justifies the efficiency of tax costs

---

973 ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 231.

974 ATCO Gas Australia, *Response to ERA43*, 11 August 2014.

associated with commercial meter sets. The Authority also considers that ATCO has not demonstrated that charging the service provider's tax liability in relation to commercial meter sets to all users does not constitute a subsidy.

2160. In its response to the Draft Decision, ATCO proposed that revenue from user specific charges be included in the calculation of tax liability. ATCO states that it inadvertently excluded the revenue received through user specific charges from the calculation of tax liability in its initial proposal. The user specific charge is a charge for the provision of service pipe, regulators, telemetry and commercial meter sets for A1, A2 and B1 customers. These charges vary between customers in accordance with the individual requirements for user specific delivery facilities. ATCO considers that the revenue relates to the provision of reference services and is therefore properly included in the estimate of taxable income under rule 87A of the NGR.

2161. The Authority accepts that Annexure A of ATCO's proposed revised access arrangement sets out how the user specific charge is calculated for A1, A2 and B1 customers. However, the Authority considers that the user specific charge is not part of the reference tariff.

2162. The Authority considers that ATCO has not provided sufficient detail on the $12.1 million revenue it forecasts receiving for user specific charges.[975] The Authority considers that the NGR is clear that the connection benefits the user, and that the connection charges should be paid by the user. The Authority considers that it would be inappropriate to require other users to pay for tax liabilities associated with the connection charges for A1, A2 and B1 customers. To do so violates the clear principles set out in the NGR.

2163. The Authority considers that the service provider might have a tax liability associated with user specific charges, but given the objective of economic efficiency and the associated principle of 'user pays', this should be recovered from the user – to do otherwise would lead to a subsidy from the existing customer base to the user of the asset.

2164. The Authority is of the view that the service provider and the user are best placed to work out the commercial terms of the tax implications for user specific assets. The Authority considers that the calculation for the user specific charges in Annexure A of ATCO's proposed revised access arrangement allows ATCO to recover its tax liability.

2165. Therefore, the Authority is not satisfied that ATCO's proposal to include costs from commercial meters and revenue from user specific charges in the taxable income meets the requirements of rule 87A of the NGR.

Tax Depreciation Methodology

2166. The Draft Decision required ATCO to apply diminishing value depreciation on new capital expenditure from the fourth access arrangement period to depreciate the TAB, in line with the behaviour of a benchmark efficient entity as outlined in the NGR.

---

[975] ATCO Gas Australia, *Response to ERA Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Table 12-6 p 237.

2167. ATCO has rejected the Authority's Draft Decision's requirement, and has presented the opinion of auditor Ernst & Young to support its position. Ernst & Young has supported ATCO's position:[976]

> ...it is my view that ERA's recommendation in relation to the forced adoption of the diminishing value method for all capital expenditure incurred post 1 July 2014 for the post-tax revenue model purposes is inappropriate as it can't be assumed that the adoption of the diminishing value method is consistent with an expected outcome for a benchmark efficient entity. In my opinion, there are circumstances where a benchmark efficient entity would not choose to adopt the diminishing value method as it would not result in an overall minimisation of the income tax liabilities over the effective lives of the depreciable assets.

2168. Ernst & Young has presented the following reasons to support its view:[977]

- ATCO has selected the straight line method to depreciate its TAB prior to the application of the post-tax revenue model.
- If ATCO is required to apply diminishing tax depreciation on capital expenditure that it has already selected to depreciate using straight line depreciation with the ATO, it risks under-recovery on these assets. Moreover, ATCO may run the complication of maintaining two tax depreciation schedules, one for the ATO and one for the ERA.
- While diminishing value depreciation minimises tax liabilities in the early lives of assets, this is not the only factor in selecting the preferred tax depreciation methodology.
- Diminishing value depreciation results in an undeducted amount at the end of the effective life of the depreciable asset.
- Under tax law, ATCO could only apply a new tax depreciation methodology (in this case, diminishing value depreciation) on capital expenditure on new assets from 1 July 2014. ATCO would not be able to apply diminishing value depreciation on capital expenditure on existing assets, as such capital expenditure would have to follow the same tax depreciation methodology.
- The Authority's approach is not consistent with that of the AER, which has accepted both tax depreciation methodologies.
- Diminishing tax depreciation could discourage improvements or alterations to existing assets, especially during later stages of their lives given the risk of remaining undeducted capital costs at the end of their lives. According to Ernst & Young, it is not clear that this is consistent with the National Gas Objective.
- Straight line tax depreciation results in a smoother tariff profile over future access arrangement periods.
- Based on the Authority's calculation of ATCO's tax liability in the Draft Decision, ATCO will have a negative tax liability over the fourth access arrangement period under diminishing tax depreciation. Ernst & Young considers that this outcome is not consistent with the behaviour of a benchmark efficient entity.

---

976 Ernst & Young, *Review of the regulated tax asset base for regulated revenue purposes – addendum to the report of Vaughan Lindfield*, 21 November 2014, p. 3.

977 Ernst & Young, *Review of the regulated tax asset base for regulated revenue purposes – addendum to the report of Vaughan Lindfield*, 21 November 2014, pp. 4-6.

2169. In implementing the NGR requirement to move to a post-tax model consistent with the requirements of rule 87A, the Authority considers that:

- ATCO's tax liabilities going forward should align with the tax liabilities of a benchmark efficient entity; and
- a benchmark efficient entity would seek to minimise its tax liabilities.

2170. The Authority has reviewed ATCO's response and the Ernst & Young opinion. The Authority has decided to accept ATCO's adoption of the straight line method to depreciate new capital expenditure in its TAB after 1 July 2014 for the following reasons:

- The Authority has sought and obtained evidence from ATCO that it has and continues to adopt straight line depreciation in its tax returns.[978] The Authority considers that ATCO has the incentive to select the most efficient tax depreciation method, particularly during the pre-tax regime.
- The Authority now considers that a benchmark efficient entity would seek to minimise its tax liabilities over the lives of the assets, rather than over one access arrangement period only. Such an entity would select the tax depreciation methodology that achieves this, based on its circumstances. In a neutral NPV context, and in line with the National Gas Objective, the benchmark efficient entity would also safeguard the long term interests of consumers through making sure that costs are evenly spread out through the lives of assets.

Debt Servicing Costs

2171. The Authority has amended ATCO's forecast debt servicing costs to reflect its revised decision on the opening RAB, and revised cost of debt risk margin and nominal risk free rate as noted in the Rate of Return chapter of this Final Decision.

Final Decision

2172. The Authority has updated ATCO's estimated cost of corporate income tax based on the above discussion. The Authority has based ATCO's taxable income on smoothed tariff revenue, as being the closest estimate to actual accounting revenue that tax would be based on.

2173. The Authority has calculated taxable income as assessable income less tax deductible costs that are recognised by the ATO, as follows: [979]

- Smoothed tariff revenue [980]
- *plus* Revenue from prudent discounts.
- *plus* Ancillary service revenue.
- *minus* Approved forecast operating expenditure.
- *minus* Depreciation of the TAB, which excludes capital contributions, and customer commercial meter sets. The Authority has applied straight line depreciation on the TAB.

---

978 WA Network Holdings Pty Ltd, Consolidated annual financial report for the year ended 31 December 2014.

979 ERA, *GDS Tariff Model, September* 2015.

980 Authority notes that ATCO has accepted to base taxable income on smoothed revenue rather than the net cost of service, in response to the Draft Decision.

- *minus* Debt servicing costs, which the Authority has calculated by multiplying the debt portion of the opening RAB by the debt to equity ratio (assumed at 60 per cent) and the Authority's nominal cost of debt (cost of debt risk margin plus nominal risk free rate) based on the Rate of Return chapter of this Final Decision.
- *equals* Estimated taxable income.

2174. Table 106 breaks down the Authority's approved calculation of estimated cost of corporate income tax net of imputation credits.

Table 106 Authority's Final Decision Approved Estimated Cost of Corporate Income Tax Net of Imputation Credits (AA4)

Nominal $	July to Dec 2014	2015	2016	2017	2018	2019	Total
Revenue							
Tariff Revenue (smoothed)	98.74	179.48	165.97	156.78	149.11	142.06	892.14
Prudent Discount Revenue	0.68	1.34	0.83	0.55	0.60	0.66	4.65
Ancillary Service Revenue	0.48	0.70	0.61	0.64	0.66	0.69	3.78
Capital Contributions	-	-	-	-	-	-	-
Revenues from additional user charges	-	-	-	-	-	-	-
Total - Revenue	99.90	181.52	167.41	157.96	150.37	143.41	900.57
Expenses							
Operating expenditure	(31.13)	(69.22)	(70.16)	(71.99)	(74.51)	(76.58)	(393.59)
Depreciation of the TAB	(23.02)	(48.78)	(54.25)	(54.96)	(54.39)	(57.72)	(293.11)
Debt servicing costs	(15.31)	(32.34)	(34.81)	(36.91)	(38.71)	(40.38)	(198.47)
Total - Expenses	(69.46)	(150.34)	(159.21)	(163.87)	(167.60)	(174.69)	(885.17)
Tax							
Net Income	30.44	31.18	8.20	(5.90)	(17.23)	(31.28)	
Tax loss carried forward	-	-	-	(5.90)	(23.13)	(54.41)	
Taxable income	30.44	31.18	8.20	(5.90)	(23.13)	(54.41)	
Income tax expense (30%)	9.13	9.35	2.46	-	-	-	20.95
Value of Imputation Credits	(3.65)	(3.74)	(0.98)	-	-	-	(8.38)
Authority Approved Estimated Cost of Corporate Income Tax Net of Imputation Credits	**5.48**	**5.61**	**1.48**	**-**	**-**	**-**	**12.57**

Source: ERA, GDS Tariff Model, September 2015.

2175. The Authority has also amended ATCO's closing TAB for the fourth access arrangement period as follows:

- Updated initial capital base to exclude commercial meters.
- Updated opening tax asset base to exclude capital contributions.
- Updated forecast capital expenditure based on this Final Decision.
- Updated tax depreciation by excluding depreciation of commercial meters.

2176. Table 107 lists the Authority's estimated closing tax asset base by year over the fourth access arrangement period.

Table 107 Authority's Final Decision Approved Estimated Closing Tax Asset Base (AA4)

$ million nominal	July to Dec 2014	2015	2016	2017	2018	2019
Opening Tax Asset Base	467.18	483.41	533.53	568.44	595.17	621.16
Authority Forecast Capital Expenditure	39.24	98.91	89.15	81.69	80.38	84.44
Authority Forecast Depreciation	23.02	48.78	54.25	54.96	54.39	57.72
Authority Approved Estimated Closing Tax Asset Base	**483.41**	**533.53**	**568.44**	**595.17**	**621.16**	**647.88**

Source: ERA, GDS Tariff Model, September 2015.

Required Amendment 10

The estimated cost of income tax must be calculated as per Table 106.

The TAB must be revised as per Table 107, to implement the following:

- Exclude capital contributions from the calculation.
- Exclude commercial meters from the calculation.
- Exclude user specific charges revenue from the calculation.

The cost of debt risk margin and nominal risk free margin must be updated for the calculation of debt servicing costs.

Return on Working Capital

Regulatory Requirements

2177. The NGL(WA) and NGR do not make specific reference to the cost of working capital used by a service provider.

2178. However, rule 76 of the NGR provides that total revenue is to be determined for each regulatory year of the access arrangement period using the building block approach. The cost of working capital is not specifically included as a building block.

ATCO's Proposed Revisions

2179. ATCO proposed to include a return on working capital of $1.26 million in nominal dollars over the course of the fourth access arrangement period as part of the total revenue building blocks shown in Table 79 of the access arrangement information and reproduced below as Table 108. The current access arrangement does not allow for a return on working capital.[981]

Table 108 ATCO's Initial Proposed Return on Working Capital (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019
Prior Year Tariff Revenue	84.27	181.49	188.71	202.82	218.42	234.86
Expenses						
Forecast Capital Expenditure	45.87	108.40	119.81	124.97	127.43	132.73
Forecast Operating Expenditure	36.88	77.03	79.83	83.60	87.98	91.89
Total Expenses	82.74	185.43	199.64	208.56	215.41	224.62
Working Capital Requirement						
Receivables (18 days)	4.16	8.95	9.31	10.00	10.77	11.58
Payables (15 days)	(3.40)	(7.62)	(8.20)	(8.57)	(8.85)	(9.23)
Inventory (0.89% of capital expenditure)	0.41	0.96	1.07	1.11	1.13	1.18
Working Capital Requirement	1.16	2.29	2.17	2.54	3.05	3.53
Return on Working Capital at WACC	0.10	0.20	0.19	0.22	0.26	0.30

Source: ATCO Gas Australia, Tariff Model, September 2014.

2180. ATCO stated that working capital is a stock of funds that a business must maintain to pay costs as they fall due.[982] A cost arises as a result of the misalignment (on average) between incurring the costs of providing services and recovering the

[981] Economic Regulation Authority, *Final Decision on WA Gas Networks Pty Ltd proposed revised access arrangement for the Mid-West and South-West Gas Distributions System*, 28 February 2011, p. 107.

[982] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 264.

revenues associated with the provision of those services.[983] The return on working capital thus reflects the cost of maintaining these funds.

2181. ATCO stated that it had estimated its working capital amount using the "working capital cycle model as previously accepted by the ERA for Western Power".[984] ATCO's working capital cycle is made up of three core components:

- Inventory
- Accounts payable (creditor payments)
- Accounts receivable (debtor collection)

2182. ATCO's proposed inventory component is 0.89 per cent. ATCO stated that this is determined from the average level of inventory as a percentage of the forecast capital expenditure program for the fourth access arrangement period.[985] ATCO applied this percentage to forecast capital expenditure.

2183. ATCO's proposed accounts payable (creditor payment) days is 15 days. ATCO stated that this is determined from the standard terms of payment with its suppliers.[986] ATCO applied these payment terms to forecast operating and capital expenditure.

2184. ATCO's proposed accounts receivable days is 18 days. ATCO stated that this is determined from its meter reading cycles and payment terms in its contracts.[987] ATCO used the revenue from the year prior to calculate its receivable requirement.

Draft Decision

2185. The Authority noted that it did not have any information available to it besides the access arrangement information when considering whether to approve ATCO's proposal for a working capital amount. The Authority has previously adopted and approved the same working capital cycle model proposed by ATCO in relation to its Final Decision for the Western Power network.[988] However, in this case, the information provided by ATCO in its proposed revised access arrangement was not sufficient to verify that a return on working capital was necessary. Accordingly, the Authority sought further clarification from ATCO as to the calculations it performed for its working capital cycle model, in order to verify ATCO's claims. The Authority requested that ATCO clarify how it produced the components as described in paragraphs 2182, 2183 and 2184, which are the inventory as a percentage of capital expenditure, accounts payable creditor days and accounts receivable days.

2186. ATCO stated that its forecast for inventory as a percentage of capital expenditure was calculated by taking the average of monthly inventory levels from its general ledger for the years of 2011, 2012 and 2013. These were then divided by the actual capital expenditure in each year to determine inventory as a percentage of capital

983 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 264.

984 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 264.

985 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 264.

986 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 264.

987 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 264.

988 Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network*, 5 September 2012, p. 260.

expenditure for each year. These three percentages were then averaged to produce an inventory as a percentage of capital expenditure figure of 0.89 per cent. [989]

2187. For creditor payment days, ATCO stated that it took creditor balances from its general ledger for the 12 month period beginning November 2012 to October 2013 and calculated an average monthly creditor balance. This was then divided by the average of capital expenditure and operating expenditure (excluding UAFG) over the same period to produce the creditor payment days figure of 15 days.[990]

2188. For receivable days, ATCO stated that it took the receivable balances from its general ledger for the 12 month period beginning November 2012 to October 2013 and calculated an average monthly receivable balance. This was then divided by the total haulage revenue over the same period to produce a receivable days figure of 18 days.[991]

2189. The Authority considered that ATCO had adopted a reasonable methodology in producing its forecast return on working capital. However, as a result of various required amendments throughout the Draft Decision, the Authority also required that ATCO amend its return on working capital amount in Table 84 of the access arrangement information due to the various changes to the tariff revenue, forecast operating expenditure, forecast capital expenditure and the weighted average cost of capital. The Authority also requested that ATCO make an adjustment to remove the double counting of inflation, as a result of using nominal dollars multiplied by the nominal weighted average cost of capital.

ATCO's Response to the Draft Decision

2190. ATCO states that it did not implement the Authority's amendment in relation to working capital because "the ERA requires the removal of an 'inflationary gain' which is not relevant to working capital".[992] ATCO states that its working capital proposal does not index the capital base going forward, and therefore it is not appropriate to adjust the working capital amount.[993]

2191. ATCO has concerns with respect to the Authority's calculations for the return on working capital component in the tariff model. ATCO states:

> It appears the ERA's inflationary gain for working capital has been back solved and as a result, the net present value of the real and nominal returns on working capital do not reconcile. The return on working capital component calculated by the ERA delivers a lower return than that required to cover the efficient costs of a benchmark efficient entity. ATCO's modelling approach resolves this issue.[994]

---

989 ATCO Gas Australia, *Email response to ERA46 and ERA47*, 11 August 2014.

990 ATCO Gas Australia, *Email response to ERA46 and ERA47*, 11 August 2014.

991 ATCO Gas Australia, *Email response to ERA46 and ERA47*, 11 August 2014.

992 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014*, p. 239.

993 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 240.

994 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 240.

2192. ATCO states that it will maintain its working capital assumptions as set out in its initial proposal for inventory as a percentage of capital expenditure, accounts payable creditor days and accounts receivable days.[995] ATCO's revised proposal return on working capital is set out in Table 109.

Table 109 ATCO's Revised Proposal Return on Working Capital (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019
Tariff Revenue	95.59	188.27	196.97	204.51	212.00	218.77
Expenses						
Forecast Capital Expenditure	43.70	108.84	121.84	126.22	123.24	118.64
Forecast Operating Expenditure	32.61	74.82	77.71	81.21	85.47	90.20
Total Expenses	76.31	183.67	199.55	207.44	208.71	208.84
Working Capital Requirement						
Receivables (18 days)	4.71	9.28	9.71	10.09	10.46	10.79
Payables (15 days)	(3.14)	(7.55)	(8.20)	(8.52)	(8.58)	(8.58)
Inventory (0.89% of capital expenditure)	0.39	0.97	1.08	1.12	1.10	1.06
Working Capital Requirement	1.97	2.71	2.60	2.68	2.97	3.26
Return on Working Capital at WACC	0.15	0.21	0.20	0.21	0.23	0.25

Source: ATCO Gas Australia, Tariff Model, December 2014

Submissions

2193. The Authority has not received any submissions in relation to the provision for a return on working capital for ATCO's initial proposal, the Authority's Draft Decision or ATCO's revised proposal.

Considerations of the Authority

2194. Upon further consideration of ATCO's initial proposal and revised proposal, the Authority agrees that a modelling adjustment for inflationary gain is not required for the calculation of a return on working capital.

2195. As the Authority received no submissions addressing the provision for a return on working capital, the Authority considers that the working capital assumptions as proposed by ATCO in its initial and revised proposal are still valid. However, as a result of various required amendments throughout this Final decision, Table 83 of the access arrangement information will also need to be amended due to the various changes to the tariff revenue, forecast operating expenditure, forecast capital expenditure and the weighted average cost of capital.

[995] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 240.

Final Decision

2196. The Authority's Final Decision is to approve the inclusion of ATCO's proposed working capital cycle mode and assumptions as set out in paragraphs 2182, 2183 and 2184 to calculate the return on working capital requirement. However, as explained above, due to the various amendments required in this Final Decision, ATCO is required to amend Table 83 of the access arrangement information of the as set out in Table 110 below.

Table 110 Authority's Final Decision Approved Return on Working Capital (AA4)

Nominal $ million	July to Dec 2014	2015	2016	2017	2018	2019
Tariff Revenue	99.90	181.52	167.41	157.96	150.37	143.41
Expenses						
Forecast Capital Expenditure	31.13	69.22	70.16	71.99	74.51	76.58
Forecast Operating Expenditure	39.24	98.91	89.15	81.69	80.38	84.44
Total Expenses	70.37	168.12	159.31	153.68	154.89	161.02
Working Capital Requirement						
Receivables (18 days)	9.77	8.95	8.23	7.79	7.42	7.07
Payables (15 days)	(5.74)	(6.91)	(6.53)	(6.32)	(6.37)	(6.62)
Inventory (0.89% of capital expenditure)	0.35	0.88	0.79	0.73	0.72	0.75
Working Capital Requirement	4.39	2.92	2.50	2.20	1.77	1.21
Return on Working Capital at Authority Approved WACC	**0.13**	**0.18**	**0.15**	**0.13**	**0.11**	**0.07**

Source: ERA, GDS Tariff Model, September 2015.

Required Amendment 11

The value of return on working capital for the fourth access arrangement period must reflect the values shown in Table 110 of this Final Decision

Allocation of Total Revenue between Reference Services and Other Services

Regulatory Requirements

2197. Rule 93 of the NGR requires that total revenue is allocated between reference services and other services on the basis of an allocation of costs. As an alternative to cost allocation, rule 93 provides for services other than reference services to be classed as rebateable services, with part of the revenue from sale of these services to be rebated or refunded to users of reference services.

> 93. Allocation of total revenue and costs
>
> 1) Total revenue is to be allocated between reference and other services in the ratio in which costs are allocated between reference and other services.
>
> 2) Costs are to be allocated between reference and other services as follows:
>
> a) costs directly attributable to reference services are to be allocated to those services; and
>
> b) costs directly attributable to pipeline services that are not reference services are to be allocated to those services; and
>
> c) other costs are to be allocated between reference and other services on a basis (which must be consistent with the revenue and pricing principles) determined or approved by the [Authority].
>
> 3) The [Authority] may, however, permit the allocation of the costs of rebateable services, in whole or part, to reference services if:
>
> a) the [Authority] is satisfied that the service provider will apply an appropriate portion of the revenue generated from the sale of rebateable services to provide price rebates (or refunds) to the users of reference services; and
>
> b) any other conditions determined by the [Authority] are satisfied.
>
> 4) A pipeline service is a rebateable service if:
>
> a) the service is not a reference service; and
>
> b) substantial uncertainty exists concerning the extent of the demand for the service or of the revenue to be generated from the service; and
>
> c) the market for the service is substantially different from the market for any reference service.

ATCO's Proposed Revisions

2198. In order to determine the total revenue that is to be recovered from reference haulage service tariffs, ATCO has subtracted the Net Present Value (**NPV**) of ancillary service revenue and the NPV of prudent discount revenue from the NPV of total revenue derived through the building block methodology. ATCO has then solved for price paths that align the NPV of total revenue with the NPV of forecast tariff revenues.

2199. ATCO has proposed to continue offering the same ancillary services in the fourth access arrangement period as the third access arrangement period. Ancillary services cover the following services: applying a meter lock, removing a meter lock, deregistering a delivery point, disconnecting a delivery point, and reconnecting a delivery point.

2200. Table 111 shows the NPV of ATCO's proposed tariff revenues for the fourth access arrangement period, which ATCO derives by subtracting the NPV of ancillary service revenues and revenues from customers that receive prudent discounts from total revenues calculated through the cost of service.

Table 111 ATCO's Initial Proposed Tariff Revenues (AA4)

Nominal $ millions	NPV
ATCO's Proposed Total Revenues	919.63
ATCO's Proposed Ancillary Service Revenues (AA4)	3.24
ATCO's Proposed Revenues from Customers that Receive Prudent Discounts (AA4)	3.81
ATCO's Proposed Haulage Tariff Revenues	912.58

Source: ATCO Gas Australia, Tariff Model, September 2014.

Submissions

2201. The Authority has not received any submissions in relation to ATCO's allocation of total revenue between reference services and other services in the proposed revised access arrangement.

Draft Decision

2202. The Authority also determined the total revenue to be recovered from reference haulage service tariffs by subtracting the NPV of ancillary service revenue and the NPV of prudent discount revenue from the NPV of total revenue derived through the building block methodology.

2203. The Authority computed a different total revenue figure to that proposed by ATCO due to the Authority's required adjustments to the revenue building block components and an adjustment to ancillary service revenues.

2204. The Authority has adjusted tariffs in 2015, and has kept them constant in real terms from 2015 to 2019 such that the present value of the total revenue is identical to the net cost of service. For the B3 standing charge, the Authority has applied a separate adjustment to increase it gradually from 2015 to the avoidable cost recovery level in 2019.

2205. Table 112 shows the Draft Decision NPV of the Authority approved tariff revenues for the fourth access arrangement period, derived by subtracting the NPV of ancillary service revenues and revenues from customers that receive prudent discounts from total revenues calculated through the cost of service.

Table 112 Authority's Draft Decision Approved Tariff Revenues (AA4)

Nominal $ millions	NPV
Authority Approved Total Revenues	692.69
Authority Approved Ancillary Service Revenues (AA4)	3.35
Authority Approved Revenues from Customers that Receive Prudent Discounts (AA4)	4.06
Authority Approved Haulage Tariff Revenues	685.28

Source: ERA, GDS Tariff Model, October 2014.

ATCO's Response to the Draft Decision

2206. In its response to the Draft Decision ATCO accepted the methodology applied by the Authority but not the revenue calculation. ATCO has revised its volumes and revenue for ancillary services and prudent discounts in its response to the Draft Decision.[996] ATCO's revised proposal ancillary service operating expenditure forecast for the fourth access arrangement period is shown in Table 35.

2207. Table 113 shows the NPV of ATCO's proposed tariff revenues for the fourth access arrangement period, which ATCO derives by subtracting the NPV of ancillary service revenues and revenues from customers that receive prudent discounts from total revenues calculated through the cost of service.

Table 113 ATCO's Revised Proposed Tariff Revenues (AA4)

Nominal $ millions	NPV
ATCO's Proposed Total Revenues	880.47
ATCO's Proposed Ancillary Service Revenues (AA4)	2.96
ATCO's Proposed Revenues from Customers that Receive Prudent Discounts (AA4)	3.89
ATCO's Proposed Haulage Tariff Revenues	873.61

Source: ATCO Gas Australia, Tariff Model, November 2014.

Considerations of the Authority

2208. The Authority has assessed ATCO's proposed method for calculating ancillary service tariffs for the fourth access arrangement period against the requirements of rule 94 of the NGR in paragraphs 2368 to 2375. The Authority considers that ATCO's revised Ancillary Services operating expenditure is consistent with ATCO's revised proposal demand forecast. Consistent with paragraph 464 of the Operating Expenditure chapter of this Final Decision, the Authority is satisfied with ATCO's revised proposal Ancillary Service Tariff volumes and revenues. Accordingly, the Authority accepts ATCO's revised proposed Ancillary Service Tariff volumes and revenues.

2209. The Authority notes that ATCO has revised its number of customers receiving prudent discounts from its initial proposal. ATCO initially forecast that the number of customers would fall from 14 to 11 during the fourth access arrangement period. In

[996] ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Table 6-28 p. 102.

its response to the Draft Decision ATCO proposes that 16 customers will receive prudent discounts throughout the fourth access arrangement period. The Authority has accepted ATCO's proposed number of customers receiving prudent discounts.

2210. The Authority has computed a different total revenue NPV figure to that proposed by ATCO due to the Authority using its approved nominal after tax WACC of 6.02 per cent for 2015 onwards (5.97 per cent used for July to December 2014), which was determined in the Rate of Return section of this Final Decision.

2211. Table 114 shows the NPV of the Authority approved tariff revenues for the fourth access arrangement period, derived by subtracting the NPV of ancillary service revenues and revenues from customers that receive prudent discounts from total revenues calculated through the cost of service.

Table 114 Authority Approved Tariff Revenues (AA4)

Nominal $ millions	NPV
Authority Approved Total Revenues	756.33
Authority Approved Ancillary Service Revenues (AA4)	3.16
Authority Approved Revenues from Customers that Receive Prudent Discounts (AA4)	3.99
Authority Approved Haulage Tariff Revenues	749.18

Source: ERA, GDS Tariff Model, September 2015.

Required Amendment 12

The value of tariff revenues to be allocated for the calculation of haulage tariffs for the fourth access arrangement period must be amended to reflect Table 114 of this Final Decision.

Reference Tariffs

Haulage Tariffs

Regulatory Requirements

2212. Rule 92 of the NGR discusses the equalisation of revenues from charged tariffs with calculated tariff revenue.

> 92. Revenue Equalisation
>
> 2) The reference tariff variation mechanism must be designed to equalise (in terms of present values):
>
> a) forecast revenue from reference services over the access arrangement period; and
>
> b) the portion of total revenue allocated to reference services for the access arrangement period.

2213. Rule 94 of the NGR sets out the requirements for the determination of reference tariffs for distribution pipelines.

> 94. Tariffs – distribution pipelines
>
> 1) For the purpose of determining reference tariffs, customers for reference services provided by means of a distribution pipeline must be divided into tariff classes.
>
> 2) A tariff class must be constituted with regard to:
>
> a) the need to group customers for reference services together on an economically efficient basis; and
>
> b) the need to avoid unnecessary transaction costs.
>
> 3) For each tariff class, the revenue expected to be recovered should lie on or between:
>
> a) an upper bound representing the stand alone cost of providing the reference service to customers who belong to that class; and
>
> b) a lower bound representing the avoidable cost of not providing the reference service to those customers.
>
> 4) A tariff, and if it consists of 2 or more charging parameters, each charging parameter for a tariff class:
>
> a) must take into account the long run marginal cost for the reference service or, in the case of a charging parameter, for the element of the service to which the charging parameter relates;
>
> b) must be determined having regard to:
>
> i) transaction costs associated with the tariff or each charging parameter; and
>
> ii) whether customers belonging to the relevant tariff class are able or likely to respond to price signals.
>
> 5) If, however, as a result of the operation of subrule (4), the service provider may not recover the expected revenue, the tariffs must be adjusted to ensure recovery of expected revenue with minimum distortion to efficient patterns of consumption.
>
> 6) The [Authority's] discretion under this rule is limited.

2214. Rule 96 of the NGR covers provisions for prudent discounts.

> 96. Prudent discounts
>
> 1) Despite the other provisions of this Division, the [Authority] may, on application by a service provider, approve a discount for a particular user or prospective user or a particular class of users or prospective users.
>
> 2) The [Authority] may only approve a discount under this rule if satisfied that:
>
> a) the discount is necessary to:
>
> i) respond to competition from other providers of pipeline services or other sources of energy; or
>
> ii) maintain efficient use of the pipeline; and
>
> b) the provision of the discount is likely to lead to reference or equivalent tariffs lower than they would otherwise have been.
>
> Note:
>
> Even though a user's incremental load is retained at a discounted price, overall tariffs may be lower because of the user's contribution to fixed costs.
>
> 3) If the [Authority] approves a discount under this rule, the [Authority] may also approve allocation of the cost, or part of the cost, of providing the discount to the costs

of providing a reference or other service in one or more future *access arrangement periods*.

4) In this rule:

equivalent tariff means the tariff that is likely to have been set for a service that is not a reference service if the service had been a reference service.

ATCO's Proposed Revisions

Tariff classes

2215. ATCO proposed that existing tariff classes continue into the fourth access arrangement period with the same charging parameters.

2216. ATCO's tariff classes are as follows:

- Tariff Class A1 - approximately 70 customers that require in excess of 35 TJ/year supplied at high or medium pressures, a contracted peak rate of 10 GJ or more per hour and user specific delivery facilities.
- Tariff Class A2 - approximately 110 customers that require volumes of gas in excess of 10 TJ/year but less than 35 TJ/year supplied at high or medium pressures, a contracted peak rate of less than 10 GJ/hour or above 10 TJ/hour and user specific delivery facilities.
- Tariff Class B1 - approximately 1,400 customers that require volumes of gas that do not exceed 10 TJ/year supplied at high or medium pressures, a contracted peak rate of less than 10 GJ/hour, and possibly user specific delivery facilities.
- Tariff Class B2 - approximately 10,000 large residential and small industrial customers that can be supplied from the medium and low pressure parts of the GDS. These small use customers can be supplied using up to 20 metres of service pipe, a standard pressure regulator and a standard 12m3/hour meter.
- Tariff Class B3 - more than 670,000 residential and small industrial customers that can be supplied from the medium and low pressure parts of the GDS. These customers use less than 20 metres of service pipe. Currently these customers utilise a standard 8m3/hour meter (AL8). ATCO proposed to include a larger 10m3/hour meter in the standard delivery facilities for these customers in the fourth access arrangement period.

2217. ATCO stated that the five tariff classes achieve a balance between grouping customers together on an economically efficient basis, and avoiding unnecessary transaction costs associated with a multitude of tariff classes.[997]

Reference tariff charging parameters

2218. ATCO did not propose to change the charging parameters for reference tariffs in the fourth access arrangement period. ATCO proposed to present usage charges for A2, B1, B2 and B3 customers per day rather than per year.

2219. Table 115 shows ATCO's charging parameters for reference tariffs for the fourth access arrangement period.

---

997 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 271.

Table 115 Reference Tariff Charging Parameters (AA4)

Tariff Class	Service Element	Charging Parameter
A1	Fixed charge for using the distribution system	Standing Charge ($/year)
	Fixed charge for the network capacity utilised	Demand Charge ($/MHQ GJ/km)
	Variable charge based on throughput	Usage Charge ($/GJ/km)
	Charge to reflect specific costs associated with customer for service pipe, regulators, metering and telemetry	User Specific Charge ($)
A2	Fixed charge for using the distribution system	Standing Charge ($/year)
	Variable charge based on throughput	Usage Charge ($/GJ/day)
	Charge to reflect specific costs associated with customer for service pipe, regulators, metering and telemetry	User Specific Charge ($)
B1	Fixed charge for using the distribution system	Standing Charge ($/year)
	Variable charge based on throughput	Usage Charge ($/GJ/day)
	Charge to reflect specific costs associated with customer for service pipe, regulators, metering and telemetry	User Specific Charge ($)
B2	Fixed charge for using the distribution system	Standing Charge ($/year)
	Variable charge based on throughput	Usage Charge ($/GJ/day)
B3	Fixed charge for using the distribution system	Standing Charge ($/year)
	Variable charge based on throughput	Usage Charge ($/GJ/day)

Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Table 89, p. 273.

Adjustments to the standing charges for B3 reference tariff customers

2220. ATCO proposed to increase the standing charge parameter associated with B3 reference tariff customers. ATCO included 2 GJ of gas consumption in the standing charge. ATCO proposed to offset the increase in the standing charge with a decrease in the usage charge to retain the proportion of revenue to be recovered from B3 customers.

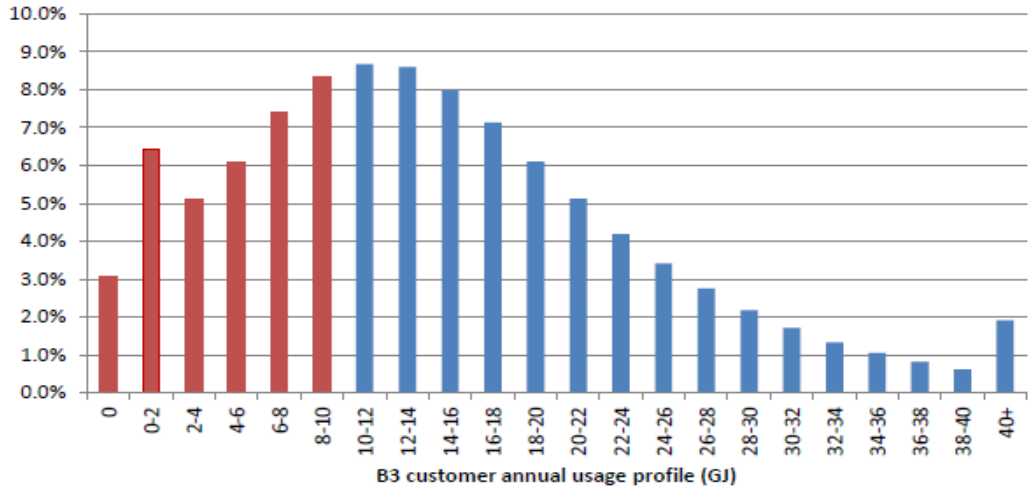
2221. ATCO made the changes to ensure that the avoidable costs of connecting every B3 customer are recovered, and provide efficient price signals to new customers. ATCO calculated the avoidable costs of connecting B3 customers as the net present value of the costs of a standard meter, standard regulator and average length of service pipe.

2222. ATCO provided the following analysis to demonstrate the impact that this change will have on B3 customers.[998]

2223. Figure 23 shows the percentage of B3 customers by annual consumption based on ATCO's consumption profile in 2013.

[998] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 275.

Figure 23 Distribution of Annual Consumption of B3 Customers in 2013



Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Figure 87, p. 275.

2224. ATCO's initial proposal resulted in price impacts for a customer moving from the current tariff to its proposed tariff for the fourth access arrangement period ranging from increases of 86 per cent to decreases greater than 12 per cent.

2225. Under ATCO's initial proposal for a B3 customer, the largest annual network bill increase was $60, being the difference between the current annual standing charge and ATCO's initial proposal annual standing charge.

Haulage tariffs

2226. ATCO calculated its initial proposed reference tariffs for the fourth access arrangement period as follows:[999]

- Multiplied each charging parameter under each tariff class in the third access arrangement period by customer number and usage forecasts for each fourth access arrangement period tariff.
- Applied adjustments to the standing charge for B2[1000] and B3 customers starting on 1 January 2015.
- Adjusted each charging parameter by the same amount until the revenue generated by the reference tariffs is equalised with the total revenue to be recovered from reference service customers.

2227. ATCO considered that this method complies with rule 92(2) of the NGR.

2228. As per rule 94 (3) of the NGR, ATCO calculated the avoidable costs, standalone costs and expected revenue for each tariff class to confirm that expected revenue falls between avoidable costs and standalone costs.

---

999 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Tables 90 and 92, pp. 281-282.

1000 In the Access Arrangement Information, ATCO only discusses its proposal of increasing the standing charge for B3 customers.

2229. According to ATCO:

- the avoidable cost of providing a particular reference service is the cost that would not be incurred if the service were no longer provided; and[1001]
- the stand alone cost of providing a particular reference service is the cost that would be incurred by an efficient service provider entering the market for gas distribution services and providing only that reference service.[1002]

2230. ATCO calculated avoidable costs for each tariff class by summing up avoidable operating expenditure (excluding UAFG), return on and depreciation of avoidable capital expenditure and avoidable UAFG, calculated as follows:[1003]

- Avoidable operating expenditure (excluding UAFG)[1004]: reviewed costs in each cost centre to identify costs that would not be incurred if the tariff class was no longer provided with the reference service, and summed up such costs for each tariff class;
- Return on and depreciation of avoidable capital expenditure[1005]: identified avoidable capital projects for each tariff class, and the proportion of avoidable capital expenditure for such projects by tariff class (expenditure on medium/low pressure mains), and calculated the return on, and depreciation of, this capital expenditure. ATCO calculated return and depreciation using a methodology that was consistent with that used in the total revenue calculation. ATCO considered that forecast capital expenditure on high pressure mains was not avoidable, as it was required to provide new and replacement haulage capacity necessary to customers in all tariff classes; and
- Avoidable UAFG[1006]: reviewed number of customers and usage in each tariff class, accounted for measurement errors at gate stations and errors associated with interval meters, and corrected temperature for measurements made by non-interval meters.

2231. ATCO calculated standalone costs for each tariff class by summing up standalone operating expenditure, and return on, and depreciation of, standalone capital expenditure, calculated as follows:

- Standalone operating expenditure: subtracted avoidable costs for each tariff class from total costs for the tariff class.
- Return on and depreciation of standalone capital expenditure: identified proportion of capital base at 30 June 2014 and forecast capital expenditure that is required to provide haulage services to each tariff class on a standalone basis, and calculated the return on, and depreciation of, this capital expenditure. ATCO calculated return and depreciation using a methodology that was consistent with that used in the total revenue calculation, which was a straight line depreciation over the stand alone asset lives, and return on the opening asset base at the rate of return.[1007]

1001 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Appendix 27, p. 1.

1002 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Appendix 27, p. 3.

1003 ATCO Gas Australia, *Access Arrangement - Appendix 27*, 17 March 2014.

1004 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Appendix 27, p. 1.

1005 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Appendix 27, p. 2.

1006 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Appendix 27, p. 1.

1007 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Appendix 27, p. 4.

2232. Table 116 shows ATCO's initial proposal estimated expected revenue, avoidable costs and standalone costs by tariff class over the fourth access arrangement period.

Table 116 ATCO's Initial Proposal Estimated Expected Revenue, Avoidable Costs and Standalone Costs by Tariff Class (AA4)

Real $ million at 30 June 2014	A1	A2	B1	B2	B3
Expected Revenue (NPV)	42.35	38.17	51.24	53.65	727.17
Avoidable Cost	5.29	4.86	6.31	6.81	75.37
Standalone Cost	407.98	531.80	635.30	652.61	827.58

Source: ATCO, Tariff Model, September 2014

Draft Decision

2233. The Authority approved ATCO's proposal not to revise the tariff classes or tariff charging parameters from the third access arrangement period. The Authority noted that ATCO adjusted the values in relation to tariff charging parameters to reflect daily, rather than annual, usage as ATCO currently charges retailers based on daily consumption. The Authority also noted that ATCO's adjustment ensures that the access arrangement is aligned with current practice. The Authority accepted this adjustment.

2234. The Authority reviewed ATCO's proposal to increase the standing charge for B3 customers in terms of the following:

- Proposal to reflect the avoidable capital costs of connecting a B3 customer in the standing charge;
- Proposed method to re-calculate the B3 standing charge; and
- Price path towards the re-calculated B3 standing charge and usage charges.

2235. The Authority agreed with ATCO's proposal to reflect the avoidable capital costs of connecting a B3 customer in the standing charge. The Authority considered that ATCO should be allowed to at least recover the avoidable capital costs of connecting a B3 customer. The Authority considers that this proposal would provide efficient price signals as follows:

- If retailers pass on the standing charge increase to customers, customers will factor in the cost reflective charge in their decision to connect/stay connected to gas.
- If retailers do not pass on the standing charge increase to customers, retailers will factor in the cost reflective charge in their decision whether or not to disconnect delivery points that are no longer current gas customers.

2236. The Authority noted that ATCO's proposal to reflect the avoidable capital costs of connecting a B3 customer in the standing charge reduced ATCO's risk of B3 customer revenue being lower than forecast. This is because ATCO would recover the bulk of the cost of the B3 customer connection through the standing charge, irrespective of how much gas the customer consumes.

2237. As noted above, ATCO calculated the avoidable costs of a customer connection as the cost of a standard meter, standard regulator and average length of service pipe. ATCO assumed an asset life for these three assets of 25 years. ATCO re-calculated

the B3 standing charge as the net present value of the avoidable costs using a discount factor that included its inflation and WACC assumptions.

2238. The Authority reconciled ATCO's assumed avoidable costs with the access arrangement information. However, the Authority did not benchmark these costs. The Authority decided to accept ATCO's assumed avoidable costs. Moreover, the Authority confirmed that the 25-year asset life assumption was consistent with ATCO's RAB asset lives in the proposed revised access arrangement.

2239. The Authority updated the discount factor (used to calculate a net present value) to re-calculate the B3 standing charge based on its approved inflation assumption and approved WACC as per the Rate of Return in its Draft Decision. The Authority revised ATCO's standing charge from $128.30 to $99.63.

2240. Under the *National Gas Access (WA) (Local Provisions) Regulations 2009*, the Authority is required to consider the impact on customers and retailers when determining the price path for small use customers. The Authority considered that the movement from the current B3 standing charge of $70.98 to $99.63 in one year would have a significant impact on small use customers and retailers. As a result, the Authority decided to implement the increased standing charge gradually from 2015 to 2019.

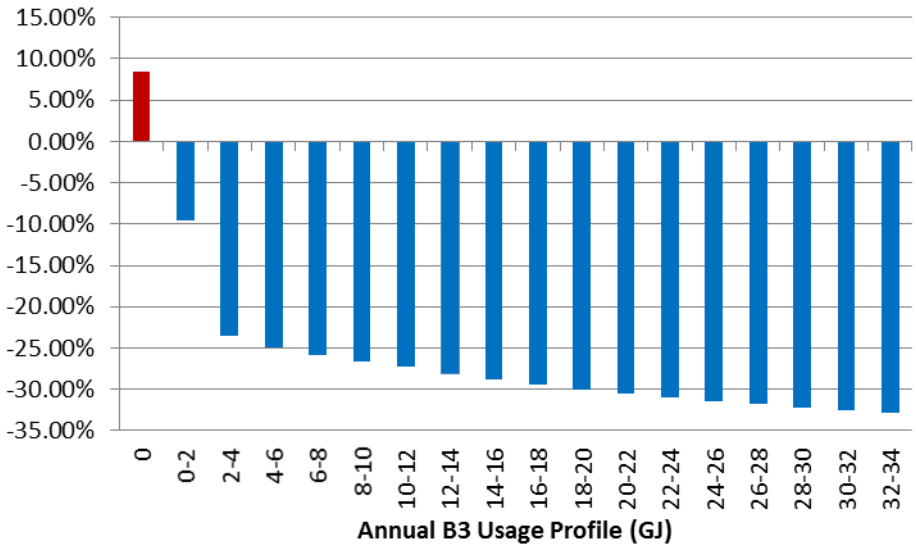
2241. In order to ensure that B3 customers were not allocated an unfair share of revenue to be recovered as a result of the standing charge increase, the Authority calculated B3 usage charges as follows:

- For 2015 the Authority:
  - decreased usage charges by the full extent of the revenue adjustment of the Draft Decision; and
  - set the revenue allocation to the B3 tariff class in 2015 at the 2014 level of 80.9 per cent.[1008]
- For 2016-2019 the Authority:
  - Set the bill of an average B3 user to remain constant in real terms, which covered standing and usage tariffs. Effectively, this resulted in a further reduction for average B3 usage tariffs to offset the increase in the standing charge in real terms.

2242. The Authority evaluated the impact of its approved B3 standing and usage charge price path on B3 customers based on B3 customer profile data provided by ATCO. Figure 24 shows the expected network gas bill impact (in real terms) of the Authority's Draft Decision for B3 tariff price path on B3 customers by usage bracket for 2015. As shown in Figure 24, under the Draft Decision, only customers that do not use any gas would face a tariff increase in 2015 of around 8.42 per cent. For all other B3 customers, the usage tariff decrease would more than offset the standing charge increase.

[1008] ATCO Gas Australia, *Tariff Model*, September 2014.

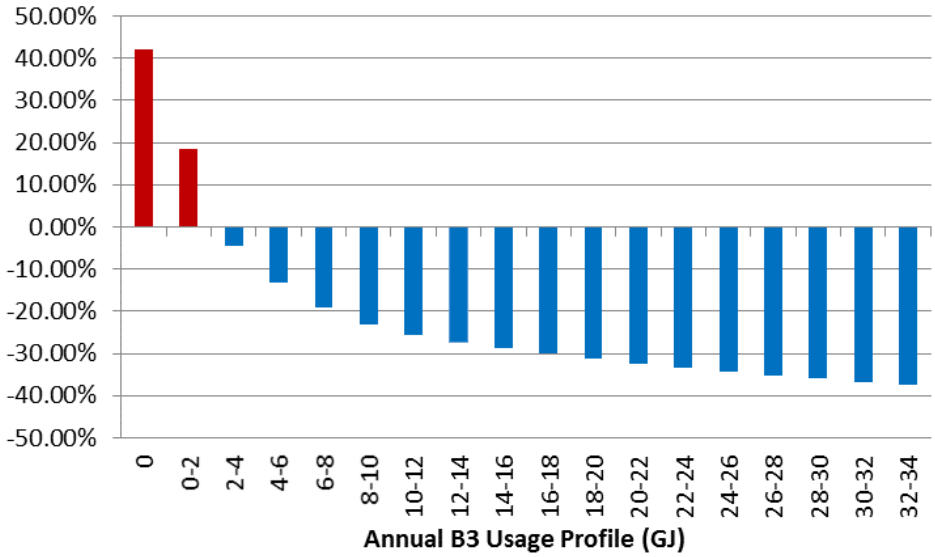
Figure 24 Price Impact (Real) on B3 Customers of the Authority Draft Decision B3 Price Path, 2014-2015 (%)



Source: ATCO Gas Australia, Access Arrangement Information, 17 March 2014, Figure 88, p. 275. ERA, GDS Tariff Model, October 2014.

2243. Figure 25 shows the expected network gas bill impact (in real terms) of the Authority's Draft Decision B3 tariff price path on B3 customers by usage bracket for 2014-2019. As shown in Figure 25, only customers that use 0-2 GJ of gas would face a tariff increase (in real terms) over the fourth access arrangement period. For all other B3 customers, the usage tariff decrease would more than offset the standing charge increase.

Figure 25 Price Impact (Real) on B3 Customers of the Authority Draft Decision B3 Price Path, 2014– 2019 (%)



Source: ERA, GDS Tariff Model, October 2014.

2244. The Authority's Draft Decision GDS haulage tariffs were based on its approved total as per its Draft Decision. The Authority implemented the following price paths:[1009]

- For A1, A2, B1 and B2 tariff classes the Authority:
  - decreased haulage tariffs by the full extent of the revenue adjustment in 2015; and
  - fixed haulage tariffs in real terms from 2015 till 2019.
- For B3 tariff class the Authority:
  - increased standing charge gradually to $99.63 in real 30 June 2014 dollar terms by 2019;
  - decreased usage charges by the full extent of the revenue adjustment in 2015; and
  - decreased usage charges in real terms from 2015 till 2019.

2245. The Authority was not able to update ATCO's avoidable cost and standalone cost calculations to test whether the expected revenue by tariff class would still be between these two bounds consistent with rule 94(3) of the NGR. The Authority required ATCO to provide this calculation in response to its Draft Decision.

ATCO's Response to the Draft Decision

2246. ATCO states in its response to the Draft Decision that it accepts the Authority's approach to phase in the increases to the standing charges for B3 customers over the fourth access arrangement period. However, it does not accept the Authority's calculations for the B3 standing charge. ATCO states that it has recalculated its charges based on its own revenue calculations as it did not accept the Authority's Draft Decision.[1010]

2247. Table 117 below presents ATCO's revised proposed standing charge for B3 tariff customers for each year of the fourth access arrangement period, beginning from 2015.

Table 117 ATCO Revised Proposal Standing Charge for B3 Tariff (AA4)

Real $ million at 30 June 2014	2015	2016	2017	2018	2019
Standing Charge	83.04	95.30	106.92	117.91	128.30

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 240.

2248. ATCO accepts the Authority's approach to the price structure and variations to the components of the price structure over the fourth access arrangement period. However, ATCO does not accept the Authority's Draft Decision tariff path. ATCO considers that a smooth tariff path provides a better balance for customers for the following reasons:

- Cash flow – ATCO considers that it provides a better match between building block costs and revenue.

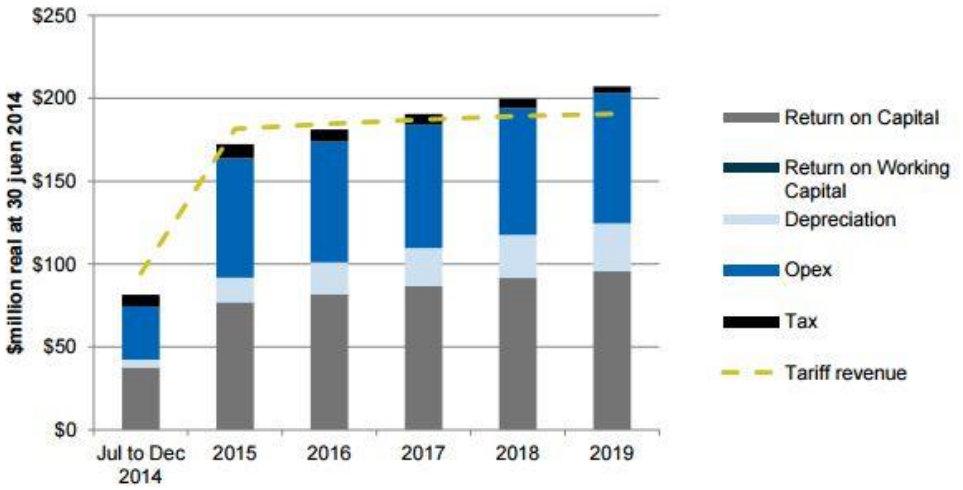
1009 The Authority assumed that tariffs in the revised access arrangement will be passed on to customers.

1010 ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 243.

- Price shock – ATCO considers that it reduces the price shock to customers between regulatory periods.
- Incentive maintained for new retailers – ATCO considers that retail margins are reduced over time rather than all in one year, thereby providing what it considers to be a more consistent incentive for new retailer entry and price competition.
- Reduces the significant impact on the business of the reduced revenue – ATCO considers that this will better enable it to manage its financial position and financing.[1011]

2249. Figure 26 shows ATCO's revised proposed total revenue over each year of the fourth access arrangement period compared to the tariff revenue it forecasts it will receive over the same period. ATCO considers that its price path will result in less revenue being received compared to the building block total revenue in the final years of the period. ATCO states this is preferred to the Authority's Draft Decision price path, which it considers would result in a significant drop in revenue in 2015 compared to 2014.[1012]

Figure 26 ATCO Revised Proposal Revenue Building Blocks and Tariff Revenue Path (AA4)



Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Figure 14-1, p. 241.

2250. As a result of the amendments made by ATCO in its revised proposal, ATCO has calculated that its average annual tariff change to all customers is a reduction of 1.8 per cent per year and a reduction of 1.1 per cent for residential customers. Table 118 presents ATCO's revised proposal changes to the average annual price over the fourth access arrangement period.

[1011] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 243.

[1012] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 244.

Table 118 ATCO Revised Proposal Price Path - % annual change in average price (AA4)

Reference Tariff	2015	2016	2017	2018	2019	Average Annual % Change
A1	-3.1%	0.5%	-2.4%	-3.3%	-3.4%	-2.4%
A2	-1.5%	-1.2%	-2.3%	-2.4%	-2.9%	-2.1%
B1	-4.0%	-1.2%	-1.6%	-1.7%	-1.7%	-2.1%
B2	-1.8%	1.0%	0.2%	-0.1%	-0.0%	-0.1%
B3	-4.6%	0.7%	-0.2%	-0.5%	-0.8%	-1.1%
All Customers	-3.9%	-2.0%	-0.6%	-1.0%	-1.4%	-1.8%

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 14-2, p. 242.

2251. Table 119 presents ATCO's nominal haulage reference tariffs for each reference service under ATCO's revised proposal access arrangement for the GDS.

Table 119 ATCO's Revised Proposal (Nominal) Haulage Reference Tariffs (AA4)

Nominal $	Units	1-Jul-2015	1-Jan-16	1-Jan-17	1-Jan-18	1-Jan-19
Reference tariff A1						
Standing charge	$/year	47,045.25	47,349.99	47,656.71	47,965.41	48,276.12
Demand charge						
First 10 km	$/GJ km	198.28	199.56	200.86	202.16	203.47
Distance > 10 km	$/GJ km	104.36	105.04	105.72	106.40	107.09
Usage charge						
First 10 km	$/GJ km	0.04207	0.04234	0.04261	0.04289	0.04317
Distance > 10 km	$/GJ km	0.02102	0.02115	0.02129	0.02143	0.02157
Reference tariff A2						
Standing charge	$/Year	26,046.75	26,215.47	26,385.28	26,556.20	26,728.22
First 10 TJ	$/GJ	2.52	2.53	2.55	2.57	2.58
Volume > 10 TJ	$/GJ	1.35	1.36	1.37	1.38	1.38
Reference tariff B1						
Standing charge	$/Year	1,312.09	1,320.59	1,329.15	1,337.76	1,346.42
First 5 TJ	$/GJ	5.01	5.04	5.08	5.11	5.14
Volume > 5 TJ	$/GJ	4.30	4.33	4.35	4.38	4.41
Reference tariff B2						
Standing charge	$/Year	337.57	348.47	359.37	370.27	381.18
First 100 GJ	$/GJ	8.33	8.36	8.38	8.40	8.43
Volume > 100 GJ	$/GJ	4.96	4.98	4.99	5.01	5.02
Reference tariff B3						
Standing charge	$/Year	86.18	101.37	116.57	131.77	146.96
First 2 GJ	$/GJ	-	-	-	-	-
Volume > 2 and <10 GJ	$/GJ	15.33	14.17	12.95	11.66	10.29
Volume > 10 GJ	$/GJ	6.61	6.12	5.59	5.03	4.44

Source: ATCO Gas Australia, Tariff Model, December 2014.

2252. ATCO submits that should the Authority's Final Decision reduce prices compared to those incurred in 2014, ATCO will incur losses as a result of a reduction in revenue. ATCO notes that it has continued operating its business under its current business model, policies and approaches used in the third access arrangement period and as proposed for the fourth access arrangement period. ATCO notes that, where the Authority disagrees with ATCO's approach, policies or efficiency of costs incurred these decisions are applied retrospectively, ATCO has no ability to respond to the decision. ATCO states that this will be the case up until the Final Decision is

published and for a transition period beyond the decision as the business implements the required amendments.[1013]

2253. ATCO acknowledges that this situation has resulted from the delay due to the change in rule 87 of the NGR. ATCO considers that it is not consistent with the NGO for it to bear the costs associated with the delay. ATCO submits that its full costs in 2014 should be recognised in the Final Decision. As discussed in the Operating Expenditure and Capital Expenditure chapters of this Final Decision, ATCO submitted externally reviewed regulatory financial statements to the Authority in February 2015. ATCO considers that these costs should be incorporated into the Authority's decision.[1014]

2254. As ATCO has made various amendments since its initial proposal, it has recalculated its stand alone and avoidable costs by reference tariff class. Table 120 presents ATCO's revised proposal stand alone and avoidable costs by reference tariff class for the fourth access arrangement period.

Table 120 ATCO's Revised Proposal Estimated Expected Revenue, Avoidable Costs and Standalone Costs by Tariff Class (AA4)

Real $ million at 30 June 2014	A1	A2	B1	B2	B3
Expected revenue	39.8	31.3	47.0	51.4	704.0
Stand alone cost	394.0	501.6	607.6	624.2	799.8
Avoidable cost	5.9	2.7	6.8	6.3	81.4

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, Table 14-4, p. 244.

Submissions

2255. Both Alinta and Kleenheat presented submissions to the Authority in relation to ATCO's initial proposal haulage tariffs. Both retailers considered that recovering a higher portion of the revenue requirement through fixed charges does not necessarily send more appropriate price signals to customers.[1015] Kleenheat specifically noted that an increase to standing charges for B3 customers could be counterintuitive to promoting efficient growth. Alinta considered that price signals to customers would not be achieved unless retailers obtain agreement from the Government to pass through tariff increases.[1016] Kleenheat noted that the current regulated retail natural gas tariff structure may limit the effectiveness of price signals by ATCO to B3 customers.[1017] Moreover, Alinta considered that low consumption residential

[1013] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 246.

[1014] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 244.

[1015] Alinta Energy, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014, p. 8. Kleenheat Gas, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014, p. 2.

[1016] Alinta Energy, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014, p. 8.

[1017] Kleenheat Gas, *Submission on Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement*, 21 May 2014, p. 2.

customers would wear a disproportionate amount of cost in comparison with their overall usage. According to Alinta, costs should be apportioned across customers incrementally utilising the network, not through higher fixed costs.

2256. Further, Alinta elaborated that the impact of network price increases may be worn exclusively by retailers if there is misalignment between ATCO's new tariffs and the Government's retail tariff decision. This will be exacerbated in a competitive market where new entrant retailers are able to make offers to high use customers, leaving the incumbent to supply low use customers at below cost. On the other hand, Alinta considered that if retailers were able to pass through network cost increases to customers, ATCO's proposal to increase the standing charge for B3 customers would result in material price volatility worn by customers with low consumption (0-5GJ). These customers may choose to disconnect. Alinta considered that this would be contrary to ATCO's proposed marketing campaign, aimed at increased connections and consumption. Alinta also stated that if a customer disconnected without paying for the removal of the meter, the retailer would continue to pay ATCO the standing charges for the site.

2257. Alinta made a subsequent submission to the Authority in response to the Draft Decision and ATCO's revised proposal. Alinta notes that it is difficult for the Authority to define the overall impact of the Authority's final decision on customers given the Authority has no role in how the cost impacts are passed through to customers. Alinta reiterated that it did not support ATCO's proposal to increase the standing charge for B3 customers, as those customers with the least consumption would wear the burden of network charges and choose to disconnect due to the increased cost of running appliances. However, Alinta noted the Authority's Draft Decision regarding standing charges for B3 customers and, given the Authority's decision to allow an increase in standing charges, Alinta supports the proposed gradual increase.[1018]

Considerations of the Authority

2258. The Authority notes that given the changes to total revenue in this Final Decision, haulage tariffs reduce by a lesser amount than the Authority's Draft Decision. The haulage tariffs for A1, A2, B1 and B2 tariff class customers reduce by 10.0 per cent each year of the fourth access arrangement period.

2259. The Authority notes that ATCO has accepted the Draft Decision approach to phase in standing charges for B3 customers over the course of the fourth access arrangement period, but not the calculated standing charge.

2260. ATCO has not revised its B3 avoidable costs from its initial proposal of $128.30 despite noting that it had made changes due to its revised proposal. The Authority notes that ATCO has not provided any reasons as to why it has not accepted the Authority's Draft Decision B3 standing charge. Consistent with the Draft Decision, the Authority has updated the model supplied by ATCO for calculating B3 avoidable costs based upon the Authority's Final Decision approved inflation and WACC. The Authority considers that this is the best methodology for determining the avoidable costs of connecting a B3 customer. The Authority's recalculated value is $105.41, which will be the standing charge for 2019 in real terms.[1019] In effect, by 2019 the

[1018] Alinta Energy, *Submission on the Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 12 January 2015, p. 6.

[1019] Real $ at 30 June 2014.

standing charge will recover the current avoidable costs of connecting the B3 customer to the GDS.

2261. The Authority notes the comments made by Alinta regarding the standing charge increases in response to the Authority's Draft Decision and ATCO's revised proposal. The Authority considers that by phasing in the standing charge this will minimise any price impact. The Authority notes Alinta's support in relation to the proposed gradual increase of the standing charge.

2262. Under the *National Gas Access (WA) (Local Provisions) Regulations 2009*, the Authority is required to consider the impact on customers and retailers when determining the price path for small use customers. Given the phasing in of the increases to the B3 standing charge over the course of the fourth access arrangement period, the Authority has minimised the impact for B3 customers by reducing the variable charges. The Authority's decision ensures that the average B3 customer benefits by the same reductions as the other tariff classes over the course of the fourth access arrangement period. This results in larger variable usage tariff reductions than other tariff classes.

2263. The Authority notes that in its Draft Decision it decreased haulage tariffs by the full extent of the revenue adjustment in 2015 and fixed haulage tariffs in real terms from 2015 to 2019 (except for the B3 standing charge). ATCO's revised proposal smooths the price change on an annual basis. The Authority has reconsidered its tariff price path smoothing approach for this Final Decision and has decided to accept a smooth annual price path. Further, the Authority notes that extensions to the submission date for the access arrangement review have been required, as a result of the change to rule 87 of the NGR, and that this has resulted in a delay in the commencement of new tariffs. Accordingly, the Authority has taken this into account when setting its tariffs. The commencement date for the new tariffs, as per this Final Decision, is now 1 October 2015.

2264. The Authority notes ATCO's concerns regarding the delay to the commencement of the new tariffs and the costs it has incurred during the 2014 period. However, the Authority has determined haulage reference tariffs based on its assessment of ATCO's forecast operating expenditure, in accordance with the requirements of rule 91(1) of the NGR based on its assessment of what would be incurred by a prudent service provider acting efficiently. The Authority has also determined haulage reference tariffs based on its assessment of ATCO's forecast conforming capital expenditure, in accordance with the requirements of rule 79(1) for the purposes of rule 78 of the NGR.

2265. The Authority notes that it has calculated haulage reference tariffs based on its assessment of ATCO's proposed demand forecast. The Authority considers that given its required changes in its Draft Decision which would result in all tariffs to be charged based on a price cap (or variant) form of price control and not a revenue cap form of price control, forecast demand should be used to determine tariff revenue prior to the access arrangement start date (1 July 2014 to 1 October 2015). The use of actual revenue would be akin to a revenue cap which is not the form of price control approved.

2266. The Authority also used forecast demand during the period 1 July 2014 to 1 October 2015 to determine prudent and efficient expenditure for the fourth access arrangement period. The demand forecast during this period also has flow-on impacts to the demand forecasts for the remainder of the fourth access arrangement period. If the Authority had used actual tariff revenue during the period 1 July 2014

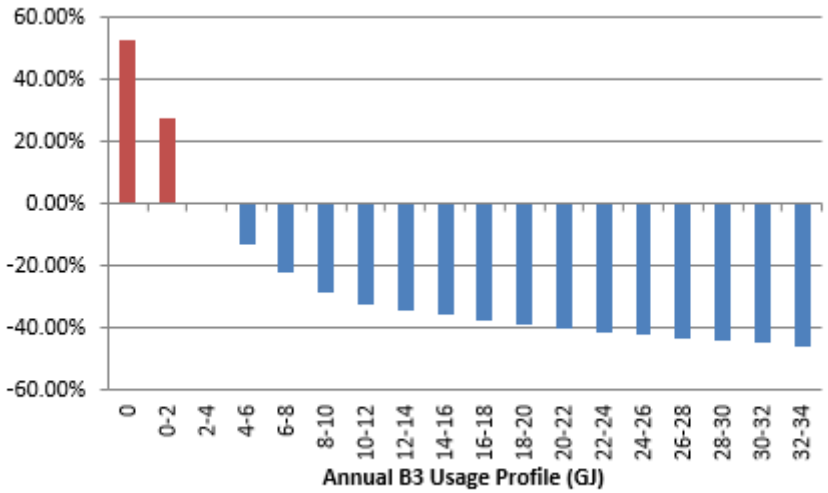
to 1 October 2015 as requested by ATCO, to determine haulage tariffs, then for consistency, the Authority would have revised the demand forecast and reassessed efficient capital and operating expenditure. The Authority provided its explanation for using actual operating and capital expenditure information to determine efficient and prudent expenditure for the six month period to 31 December 2014.

2267. The Authority has evaluated the impact of its approved B3 standing and usage charge price path on B3 customers based on B3 customer profile data provided by ATCO. Figure 27 shows the expected network gas bill impact (in real terms) of the Authority's approved B3 tariff price path on B3 customers by usage bracket from 30 September 2015 to 31 December 2019. Customers that consume less than approximately 3 GJ per year will face a price increase reflecting the increase to the standing charge. For all other B3 customers, the usage tariff decrease will more than offset the standing charge increase.

2268. On 16 March 2015, ATCO wrote to the Authority regarding a concern that Alinta would de-register meters which had zero usage recorded in the last 12 months. ATCO noted this would result in it not being expected to recover the total revenue determined by the Authority. ATCO proposed three options to address this matter. The first option was to reduce the forecast number of connections used for the purpose of calculating reference tariffs by the number of meters Alinta could de-register. The next two options involved changes to the tariff variation formula.

2269. The Authority considered ATCO's letter and its proposal to address this issue raised by ATCO. The Authority made enquires to Alinta as to whether it was its intention to de-register these meters. Alinta confirmed that it was not looking to de-register these zero usage meters in the foreseeable future. As a result, the Authority considers that its demand forecast is the best forecast possible in the circumstances (rule 74 of the NGR) to determine tariffs which is expected to recover the total revenue. The Authority does not consider that a specific tariff variation is warranted to account for variations of estimated demand against actual.

Figure 27 Price Impact (Real) on B3 Customers of the Authority Approved B3 Price Path, 30 September 2015 to 31 December 2019 (%)



Source: ERA, GDS Tariff Model, September 2015.

2270. The Authority notes that it is not able to recalculate the avoidable and standalone costs of its Final Decision approved haulage tariffs. However, the Authority reasonably expects that its haulage tariffs are between the avoidable and standalone costs. When ATCO submits its annual tariff variation each year it is expected to demonstrate compliance with rule 94 of the NGR.

2271. The Authority's approved haulage reference tariffs for each tariff class are set out in nominal dollars in Table 121 and in real dollars in Table 122. Annexure A of the proposed revised access arrangement must be amended to reflect the Authority's approved haulage reference tariffs for each tariff class as of 1 October 2015, per Table 122. As the Authority has rejected ATCO's revised proposed WACC in the Rate of Return section of this Final Decision, all references to ATCO's revised proposed WACC in Annexure A of the proposed revised access arrangement must be removed and replaced with: "using a nominal post-tax weighted average cost of capital as per the annual update".

Table 121 Authority's Final Decision Approved (Nominal) Haulage Reference Tariffs (AA4)

Nominal $	Units	1-Oct-15	1-Jan-16	1-Jan-17	1-Jan-18	1-Jan-19
Reference tariff A1						
Standing charge	$/year	45,569.49	41,812.23	38,364.76	35,201.54	32,299.13
Demand charge						
First 10 km	$/GJ km	192.06	176.22	161.69	148.36	136.13
Distance > 10 km	$/GJ km	101.09	92.75	85.11	78.09	71.65
Usage charge						
First 10 km	$/GJ km	0.04075	0.03739	0.03430	0.03148	0.02888
Distance > 10 km	$/GJ km	0.02036	0.01868	0.01714	0.01573	0.01443
Reference tariff A2						
Standing charge	$/Year	25,229.69	23,149.47	21,240.77	19,489.44	17,882.51
First 10 TJ	$/GJ	2.44	2.24	2.05	1.88	1.73
Volume > 10 TJ	$/GJ	1.31	1.20	1.10	1.01	0.93
Reference tariff B1						
Standing charge	$/Year	1,270.94	1,166.15	1,070.00	981.77	900.82
First 5 TJ	$/GJ	4.86	4.45	4.09	3.75	3.44
Volume > 5 TJ	$/GJ	4.16	3.82	3.50	3.22	2.95
Reference tariff B2						
Standing charge	$/Year	318.47	292.21	268.12	246.01	225.73
First 100 GJ	$/GJ	8.10	7.43	6.82	6.26	5.74
Volume > 100 GJ	$/GJ	4.83	4.43	4.06	3.73	3.42
Reference tariff B3						
Standing charge	$/Year	77.98	81.87	93.15	104.83	116.92
First 2 GJ	$/GJ	-	-	-	-	-
Volume > 2 and <10 GJ	$/GJ	15.41	13.13	10.27	7.52	4.86
Volume > 10 GJ	$/GJ	6.65	5.66	4.43	3.24	2.10

Source: ERA, Final Decision Appendix 10, GDS Tariff Model. September 2015.

Table 122 Authority's Final Decision Approved (Real) Haulage Reference Tariffs (AA4)

Real $ at 30 June 2014	Units	1-October-2015	1-Jan-16	1-Jan-17	1-Jan-18	1-Jan-19
Reference tariff A1						
Standing charge	$/year	44,297.51	39,887.27	35,916.11	32,340.31	29,120.52
Demand charge						
First 10 km	$/GJ km	186.70	168.11	151.37	136.30	122.73
Distance > 10 km	$/GJ km	98.27	88.48	79.67	71.74	64.60
Usage charge						
First 10 km	$/GJ km	0.03961	0.03567	0.03212	0.02892	0.02604
Distance > 10 km	$/GJ km	0.01979	0.01782	0.01604	0.01445	0.01301
Reference tariff A2						
Standing charge	$/Year	24,525.45	22,083.71	19,885.06	17,905.31	16,122.67
First 10 TJ	$/GJ	2.37	2.13	1.92	1.73	1.56
Volume > 10 TJ	$/GJ	1.27	1.14	1.03	0.93	0.83
Reference tariff B1						
Standing charge	$/Year	1,235.46	1,112.46	1,001.70	901.97	812.17
First 5 TJ	$/GJ	4.72	4.25	3.83	3.45	3.10
Volume > 5 TJ	$/GJ	4.05	3.64	3.28	2.95	2.66
Reference tariff B2						
Standing charge	$/Year	309.58	278.76	251.01	226.02	203.52
First 100 GJ	$/GJ	7.88	7.09	6.39	5.75	5.18
Volume > 100 GJ	$/GJ	4.69	4.22	3.80	3.42	3.08
Reference tariff B3						
Standing charge	$/Year	75.81	78.10	87.20	96.31	105.41
First 2 GJ	$/GJ	-	-	-	-	-
Volume > 2 and <10 GJ	$/GJ	14.98	12.52	9.61	6.91	4.38
Volume > 10 GJ	$/GJ	6.47	5.40	4.15	2.98	1.89

Source: ERA, GDS Tariff Model. September 2015.

Final Decision

2272. The Authority's Final Decision is not to approve ATCO's proposed B3 standing charges, in addition to ATCO's haulage tariff price path for the fourth access arrangement period. The proposed revised access arrangement must be amended as per the required amendment set out below.

Required Amendment 13

The calculation of the B3 standing charge, in addition to all haulage tariff price paths, must be calculated as per Table 122 of this Final Decision.

Annexure A of the proposed revised access arrangement must be amended as per the requirements of paragraph 2271.

Haulage Tariff Variation Mechanism

Regulatory Requirements

2273. Rules 92 and 97 of the NGR set out requirements for an access arrangement to include a mechanism for variation of reference tariffs over the course of an access arrangement period.

> 92. Revenue equalisation
>
> 1) A full access arrangement must include a mechanism (a reference tariff variation mechanism) for variation of a reference tariff over the course of an access arrangement period.
>
> 2) The reference tariff variation mechanism must be designed to equalise (in terms of present values):
>
> a) forecast revenue from reference services over the access arrangement period; and
>
> b) the portion of total revenue allocated to reference services for the access arrangement period.
>
> 3) However, if there is an interval (the interval of delay) between a revision commencement date stated in a full access arrangement and the date on which revisions to the access arrangement actually commence:
>
> a) reference tariffs, as in force at the end of the previous access arrangement period, continue without variation for the interval of delay; but
>
> b) the operation of this subrule may be taken into account in fixing reference tariffs for the new access arrangement period.
>
> 97. Mechanics of reference tariff variation
>
> 1) A reference tariff variation mechanism may provide for variation of a reference tariff:
>
> a) in accordance with a schedule of fixed tariffs; or
>
> b) in accordance with a formula set out in the access arrangement; or
>
> c) as a result of a cost pass through for a defined event (such as a cost pass through for a particular tax); or
>
> d) by the combined operation of 2 or more or the above.
>
> 2) A formula for variation of a reference tariff may (for example) provide for:
>
> a) variable caps on the revenue to be derived from a particular combination of reference services; or
>
> b) tariff basket price control; or
>
> c) revenue yield control; or
>
> d) a combination of all or any of the above.
>
> 3) In deciding whether a particular reference tariff variation mechanism is appropriate to a particular access arrangement, the [ERA] must have regard to:
>
> a) the need for efficient tariff structures; and
>
> b) the possible effects of the reference tariff variation mechanism on administrative costs of the [ERA], the service provider, and users or potential users; and
>
> c) the regulatory arrangements (if any) applicable to the relevant reference services before the commencement of the proposed reference tariff variation mechanism; and

d) the desirability of consistency between regulatory arrangements for similar services (both within and beyond the relevant jurisdiction); and

e) any other relevant factor.

4) A reference tariff variation mechanism must give the [ERA] adequate oversight or powers of approval over variation of the reference tariff.

5) Except as provided by a reference tariff variation mechanism, a reference tariff is not to vary during the course of an access arrangement period.

ATCO's Proposed Revisions

2274. ATCO's current access arrangement [1020] sets out a price path in which reference tariffs for all reference services are set and varied with a formula that means that ATCO bears the risk of variations in volume.

2275. ATCO initially proposed to amend the tariff variation mechanism for haulage tariffs in the fourth access arrangement period. ATCO's initial proposed tariff variation mechanism is as follows:

- Revenue yield per delivery point for B2 and B3 tariff class customers; and
- Weighted average price cap for A1, A2 and B1 tariff class customers.

Tariff Variation Mechanism for B2 and B3 Tariff Class Customers

2276. ATCO proposed to amend the tariff variation mechanism for B2 and B3 haulage tariffs for the fourth access arrangement period.[1021] Instead of continuing to apply the current tariff basket price control, ATCO proposed a revenue yield per delivery point (customer)[1022] price control. Under its proposed revenue yield price control, ATCO would:

- set forecast average number of delivery points and "allowed" revenue per delivery point for each year of the fourth access arrangement period in the access arrangement;
- at the end of each year of the fourth access arrangement period, calculate actual revenue per delivery point; and
- when consumption per customer is less (higher) than forecast in a given year, the actual revenue per customer would be lower (higher) than the set forecast revenue per delivery point in the access arrangement. Under (over) recovered revenue per delivery point will be added (subtracted) to the corresponding tariffs two years following the given year.

2277. ATCO considered that a revenue yield per customer price control would manage the risks of revenue under-recovery as a result of actual usage being lower than forecast, especially given the trend of declining average consumption.

2278. ATCO stated that gas consumption during the second and third access arrangement periods has been lower than forecast, which has led to significant under-recovery of

---

1020 Access Arrangement for the Mid-West and South-West Gas Distribution Systems, Revised by reason of and pursuant to orders of the Australian Competition Tribunal made on 8 June 2012, Annexure B.

1021 ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, Annexure B.

1022 A delivery point is defined as a point, including a flange or joint, specified in a Service Agreement and in the Delivery Point Register, as a point at which [User] is entitled to take delivery of Gas from [Service Provider] out of the GDS. A delivery point is equivalent to a customer or a connection.

revenue. ATCO stated that the majority of costs associated with providing gas haulage services are fixed, which means that a reduction in consumption levels does not result in a cost reduction.

Tariff Variation Mechanism for A1, A2 and B1 Tariff Class Customers

2279. ATCO proposed a tariff basket annual tariff variation mechanism in the form of a weighted average price cap for A1, A2 and B1 customers.[1023]

2280. ATCO stated that a tariff basket approach provides more flexibility to adjust prices in response to changes in cost relativities amongst the tariff classes, variation from forecast volumes and variation from forecast customer numbers. ATCO considers that a weighted average price cap for A1, A2 and B1 customers will provide more efficient price signals.

Cost Pass-Through Events and Notice Period

2281. ATCO amended its cost pass-through events to include direct and indirect regulatory costs, to the extent that such costs can be demonstrated to have been reasonably excluded from the forecast conforming capital expenditure or forecast operating expenditure.

2282. ATCO proposed to reduce the notice period for a tariff variation from 90 business days to 40 business days,[1024] in order to ensure that the necessary Consumer Price Index (**CPI**) statistics of the Australian Bureau of Statistics (**ABS**) are available as per the tariff variation formula.

Draft Decision

2283. The Authority assessed the following elements of ATCO's proposed revised access arrangement in relation to NGR requirements:

- ATCO's proposed revenue yield price control for B2 and B3 customers;
- ATCO's proposed tariff basket annual tariff in the form of a weighted average price cap for A1, A2 and B1 customers;
- ATCO's proposed cost pass-through mechanism; and
- ATCO's proposed changes to the Authority's oversight powers for assessment and approval of haulage tariff variation mechanisms.

Tariff Variation Mechanism for B2 and B3 Tariff Class Customers

2284. The Authority decided not to accept ATCO's proposed revenue yield per delivery point price control. Instead, the Authority required ATCO to maintain the reference tariff variation mechanism of the approved current access arrangement for B2 and B3 customers.

[1023] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, pp. 284-285.

[1024] Annexure B of the Proposed Access Arrangement 2014 states 40 business days; however, the Access Arrangement Information refers to 45 business days.

2285. The Authority agreed with the observation in Alinta's submission that ATCO submitted a proposal for a significantly increased business development and marketing operating expenditure to address declining demand.[1025]

2286. The Authority was concerned about the significant usage risk, as demand forecasts for the GDS have been higher than actual demand for both the second and third access arrangement periods.[1026] ATCO had not provided sufficient information to satisfy the Authority that ATCO's updated demand forecasting methodology addressed the problems that gave rise to historical inaccuracy in GDS demand forecasts.

2287. The Authority noted that allowing a revenue yield per delivery point would not incentivise ATCO to present a best estimate of the forecast customer numbers and usage for B2 and B3 customers. This is because ATCO would not be negatively impacted in cases where it overestimates B2 or B3 customer usage, as ATCO proposed to pass that risk onto customers through higher tariffs in the proposed revenue yield per delivery point tariff variation mechanism. Due to the lack of incentive to forecast accurately, the Authority considered that ATCO's proposal did not promote efficient investment in the GDS for the long-term interests of consumers. The Authority considered that this creates an inconsistency between ATCO's proposed revenue yield and the NGO.

2288. The Authority considered that ATCO's proposed revenue yield per delivery point did not allocate risks efficiently. In particular, the Authority did not consider it was consistent with efficient risk allocation to pass on a historical forecasting risk to customers in the form of possible higher tariffs.

2289. The Authority considered that ATCO's proposed tariff variation mechanism would incur additional administrative costs to ATCO, retailers, customers and the Authority.

2290. The Authority did not consider that the haulage tariff variation mechanism proposed by ATCO was consistent with similar arrangements within and outside the jurisdiction. The Authority also noted that there was no precedent for a revenue yield per delivery point price control within Western Australia for natural gas or electricity service providers, nor is the Authority aware of any other examples elsewhere in Australia.

2291. The Authority did not consider that ATCO's proposed mechanism would ensure that the Authority had adequate oversight of its proposed revenue yield tariff variation.

2292. The Authority assessed ATCO's proposed haulage tariff variation mechanism for B2 and B3 customers under the criteria outlined in rule 7 of the *National Gas Access (WA) (Local Provisions) Regulations 2009*. The Authority considered that ATCO's proposed revenue yield per delivery point tariff variation mechanism might result in price shocks to retailers and B2 and B3 customers that are small-use customers (if passed on).

[1025] Alinta Energy, *Alinta Submission on Issues Paper on Proposed Revisions to the Mid-West and South-West Gas Distribution Systems Access Arrangement*, 21 May 2014, p. 7.

[1026] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, section 5.3, p. 43.

Tariff Variation Mechanism for A1, A2 and B1 Tariff Class Customers

2293. The Authority accepted ATCO's proposed weighted average price cap for A1, A2 and B1 customers for the fourth access arrangement period upon assessing it against rule 97 of the NGR:

- ATCO's proposed weighted average price cap allows more scope to restructure tariffs if required, which ensures efficient tariff structures;
- ATCO's proposed weighted average price cap is not too dissimilar to the regulatory arrangements that are currently applicable to the A1, A2 and B1 customers;
- because ATCO's proposed weighted average price cap is similar to the current arrangements, the Authority did not foresee a material impact on the administrative costs of the Authority, ATCO, and users or potential users; and
- ATCO's proposed weighted average price cap is consistent with regulatory arrangements for similar services (both within and beyond Western Australia).

Cost Pass-Through Events and Notice Period

2294. The Authority rejected ATCO's proposal to include increased regulatory costs as a cost pass-through because:

- ATCO's proposed amendment is asymmetric, in that it only addresses higher than forecast regulatory costs. Unforeseen benefits may reduce ATCO's regulatory costs.
- The Authority would find it difficult to reconcile regulatory cost pass throughs relating to ATCO's proposed amendment with corresponding regulatory cost forecasts in operating expenditure and capital expenditure.
- ATCO's proposed amendment does not provide the right incentives for ATCO to focus on cost efficiencies.

2295. ATCO amended clauses 3.1(iii)(A), 3.1(iv) and 3.2 in Annexure B of the access arrangement to expand the scope of the particular cost which it can claim as a cost pass-through from direct costs to both direct and indirect costs. As ATCO did not provide any detailed explanation for this change, the Authority was not satisfied that this was consistent with the requirements of rule 97(3) of the NGR. The Authority rejected this change and required ATCO to amend the wording of the clause to only include direct costs. The Authority considered that the addition of "indirect" costs would introduce ambiguity to the interpretation of these clauses.

2296. As noted in the Draft Decision, ATCO engaged in a competitive tender process for unaccounted for gas and agreed with an external party on contractual terms for the fourth access arrangement period.[1027] As a result, the Authority did not consider that it was necessary to maintain clause 3.1(v) of Annexure B of the access arrangement which allowed for a cost pass-through event for a change in the price of unaccounted for gas, given that it had been contractually determined.

2297. ATCO proposed to reduce the notice period for tariff variations from 90 business days to 40 business days, in order to ensure that the necessary CPI statistics of the ABS are available as required in the tariff variation formula. As the Authority rejected

[1027] ATCO Gas Australia, *Letter to the ERA*, 30 July 2014.

ATCO's proposed revenue yield price control and regulatory cost pass throughs, the Authority considered that 40 days is sufficient to assess ATCO's proposed tariff variation. The Authority accepted ATCO's proposal to reduce the notice period for tariff variation from 90 business days to 40 business days.

ATCO's Response to the Draft Decision

2298. ATCO has not implemented the Authority's required amendment in the Draft Decision in relation to the haulage tariff variation.[1028]

Tariff Variation Mechanism for B2 and B3 Tariff Class Customers

2299. ATCO has maintained its proposal to vary B2 and B3 tariffs through a revenue yield per delivery point price control.

2300. ATCO states that its proposed marketing and business development activities are designed to increase consumption per customer and the number of connections. ATCO considers that as consumption and connections grow, prices will drop under its proposed revenue yield price control, and customers will be better off.[1029]

2301. ATCO considers that it has provided sufficient information regarding its past forecasting inaccuracy. ATCO considers that the historical forecasting risk is borne by the service provider, and not the customers. ATCO submits that it consistently earned less than the allowable revenue amount under the current access arrangement.[1030] ATCO states that the revenue yield approach mitigates the risk of declining average use of residential users.

2302. ATCO also disagrees with the Authority's view that revenue yield per delivery is not consistent with efficient risk allocation as it passes on historical forecasting risk to customers in the form of higher tariffs. ATCO considers that it is irrelevant as to how risks may have been borne in the past. ATCO submits that the only relevant issue is whether the forecast of demand for the fourth access arrangement period is unbiased.[1031]

2303. To the extent that the demand forecast factors in the decline in residential use, ATCO expects that the variation in actual demand compared to the forecast will not be biased in one direction and will not result in a transfer of risk.[1032] ATCO considers that its proposed demand forecast (contrary to the Draft Decision's adjusted forecast) incorporates the observed decline in average consumption per customer as follows:

- forecasting methodology incorporates effective degree day (**EDD**) weather normalisation; and

---

1028 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 248.

1029 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 250.

1030 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 250.

1031 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 250.

1032 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

- the forecast incorporates changes in retail prices, penetration of reverse cycle air-conditioning, and improvements in energy efficient appliances and homes.[1033]

2304. ATCO states that it has proposed an accurate demand forecast so that adjustments under the revenue yield are minimal. Under a price cap, ATCO submits that it has an incentive to under forecast demand to increase the likelihood of over recovering more than the allowed revenue. ATCO considers that the Authority has historically over forecast demand.[1034]

2305. ATCO considers that under the current tariff variation mechanism, a downward bias in forecast demand would result in it recovering more revenue than required. ATCO submits that under its proposed revenue yield approach, a downward bias would result in reduced prices for customers as a result of consumption being higher than required to maintain the revenue yield. Conversely, if there is an overestimation bias, ATCO submits that it will be unable to recover the efficient cost of providing services and result in customers receiving lower levels of service. ATCO considers that under a revenue yield, prices would increase for an overestimation but it would not recover more than efficient costs and service levels would not be at risk.[1035]

2306. ATCO disagrees with the Authority's assessment that the revenue yield approach gives rise to an incentive inconsistent with the NGO.[1036]

2307. ATCO does not consider that there would be additional administrative costs to the Authority in association with its revenue yield approach for the following reasons:

- process for applying the revenue yield is readily incorporated into the annual tariff processes that exist in the current access arrangement; and
- ATCO plans to submit externally audited annual regulatory financial statements to the Authority each year during the fourth access arrangement period. The accounts would contain the information required to verify any adjustments under tariff variation proposals.[1037]

2308. In response to the Authority's considerations regarding ATCO's tariff variation formula, ATCO states that any variation as a result of the revenue yield will occur through the variable component of the tariff.[1038]

2309. ATCO considers that there would be no price shocks for small use customers under the revenue yield:

- any variation would need to be passed on first by retailers;

1033 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 249.

1034 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

1035 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

1036 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

1037 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

1038 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

- there is an equal expectation that any price impact be an increase or decrease;
- sensitivity analysis suggests that forecast consumption would have to reduce by 8 per cent to give rise to a $10 impact; and
- any variation in revenue yield would be passed on through usage charges and not the standing charge, and small use customers consume low volumes of gas.[1039]

2310. Table 123 includes ATCO's revised forecast average number of delivery points and revised forecast revenue per delivery point for B2 and B3 customers for the fourth access arrangement period.

Table 123 ATCO's Forecast Revenue per Delivery Point for B2 and B3 (AA4)

	1 July 2014	1 January 2015	1 January 2016	1 January 2017	1 January 2018	1 January 2019
B2 Forecast Average Number of Delivery Points	10,226	10,540	10,871	11,191	11,498	11,791
B2 Allowed Revenue per Delivery Point (Real $ at 30 June 2014)	545.80	1028.34	1,001.23	974.21	950.09	927.17
B3 Forecast Average Number of Delivery Points	670,358	682,401	698,688	715,146	730,153	743,577
B3 Allowed Revenue per Delivery Point (Real $ at 30 June 2014)	112.59	211.81	211.44	209.98	208.25	205.94

Source: ATCO Gas Australia, Tariff Model, December 2014.

Cost Pass-Through Events and Notice Period

2311. ATCO proposes to maintain the clauses relating to the pass-through of regulatory costs from the third access arrangement period. ATCO considers that the only costs that should result in a tariff variation are licence fees and costs associated with a change in regulation or obligation.[1040]

2312. ATCO states that it has included specific information to facilitate cost pass-throughs for variations in licence fees incurred compared to the forecasts for each year. ATCO proposes to retain the definitions for regulatory change and regulatory costs from the third access arrangement period.[1041]

1039 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

1040 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

1041 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

2313. ATCO states that it accepts the amendments made to clause 3.1(iii) and 3.1(iv) in Annexure B of the access arrangement regarding the changes it made in its initial proposal for indirect costs for cost pass through events.[1042]

2314. ATCO accepts the amendment made to clause 3.1(v) in Annexure B of the access arrangement regarding the removal of the reference to unaccounted for gas cost pass throughs.[1043]

2315. ATCO does not accept the amendment to clause 4.2 of Annexure B of the access arrangement as it considers that the Authority has provided no explanation as to why it requires the inclusion of 'best endeavours'.[1044]

Submissions

2316. In its submission to ATCO's initial proposal, Alinta outlined difficulties that would be faced by retailers in passing on tariff increases in line with ATCO's proposed revenue yield price control for B2 and B3 customers:

- Retailers are only entitled to increase their regulated gas tariffs by CPI each financial year. If a retailer wants to increase the tariff above this amount, it must request that the government amend the tariff regulations, being the *Energy Coordination (Gas Tariffs) Regulations 2000* (WA).
- Any volatility in ATCO prices year to year increases the risk to retailers of not being able to pass through any cost increases.
- Contracts can have a network pass-through clause that allows retailers to pass through the impact of network cost changes. If retailers are able to pass through network cost increases, ATCO's revenue yield proposal will result in material price volatility worn by customers.
- As natural gas competes with electrical, solar and LPG products, volatile prices make it more challenging for customers to make an informed product choice based on energy costs.
- Price volatility can also make it more challenging for customers to make a choice between gas retailers.
- Retailers often provide customers, particularly small business customers that tend to contract for up to three years, with a bundled retail price. If prices are volatile, the only way that retailers can offer such a product is by adding a risk premium.

2317. According to Alinta, the primary purpose of the price cap regime is to incentivise ATCO to operate efficiently given that it would be able to keep the benefit of any efficiency gains obtained during the access arrangement period. Alinta noted that the traditional price cap methodology places the risk of declining customer numbers and usage onto the entity accountable, thereby incentivising it to at least maintain its customer base at forecast usage levels. Alinta considered that a tariff variation mechanism that removes risk associated with declining customer numbers and

---

[1042] ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 253.

[1043] ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 253.

[1044] ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 253.

usage may not provide incentives to ATCO to operate efficiently. Alinta stated that ATCO's proposed revenue yield tariff variation mechanism is inconsistent with the *National Gas Access (WA) (Local Provisions) Regulations 2009*, and does not fairly apportion risk amongst participants in the gas market. Alinta considered that it is not equitable for retailers to wear price risks, while the network operator does not wear any price risks.

2318. Alinta considered that the benefit of ATCO's proposed spend on an intensive business development and marketing campaign is questionable if it has proposed a revenue yield price control that ensures that it is not significantly impacted whether the campaign is effective or not.

2319. In its submission on the Authority's Draft Decision and ATCO's revised proposal, Alinta reiterates that it does not support ATCO's proposed revenue yield tariff mechanism. Alinta considers that ATCO's proposal does not incentivise ATCO to maintain its customer base at forecast consumption levels. Alinta states that it supports the Authority's decision to reject ATCO's proposed revenue yield.

Considerations of the Authority

2320. As per rule 92(2) of the NGR, the Authority has ensured that the approved tariff variation mechanisms for A1, A2, B1, B2 and B3 tariff classes equalise the net present value of haulage tariff revenue and total revenue allocated to haulage services. This is discussed in the Allocation of Total Revenue between Haulage Services and Other Services chapter of this Final Decision.

2321. Pursuant to rule 97(3) of the NGR, the Authority must have regard to the following matters when deciding whether a tariff variation mechanism is appropriate to a particular access arrangement:

- the need for efficient tariff structures;
- the possible effects of the tariff variation mechanism on the administrative costs of the Authority, ATCO, and users or potential users;
- the regulatory arrangements applicable to the relevant reference services before the commencement of the proposed tariff variation mechanism;
- the desirability of consistency between regulatory arrangements for similar services (both within and beyond Western Australia); and
- any other relevant factor.

2322. The tariff variation mechanism must have the effect of giving the Authority adequate oversight or powers of approval over variation of the reference tariff.[1045] Accordingly, this is a factor that the Authority must have regard to in determining whether ATCO's proposed tariff variation mechanism is appropriate.

Tariff Variation Mechanism for B2 and B3 Tariff Class Customers

2323. The Authority has assessed ATCO's proposed haulage tariff variation mechanism for B2 and B3 customers, having regard to the matters set out in rule 97(3) and rule 97(4)

[1045] Rule 97(4) of the NGR.

of the NGR. The Authority also notes that, in accordance with regulation 7 of the *National Gas Access (WA) (Local Provisions) Regulations 2009*, it must also take into account the possible impact (economic or otherwise[1046]) of the proposed tariff variation mechanism on small use customers and retailers.

2324. The Authority notes that ATCO has not accepted the Authority's required amendment for the removal of the revenue yield approach.[1047] For the reasons set out below, the Authority has decided to maintain its position in the Draft Decision not to accept ATCO's proposed revenue yield per delivery point (customer) price control.

2325. The link between the Authority's decision to reject ATCO's proposed revenue yield price control and the determination of beta for input to the Sharpe Lintner CAPM estimate for the return on equity has already been noted in the Rate of Return section of this Final Decision (see paragraph 1304). The Authority considers that a change to a revenue yield price control should lead to a downward adjustment of the value of beta. The Authority, in rejecting ATCO's proposal for a revenue yield, has not made this downward adjustment to the beta estimate for this Final Decision.

2326. The Authority notes that ATCO has cited the need for a revenue yield to address the lower than forecast consumption per customer that it is unable to mitigate. The Authority considers that ATCO can mitigate this risk through the following:

- Well targeted and NPV positive business development and marketing activities.
- Improved demand forecasting approach.

2327. As submitted by ATCO, its proposed marketing and business development activities are designed to increase customer numbers and consumption per customer, such that customers are better off when consumption and customers grow.[1048] However, ATCO does not address the potential increased costs to current and future customers, if the marketing and business development activities do not result in the growth that ATCO has forecast. The Authority discusses ATCO's proposed marketing and business development operating expenditure in the Operating Expenditure chapter of this Final Decision.

2328. The Authority notes ATCO's response in clarifying its demand forecasting methodology.[1049] With respect to ATCO's concerns regarding the Authority's demand forecast methodology in its Draft Decision, the Authority has appointed Deloitte Access Economics (**Deloitte**) to assess ATCO's demand forecast.[1050] Deloitte has assessed that ATCO's demand forecast is biased due to the exclusion of economic variables, and is most likely to be an over-forecast. This is discussed in the Demand Forecast chapter of this Final Decision. The Authority considers that its revised demand forecast and updated forecast methodology address the concerns that are

---

1046 National Gas Access (WA) (Local Provisions) Regulations 2009, regulation 7(2).

1047 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 249.

1048 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 249.

1049 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 250.

1050 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

raised by ATCO. Additionally, the Authority considers that its forecasts are unbiased and meet the requirements of rule 74 of the NGR.

2329. The Authority considers that ATCO's focus on unbiased demand forecasting does not address the key consideration under the efficient tariff structure requirement in the NGR, which is that risks are allocated efficiently. The Authority considers that the party that is best placed to address the risk, and that possesses the relevant information, should bear the risk. In this case, the Authority considers that ATCO should bear the demand forecasting risk.

2330. The Authority clarifies that it does not seek to recover or claw back forecasting errors in the past. The Authority seeks to ensure that current and future customers are not disadvantaged as a result of the risks faced by the service provider.[1051]

2331. As stated in its submission to the initial proposal, Alinta does not consider that a tariff variation mechanism that removes risk associated with declining customer numbers and gas consumption provides ATCO with incentives to operate efficiently. In its submission in response to the Draft Decision and ATCO's revised proposal, Alinta states that ATCO's proposed tariff variation mechanism would not provide an incentive for ATCO to maintain its customer base at forecast gas consumption levels.

2332. The Authority does not consider that ATCO's proposed revenue yield approach allocates risk efficiently. The Authority considers that it is not appropriate for users to bear forecasting risk as a result of ATCO being unable to mitigate the declining average customer gas consumption.

2333. The Authority notes ATCO's response with respect to the additional administrative costs.[1052] Such costs include costs of auditing metering and billing data, costs of designing and implementing arrangements for an annual update of tariffs, and costs of unforeseen tariff increases. However, the Authority considers that ATCO has only partially addressed the potential increased administrative costs. ATCO's response only references the administration costs for the Authority, and does not consider the impact on retailers, customers or ATCO itself. Whilst the Authority notes ATCO's proposed annual provision of audited regulatory financial statements, it disagrees with ATCO's statement that the task to verify the demand figures, revenue calculations and yield variance will not result in additional administrative costs. Moreover, as mentioned, ATCO has not addressed the following:

- Costs to ATCO, of auditing metering data, matching it to corrected billing data, calculating an average revenue variance, updating the tariff variation formula and implementing the updated tariff with retailers.
- Costs to retailers, of designing and implementing arrangements for an annual update of tariffs based on metering and consumption data. These arrangements would be implemented between ATCO and retailers to communicate accurate customer and consumption data and required tariff updates. These arrangements would also need to be implemented in the billing process between the retailer and its customers (if passed on). Retailers are also likely to incur additional costs to audit metering and billing data.

1051 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 251.

1052 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 259.

- Costs to customers, of unforeseen tariff increases in case revenue variance results in higher tariffs that retailers pass on to customers. The Authority is particularly concerned that customers may face price shocks under ATCO's proposal.

2334. The Authority notes that ATCO has not addressed its concerns raised in the Draft Decision regarding a lack of consistency in haulage tariff variation mechanisms with other gas distribution businesses both within and outside of this jurisdiction.

2335. For all of these reasons, the Authority considers that ATCO's proposed revenue yield approach does not satisfy rule 97(3) of the NGR.

2336. The Authority notes that ATCO has not fully addressed its concerns to ensure that the Authority has adequate oversight of its proposed revenue yield approach. The Authority notes that ATCO has clarified that any tariff variation as a result of the revenue yield will be applied through the variable charge.[1053] However, the Authority notes the following:

- ATCO has not detailed how the regulatory statements that it proposes to provide would supply evidence for revenue variance calculations to the Authority; and
- ATCO did not provide a sufficiently broken down demand forecast, by tariff class and usage bracket, which would enable the Authority to verify its revenue yield per customer calculations.

2337. The Authority considers that ATCO has not satisfied rule 97(4) of the NGR. The Authority has reassessed ATCO's proposed haulage tariff variation mechanism for B2 and B3 customers under the criteria outlined in regulation 7 of the *National Gas Access (WA) (Local Provisions) Regulations 2009*. The Authority addresses ATCO's arguments in favour of its revenue yield proposal satisfying rule 97(4) in the following:

- ATCO refers to sensitivity analyses, but does not provide any related evidence. The Authority considers that any price increase may still result in a relative price shock to small use customers. The extent of the shock is also linked to other factors, such as the customer's initial gas bill and disposable income. Moreover, there is a possibility of tariff fluctuations as a result of demand fluctuations.
- The Authority considers that ATCO's proposed revenue yield per delivery point tariff variation mechanism may result in price shocks to retailers and B2 and B3 customers that are small-use customers. ATCO raises the point that variations may not be passed on to customers, but this does not address the issue of price shocks to retailers which are also covered by the local provisions.
- The Authority considers that the price impact of the revenue yield is more likely to be an increase rather than a decrease if ATCO's demand forecast is adopted, given the bias that has been identified by the Authority's consultant Deloitte. However, as discussed in the Demand Forecast chapter of this Final Decision, the Authority has sought to adjust the GDS demand forecast to remove such bias.
- The Authority notes that ATCO considers that the price impact for small use customers would not be affected because the revenue yield price control will only be applied to the variable charge, and the consumption of these customers is low. The Authority considers that ATCO's argument in this instance only covers B3

[1053] ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 259.

customers, as the Authority has not fixed standing charges for B2 customers. The Authority notes that B2 customers are also covered by the Local Provisions.

Cost Pass-Through Events and Notice Period

2338. The Authority notes that ATCO has not accepted all of the Authority's required amendments with respect to cost pass throughs.[1054]

2339. ATCO states it has accepted the amendments made to clause 3.1(iii) and 3.1(iv) in Annexure B of the access arrangement.[1055] However, it appears that ATCO has only re-numbered clause 3.1. Clause 3.1(iii)(A) has been re-numbered as clause 3.1(c), and does not contain the rewording as stated in the Draft Decision's required amendment. Furthermore, ATCO has not excluded cost pass throughs from clause 3.1(iii)(B) as required, but rather it has renumbered this and expanded upon it further as clause 3.1(e). Clause 3.1(iv) has been renumbered as clause 3.1(d) and does not contain the rewording as stated in required amendment 16 of the Authority's Draft Decision. In addition, ATCO has introduced additional changes to clause 3.1(iv) that were not required by the Authority. Accordingly, the Authority considers that ATCO has not accepted the amendments made to clause 3.1(iii) and 3.1(iv).[1056]

2340. The Authority does not approve the changes made by ATCO to clause 3.1 of Annexure B, and maintains its decision to reject ATCO's proposal to include increased regulatory costs as a cost pass through. The Authority considers that ATCO has not addressed its concerns in relation to maintaining regulatory cost changes as cost pass throughs. The Authority notes that ATCO does not report on its regulatory costs separately, which would create an oversight issue for the Authority in case such cost increases are passed through.

2341. ATCO has included additional detail in the cost pass throughs to cover licence fee changes from those forecast as cost pass throughs. The Authority considers that ATCO should be responsible to ensure reasonable licence fee forecasts. Moreover, the Authority reviews these forecasts to ensure that they are prudent and efficient. The Authority considers that any change to licence fees as a result of a change in Law can be considered as a cost pass-through in accordance with the reference tariff variation mechanism.

2342. The Authority notes ATCO's amendment to clause 3.1(v) in Annexure B to remove the clause pertaining to unaccounted for gas. The Authority is satisfied that ATCO has sufficiently implemented this portion of required amendment 16 of the Authority's Draft Decision.[1057]

2343. The Authority considers that ATCO has only partially implemented the amendment to clause 3.2 of Annexure B, with respect to the variation of reference tariffs for cost pass through events. ATCO's amendment still maintains a reference to "Reference Tariffs", and not "Haulage Tariffs" as stated in required amendment 16 of the

---

1054 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 253.

1055 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 253.

1056 ATCO Gas Australia, *Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, 27 November 2014, Annexure B.

1057 ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 253.

Authority's Draft Decision. The Authority requires ATCO to further amend clause 3.2 of Annexure B to remove the words "Reference Tariffs" in 3.2(b) and replace it with "Haulage Tariffs".

2344. The Authority considers that ATCO's cost pass-through events should include a new cost pass-through event 3.1(e) to allow ATCO to recover any Conforming Capital Expenditure or Conforming Operating Expenditure as a result of addressing an "Intermediate" security of supply risk. This cost pass-through event is a result of the Authority rejecting ATCO's proposed sustaining capital expenditure on the basis that the expenditure for security of supply projects should be ranked an "intermediate" risk rather than a "high" risk as proposed by ATCO for the reasons discussed in paragraphs 619 to 703. The Authority requires that ATCO include the following clause 3.1(e):

> ATCO Gas Australia incurs Conforming Capital Expenditure or Conforming Operating Expenditure as a result of addressing an "Intermediate" security of supply risk following an assessment in accordance with the required steps prescribed in Table C4 of AS 4645 for an 'intermediate' ranked risk. This expenditure can only be passed through for the following areas of the network identified by ATCO in its Response to the Draft Decision: Northern Network, Peel, Hillary's, Canning Vale, Fremantle and Lathlain.

2345. The Authority notes that it has approved ATCO's proposal to reduce the notice period for tariff variations from 90 business days to 40 business days on the basis that a revenue yield price control for B2 and B3 tariff classes is not implemented.

2346. The Authority notes that ATCO does not accept the amendment to clause 4.2 of Annexure B as it considers that it is important to be consistent with the Template Haulage Contract, which uses 'reasonable endeavours' rather than 'best endeavours'.[1058] The Authority accepts ATCO's decision to use 'reasonable endeavours' in clause 4.2 and discusses its reasons for this in the Template Haulage Contract chapter of this Final Decision.

Reference tariff variation mechanism – Variation in accordance with formula for reference tariff classes A1, A2, B1, B2 and B3

2347. The Authority has amended clauses 1 and 2 of Annexure B of the proposed revised access arrangement as it has not accepted ATCO's Haulage Reference Tariff Variation Mechanism. The Authority's revised Haulage Reference Tariff Variation Mechanism incorporates cost pass throughs, an annual update for the debt risk premium and actual inflation.

2348. As detailed in the Authority's notice on proposed amendments to the Final Decision, for the haulage reference tariff variation mechanism, the Authority has amended the cost pass through mechanism so that it is incorporated within the haulage reference tariff variation mechanism rather than as a separate calculated tariff variation process. The cost pass through amount (as with the annual DRP update) will change the X-factor used in the tariff variation mechanisms. The Authority made this change as a result of ATCO making the Authority aware of the fact that it had not sought compensation of the taxation impact of cost pass through amounts. The Authority considers that ATCO should recover the taxation component of the cost pass through and the impact of other changes on return on working capital and equity raising costs

[1058] ATCO Gas Australia, *Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, p. 253.

by adopting an approach whereby the cost pass through is modelled within the tariff model and not as a separate process.

2349. The Authority also considers that this revised tariff variation mechanism would be simpler to administer (and therefore result in lower administrative costs) than reviewing two separate processes to vary tariffs and all changes would be incorporated in the one model. Also, if the cost pass-through tariff variation were to occur more frequently than annually, there would be adverse impact on small users and retailers.

2350. In addition to the above changes to the haulage reference tariff variation mechanism as a result of the public consultation process, the Authority has amended clauses 1 and 2 of Annexure B of the proposed revised access arrangement as follows:

1.1 Variation

(a) ATCO Gas Australia may vary any Haulage Tariff by varying one or more Tariff Components of that Haulage Tariff during a Variation Period in accordance with this clause 1.

(b) Each Haulage Tariff varied under this clause 1 applies as varied on and from the first day of the applicable Variation Period.

(c) Each Haulage Tariff varied under this clause includes the impacts of any cost pass through as specified in clause 2 of this Annexure.

(d) Haulage Tariffs that are applicable from the commencement of the Access Arrangement at 1 July 2014 are unchanged from those applicable at 30 June 2014 under rule 92(3) of the NGR.

(e) All Haulage Tariffs commencing 1 January of the Variation Year in Annexure A are to be recalculated after the annual update of the trailing average debt risk premium (in accordance with clause 1.4 of this Annexure). All Haulage Tariffs commencing 1 January of the Variation Year in Annexure A are to include approved Cost Pass Through Events (in accordance with clause 2 and 3 of this Annexure). This will produce the X-Factor and hence the tariffs for the Variation Year. These tariffs, which are in 30 June 2014 dollars are adjusted to the nominal dollar value, to be charged, based on real 31 December dollars of the Variation Year.

1.2 Where Variation Period is the period commencing 1 October 2015

1.2.1 Haulage Tariff Classes: Reference Tariffs A1, A2, B1, B2 and B3

The Reference Haulage Tariffs commencing on 1 October 2015, which are at 30 June 2014 dollars as set out in clauses 1.1(b), 1.2(b), 1.3(b), 1.4(b) and 1.5(b) of Annexure A are to be adjusted to the nominal dollar value to be charged based on December 2015 dollars. The adjustment of Reference Tariff A1, Reference Tariff A2, Reference Tariff B1, Reference Tariff B2 and Reference Tariff B3 that commence from 1 October 2015 tariffs is to be calculated as follows:

$$P_{2015}^{i,j} \leq P_{1}^{i,j} \frac{\text{CPI}_{Sep\,2014}}{\text{CPI}_{Mar\,2013}}$$

Where

$P_{2015}^{i,j}$ is the value of Tariff Component j of Haulage Tariff i as varied on and from the first day of the Variation Period which is 1 October 2015;

$P_1^{i,j}$ is the value of Tariff Component j of Haulage Tariff i at 1 October 2015 in 30 June 2014 dollars as set out in Annexure A;

i is the relevant Haulage Tariff class – being Reference Tariff A1, Reference Tariff A2, Reference Tariff B1, Reference Tariff B2 or Reference Tariff B3;

j is the relevant tariff component – the number of possible components, depends on the Haulage Tariff class being considered, with $j = 1 \text{ to } k$;

k is the maximum number of possible components for each relevant Tariff Component being considered;

$\text{CPI}_{Sep2014}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 30 September 2014 as a proxy to 31 December 2015 CPI;

$\text{CPI}_{Mar2013}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 31 March 2013 as a proxy to 30 June 2014 CPI.

1.3 Where Variation Period is the Year commencing 1 January of each Year 2016, 2017, 2018 and 2019

1.3.1 Haulage Tariff Classes: Reference Tariffs A1, A2 and B1

The change in Reference Haulage Tariffs commencing 1 January of the Variation Year are to not exceed the recalculated X-factor and CPI adjustment. As a result the adjustment of any of Reference Tariff A1, Reference Tariff A2 and Reference Tariff B1 that commence from 1 January of the Variation Year must meet the following condition:

$$\left(1+\text{X-Factor}_N\right)\frac{\text{CPI}_{Sep(N-1)}}{\text{CPI}_{Sep(N-2)}} \geq \frac{\sum_{i=A1}^{B1}\sum_{j=1}^{k} P_N^{i,j} Q_{(N-2)}^{i,j}}{\sum_{i=A1}^{B1}\sum_{j=1}^{k} P_{(N-1)}^{i,j} Q_{(N-2)}^{i,j}}$$

Where

$P_N^{i,j}$ is the value of Tariff Component j of Haulage Tariff i at 1 January of the Variation Year N;

$P_{(N-1)}^{i,j}$ is the prevailing Tariff Component j applied to the customers of Haulage Tariff i at 1 January of the Variation Year (N-1) for $N = 2017 \text{ to } 2019$;

$P_{2015}^{i,j}$ is the value of Tariff Component j of Haulage Tariff i at 1 October 2015 as set out in Clause 1.2.1 of Annexure B;

$Q_{(N-2)}^{i,j}$ is the number of connections or volume sold in year (N-2) where

$Q_{(N-2)}^{i,1}$ is the number of connections;

$Q_{(N-2)}^{i,j}$ is the volume sold for $j \geq 2$

i is the relevant reference Haulage Tariff class – being Reference Tariff class – A1, Reference Tariff A2 or Reference Tariff B1;

j is the relevant Tariff Component – the number of possible components, depends on the Haulage Tariff class being considered, with $j = 1 \text{ to } k$;

k is the maximum number of possible components for each relevant Tariff Component being considered;

N is the Variation Year where $N = 2016\ to\ 2019$;

X-Factor_N is the price change from 1 January of Variation Year $(\text{N}-1)$ to 1 January of Variation Year N after including the approved cost pass through and the annual update of the trailing average debt risk premium for year N at 30 June 2014 dollars;

X-Factor_{2016} is the price change from 1 October 2015 to 1 January 2016 after including the approved cost pass through and the annual update of the trailing average debt risk premium, at 30 June 2014 dollars;

$\text{CPI}_{Sep(N-1)}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 30 September of year $(N-1)$ as a proxy to 31 December of year N CPI;

$\text{CPI}_{Sep(N-2)}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 30 September of year $(N-2)$ as a proxy to 31 December of year $(N-1)$ CPI.

1.3.2 Haulage Tariff Class: Reference Tariff B2

The Reference Haulage Tariffs commencing 1 January of the Variation Year are to be recalculated after the annual update of the trailing average debt risk premium (in accordance with clause 1.4 of this Annexure). The Reference Haulage Tariffs commencing 1 January of the Variation Year in Annexure A are to include approved Cost Pass Through Events (in accordance with clause 2 and 3 of this Annexure). This will produce the X-Factor and hence the tariffs in 30 June 2014 dollars for the Variation Year. The tariffs are to be inflated by CPI to generate prices applicable from 1 January of the Variation Year. The adjustment of Reference Tariff B2 where that tariff commences from 1 January must meet the following condition:

$$P_N^j \le P_1^j \ \frac{\text{CPI}_{Sep(N-1)}}{\text{CPI}_{Mar\,2013}} \ \prod_{t=2016}^{N} \left(1+\text{X-Factor}_t\right)$$

Where

P_N^j is the value of Tariff Component j as varied from 1 January of the Variation Year N;

P_1^j is the value of Tariff Component j at 1 October 2015 as set out in Annexure A;

j is the relevant Tariff Component for $j = 1\ \text{to}\ 3$;

t is the Variation Years, where $t = 2016\ to\ \text{year}\ N$;

N is the Variation Year, where $N = 2016\ to\ 2019$;

X-Factor_t is the 30 June 2014 dollar price change from 1 January of Variation Year $(t-1)$ to 1 January of Variation Year (t) after including the approved cost pass through and the annual update of the trailing average debt risk premium for year t;

X-Factor_{2016} is the 30 June 2014 dollar price change from 1 October 2015 to 1 January 2016 after including the approved cost pass through and the annual update of the trailing average debt risk premium;

$\text{CPI}_{Sep(N-1)}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 30 September of year $(N-1)$ as a proxy to 31 December of year N CPI;

$\text{CPI}_{Mar\,2013}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 31 March 2013 as a proxy to 30 June 2014 CPI.

1.3.3 Haulage Tariff Class: Reference Tariff B3

The Reference Haulage Tariffs commencing 1 January of the Variation Year are to be recalculated after the annual update of the trailing average debt risk premium (in accordance with clause 1.4 of this Annexure). The Reference Haulage Tariffs commencing 1 January of the Variation Year in Annexure A are to include approved Cost Pass Through Events (in accordance with clause 2 and 3 of this Annexure). This will produce the X-Factor and hence the tariffs for the Variation Year. The tariffs are to be inflated by CPI to generate prices applicable from 1 January of each Variation Year. The adjustment of Reference Tariff B3 where that tariff commences from 1 January must meet the following conditions:

$$\sum_{j=1}^{4} P_{\text{N}}^{j} Q^{j} \;\leq\; \left(1+\text{X-Factor}_{N}\right)\frac{\text{CPI}_{Sep(N-1)}}{\text{CPI}_{Sep(N-2)}}\sum_{j=1}^{4} P_{\text{(N-1)}}^{j} Q^{j} \text{ ; and}$$

$$\frac{P_{N}^{4}}{P_{(N-1)}^{4}} = \frac{P_{N}^{3}}{P_{(N-1)}^{3}}$$

Where

P_{N}^{j} is the value of Tariff Component j of Reference Tariff B3, starting from 1 January of the Variation Year $N = 2016 \text{ to } 2019$;

$P_{(N-1)}^{j}$ is the value Tariff Component j or Reference Tariff B3 at year $(N-1)$;

P_{N}^{1} is a fixed standing charge per connection where:

P_{2015}^{1} is $\$75.81 \times \frac{\text{CPI}_{Sep\,2014}}{\text{CPI}_{Mar\,2013}}$ per connection;

P_{2016}^{1} is $\$78.10 \times \frac{\text{CPI}_{Sep\,2015}}{\text{CPI}_{Mar\,2013}}$ per connection;

P_{2017}^{1} is $\$87.20 \times \frac{\text{CPI}_{Sep\,2016}}{\text{CPI}_{Mar\,2013}}$ per connection;

P_{2018}^{1} is $\$96.31 \times \frac{\text{CPI}_{Sep\,2017}}{\text{CPI}_{Mar\,2013}}$ per connection;

P_{2019}^{1} is $\$105.41 \times \frac{\text{CPI}_{Sep\,2018}}{\text{CPI}_{Mar\,2013}}$ per connection;

P_N^2 is 0 for the first 2 GJ;

P_{2015}^3 is $\$14.98 \times \frac{CPI_{Sep2014}}{CPI_{Mar2013}}$ per GJ at 1 October 2015;

P_{2015}^4 is $\$6.47 \times \frac{CPI_{Sep2014}}{CPI_{Mar2013}}$ per GJ at 1 October 2015;

Q^j is the number of connections or demand volume where

Q^1 is 1 customer connection;

Q^2 is 2 GJ;

Q^3 is 8 GJ;

Q^4 is 5 GJ;

j is the relevant Tariff Component where $j = 1 \; to \; 4$;

N is the Variation Year, where $N = 2016 \; to \; 2019$;

X-Factor_N is the 30 June 2014 dollar price change from 1 January of Variation Year $(N-1)$ to 1 January of Variation Year N after including the cost pass through and the annual update of the trailing average debt risk premium, for $N = 2017 \; to \; 2019$;

X-Factor_{2016} is the price change from 1 October 2015 to 1 January 2016 after including the cost pass through and the annual update of the trailing average debt risk premium;

$CPI_{Sep(N-1)}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 30 September of year $(N-1)$ as a proxy to 31 December of year N CPI;

$CPI_{Sep(N-2)}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 30 September of year $(N-2)$ as a proxy to 31 December of year $(N-1)$ CPI.

1.4 Annual update of trailing average debt risk premium

The annual update of the trailing average debt risk premium component of the rate of return in each year starting from 1 January 2016 of the Access Arrangement Period is to be calculated by applying the following formula:

$$TA\ DRP_0 = \frac{\sum_{t=0}^{-9} DRP_t}{10}$$

Where

$TA\ DRP_0$ is the equally weighted trailing average of the DRP to apply in the following year as the annual update of the estimate used in the current year; and

DRP_t is the DRP estimated for each of the 10 regulatory years t *= 0, -1, -2…. , -9*.

DRP_t refers to the DRP estimates in each year t *= 0, -1, -2…. , -9*, which are either:

the forward looking DRP estimators for the calendar year 2016, 2017, 2018 or 2019, estimated during the 20 trading days averaging period, using the method of automatic formulas set out in Appendix 8 of the Final Decision; or

the published DRP_t estimates, derived from the Reserve Bank of Australia 10 year BBB credit spread to swap interpolated daily data (up to the period 31 March 2015) and from the Authority's 2 April 2015 estimate of the DRP, as follows, as set out in Appendix 8 of the Final Decision:

calendar year 2007: DRP_{2007}: 1.241 per cent;

calendar year 2008: DRP_{2008}: 3.489 per cent;

calendar year 2009: DRP_{2009}: 4.624 per cent;

calendar year 2010: DRP_{2010}: 2.127 per cent;

calendar year 2011: DRP_{2011}: 2.371 per cent;

calendar year 2012: DRP_{2012}: 3.172 per cent;

calendar year 2013: DRP_{2013}: 3.068 per cent;

calendar year 2014: DRP_{2014}: 2.250 per cent;

calendar year 2015: DRP_{2015}: 1.953 per cent.

The first annual update will apply for the tariff variation for the 2016 calendar year. As noted, all annual updates of the debt risk premium should be determined consistent with the automatic formulas summarised in Annexure D of the Access Arrangement and set out in detail in Appendix 8 of the Final Decision. The resulting automatic annual adjustment to the rate of return, based on the outputs of the updating of the tariff model for the revised debt risk premium for the regulatory year, should be incorporated in the relevant Annual Tariff Variation.

The Authority in the Final Decision required that ATCO nominate, as soon as practicable after the release of the Final Decision, the averaging period for each annual update applying in 2016, 2017, 2018 and 2019. The averaging periods for each year must be a nominated 20 trading days (based on eastern states holidays) in the window 1 July to 31 October in the year prior to the relevant tariff variation, to allow estimation of the updated DRP for inclusion in the relevant annual tariff variation. The nominated 20 trading day averaging period for each of the four years do not need to be identical periods, only that they occur in the period 1 July to 31 October in each relevant year, and are nominated prior.

…

2.2 Variation of Haulage Tariffs

If a Cost Pass Through Event occurs, ATCO Gas Australia:

(a) must notify the ERA of the Cost Pass Through Event; and

(b) may recover direct Conforming Operating Expenditure, depreciation of and return on direct Conforming Capital Expenditure and consequential changes to return on working capital, taxation and equity raising costs incurred or forecast to be incurred by ATCO Gas Australia (or on ATCO Gas Australia's behalf) as a direct result of the Cost Pass Through Event, provided that these costs have not already been recovered by ATCO Gas Australia. ATCO Gas Australia may account for the timing difference between incurring Conforming Operating Expenditure and the start date for the tariff variation, through a time value of money adjustment.

Final Decision

2351. The Authority's Final Decision is not to approve ATCO's proposed revenue yield approach for tariff classes B2 and B3. The Authority also does not approve ATCO's inclusion of regulatory cost pass throughs. The Authority approves ATCO's proposed weighted average price cap for tariff classes A1, A2 and B1. The proposed revised access arrangement must be amended as per the required amendment set out below.

Required Amendment 14

The proposed revised access arrangement should remove references to revenue yield in Annexure A, and remove clause 2 and clause 3.1 (e) and update all the formulas in Annexure B of the Access Arrangement to reflect the following:

The proposed revised access arrangement must reflect the haulage tariff variation formulas as presented in paragraph 2350.

> To exclude cost pass-throughs for regulatory costs (clause 3.1(e)) of Annexure B)

Clause 3.1(c) in Annexure B of the proposed revised access arrangement should be reworded as follows:

> "Conforming Capital Expenditure or Conforming Operating Expenditure as a direct result of a Change in Law or Tax Change."

Clause 3.1(d) in Annexure B of the proposed revised access arrangement should reworded as follows:

> "ATCO Gas Australia incurs Conforming Capital Expenditure or Conforming Operating Expenditure as a direct result of any Law that imposes a fee or Tax on greenhouse gas emissions or concentrations; and for avoidance of doubt, this expenditure includes only direct capital or direct operating expenditure associated with preparation for, compliance with the Laws which implement, and the participation in, the Emissions Trading Scheme; and liability only for direct capital or direct operating expenditure transferred to ATCO Gas Australia from another entity as a direct result of acting in accordance with the Emissions Trading Scheme."

The proposed revised access arrangement is required to include the following clause 3.1(e):

> "ATCO Gas Australia incurs Conforming Capital Expenditure or Conforming Operating Expenditure as a result of addressing an "Intermediate" security of supply risk following an assessment in accordance with the required steps prescribed in Table C4 of AS 4645 for an 'intermediate' ranked risk. This expenditure can only be passed through for the following areas of the network identified by ATCO in its Response to the Draft Decision: Northern Network, Peel, Hillary's, Canning Vale, Fremantle and Lathlain."

Clause 3.2 in Annexure B of the proposed revised access arrangement should be reworded as follows: "If a Cost Pass Through Event occurs, ATCO Gas Australia must notify the ERA of the Cost Pass Through Event, and may vary one or more Haulage

Tariffs to recover only direct Conforming Operating Expenditure and depreciation of and return on direct Conforming Capital Expenditure incurred or forecast to be incurred by ATCO Gas Australia (or on ATCO Gas Australia's behalf) as a direct result of the Cost Pass Through Event, provided that these costs have not already been recovered by ATCO Gas Australia.

The above amendments must take into account the deletion of clause 2, which will result in clause 3 being renumbered as clause 2 in Annexure B of the proposed revised access arrangement.

Ancillary Service Tariffs

Regulatory Requirements

2352. Rule 94 of the NGR sets out the requirements for the determination of reference tariffs for distribution pipelines. Rule 94 of the NGR is reproduced above under the Haulage Service Tariffs chapter of this Final Decision.

ATCO's Proposed Revisions

2353. ATCO has proposed to continue offering the same ancillary services in the fourth access arrangement period as currently offered in the third access arrangement period. These services are requested by retailers, and are as follows:

- Applying a meter lock
- Removing a meter lock
- Deregistering a delivery point
- Disconnecting a delivery point
- Reconnecting a delivery point (B2 and B3 customers)

2354. Annexure C of the proposed Access Arrangement sets out the reference tariffs associated with the ancillary services and the associated reference tariff variation mechanism.

2355. ATCO has proposed to calculate ancillary service tariffs on a cost recovery basis. ATCO has calculated the cost of ancillary services as follows:

- Calculate costs for each ancillary service per unit of activity. ATCO has forecast a decrease in such costs as a result of more efficient work practices and competitive tender for meter lock services.[1059]
- Forecast activity volume for each ancillary service based on historical averages.[1060]
- Inflate activity volumes for *applying a meter lock* and *removing a meter lock* based on growth in B3 customers.[1061]
- Grow activity volume for *deregistering a delivery point* by one per cent annually to reflect demolitions as a result of re-zoning.[1062]
- Grow activity volume for *disconnecting a delivery point* and *reconnecting a delivery point* in line with historical trends.[1063]

[1059] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, pp. 279-280.
[1060] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 280.
[1061] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 280.
[1062] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 280.
[1063] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 280.

Draft Decision

2356. The Authority assessed ATCO's proposed method for calculating ancillary service tariffs for the fourth access arrangement period against the requirements of rule 94 of the NGR.

2357. The Authority agreed with ATCO's overall method. The Authority approved ATCO's proposed ancillary service tariffs for the fourth access arrangement period. As noted in paragraph 468, the Authority assumed that these services are externally sourced by ATCO. The Authority required ATCO to confirm this and, if these services are provided using internal resources, provide further justification on the efficiency of these costs.

2358. The Authority also required that ATCO justify whether the ancillary service revenue to be recovered for each customer lies between an upper bound (the stand alone cost of providing the reference service to the customer) and a lower bound (the avoidable cost of not providing the reference service to the customer) as per rule 94(3) of the NGR.

2359. The Authority adjusted ATCO's escalation of activity volumes for *applying a meter lock* and *removing a meter lock* based on the Authority's adjusted growth in B3 customers rather than ATCO's forecast growth in B3 customers. To ensure compliance with rule 94(5) of the NGR, the Authority also adjusted ATCO's activity volumes and corresponding revenues for *applying a meter lock* and *removing a meter lock* from 2015 to 2019.

ATCO's Response to the Draft Decision

2360. ATCO has not implemented the Authority's required amendment in the Draft Decision in relation to ancillary service tariffs. ATCO has not adjusted the volumes, as ATCO has not accepted the Authority's adjusted demand forecast.[1064] ATCO has adjusted ancillary service volumes in response to its revised proposal demand forecast as per the Response to the Draft Decision.

2361. ATCO submits that the ancillary service tariffs proposed for the fourth access arrangement period are lower than the costs achieved during the third access arrangement period as a result of efficient work practices and competitively tendered rates. [1065]

2362. In response to the Authority's concern in the Draft Decision regarding the provision of ancillary services by external sources, ATCO states that ancillary services are provided by a mix of internal and external sources. All meter locking and unlocking services are undertaken by contractors on a fixed price basis. ATCO provides the padlocks and valve locking devices, which are incorporated into the tariffs. ATCO states that 95 per cent of the deregistration requests, disconnection services and reconnection services are undertaken by contractors, mainly on a tendered price

---

[1064] ATCO Gas Australia, Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 254.

[1065] ATCO Gas Australia, Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 254.

basis with materials included in the price. No overheads are included in the service tariffs due to the proportion of services provided by external contractors.[1066]

2363. ATCO has responded to the Draft Decision's concern regarding whether the ancillary service revenue to be recovered for each customer lies between the stand alone cost of providing the service and the avoidable cost of not providing the service.[1067] ATCO states that the avoidable cost of service to each customer is the material cost, which is a low proportion of the total ancillary service provision cost. The stand alone cost covers the direct costs of associated corporate support, IT and licence fees. The stand alone cost is a higher proportion of the total ancillary service provision cost.[1068]

2364. ATCO has calculated avoidable costs for the deregistration, disconnection and reconnection reference ancillary services, based on the materials, subcontractor and reinstatement costs as recorded in the variable volume maintenance cost forecast. ATCO states that its avoidable meter lock costs are based on per activity costs of installing or removing a meter lock by a subcontractor.[1069]

2365. ATCO's standalone costs for reference ancillary services include an allocation of the existing team administering the services and an estimate of the IT systems cost necessary for transferring information to and from retailers, as well as managing the activities.[1070] Table 124 below presents ATCO's expected ancillary service revenue per tariff class compared with the stand alone and avoidable cost of the respective ancillary reference service.

Table 124 Standalone and Avoidable Cost of Ancillary Reference Services

Real $ million at 30 June 2014	Expected Revenue	Standalone Cost	Avoidable Cost
Apply meter lock	0.5	4.5	0.5
Remove meter lock	0.2	4.2	0.2
Deregistration	1.1	4.7	0.8
Disconnection	0.4	4.3	0.3
Reconnection	0.5	4.5	0.5

Source: ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 255, Table 14-5.

2366. Table 125 shows ATCO's revised ancillary service volumes and revenues for the fourth access arrangement period.

1066 ATCO Gas Australia, Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 254.

1067 ATCO Gas Australia, Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 254.

1068 ATCO considers that at a minimum, the stand alone costs would be 19.3 per cent higher if the proposed overhead allocation rate were applied to the tariff for each customer.

1069 ATCO Gas Australia, Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 255.

1070 ATCO Gas Australia, Response to the ERA's Draft Decision on Required Amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 255.

Table 125 ATCO Revised Proposal Ancillary Service Volumes and Revenues (AA4)

	July-Dec 2014	Jan-Jun 2015	Jul – Sept 2015	2016	2017	2018	2019
Applying a meter lock							
Charging parameter ($/activity)	54.75	53.41	40.25	40.25	40.25	40.25	40.25
Activity volume (activity)	2,634.00	1,339.00	1,339.00	2,758.00	2,841.00	2,926.00	3,014.00
Revenue (Real $ millions at 30 June 2014)	0.14	0.07	0.05	0.11	0.11	0.12	0.12
Removing a meter lock							
Charging parameter ($/activity)	19.31	18.84	15.77	15.78	15.78	15.78	15.78
Activity volume (activity)	1,959.98	1,184.50	1,184.50	2,440.00	2,513.00	2,589.00	2,666.00
Revenue (Real $ millions at 30 June 2014)	0.04	0.02	0.02	0.04	0.04	0.04	0.04
Deregistering a delivery point							
Charging parameter ($/activity)	164.54	160.52	105.37	107.42	109.52	111.66	113.83
Activity volume (activity)	1,242.02	1,048.33	1,048.33	2,180.53	2,202.34	2,224.36	2,246.61
Revenue (Real $ millions at 30 June 2014)	0.20	0.17	0.11	0.23	0.24	0.25	0.26
Disconnecting a delivery point							
Charging parameter ($/activity)	110.11	87.80	90.25	90.50	90.75	91.01	91.28
Activity volume (activity)	347.53	487.00	487.00	993.48	1,013.35	1,033.62	1,054.29
Revenue (Real $ millions at 30 June 2014)	0.04	0.04	0.04	0.09	0.09	0.09	0.10
Reconnecting a delivery point							
Charging parameter ($/activity)	148.08	117.07	120.20	120.41	120.62	120.83	121.05
Activity volume (activity)	341	473	473	964	983	1,003	1,023
Revenue (Real $ millions at 30 June 2014)	0.05	0.06	0.06	0.12	0.12	0.12	0.12

Source: ATCO Gas Australia, Email Response to ERA 95, 16 June 2015

Submissions

2367. The Authority has not received any submissions in relation to ancillary service tariffs for ATCO's initial proposal, the Authority's Draft Decision or ATCO's revised proposal.

Considerations of the Authority

2368. The Authority has assessed ATCO's proposed method for calculating ancillary service tariffs for the fourth access arrangement period against the requirements of rule 94 of the NGR.

2369. The Authority notes ATCO's response in relation to the mixed internal and external sourcing of these services. The Authority is satisfied with ATCO's response regarding the efficiency of these costs.

2370. The Authority notes that ATCO's revised proposal forecast ancillary service tariff prices are inconsistent with Annexure C of ATCO's proposed revised access arrangement. The Authority considers that the ancillary service tariff variation mechanism proposed by ATCO will not result in the ancillary service tariff prices presented in Table 125. The Authority notes that ATCO's ancillary service tariff variation formula only allows for the price of the tariff, as stated in clauses 1.1 to 1.5 of Annexure C, to be increased by inflation as per clause 2 of Annexure C. The Authority does not consider that the ancillary service tariff variation mechanism provides for a real increase in the price of the tariff beyond inflation. Additionally, the Authority notes that the price for Deregistering a Delivery Point, Disconnecting a Delivery Point and Reconnecting a Delivery point in Annexure C does not correspond to the prices used by ATCO to calculate its forecast ancillary service tariff revenue in its tariff model.[1071]

2371. The Authority also notes that between ATCO's initial proposal and revised proposal, the unit price of delivering a disconnection and a reconnection of a delivery point has increased. ATCO has not provided a reason in its revised proposal for this change. However, the Authority notes that the revised prices are below current prices.

2372. As ATCO's proposed forecast ancillary service tariffs are not achievable by ATCO's proposed ancillary service tariff variation mechanism, the Authority has decided to fix the price of each ancillary service at ATCO's revised proposal 1 October 2015 price (in real 30 June 2014 dollars) for the duration of the fourth access arrangement period.[1072] The Authority considers that Annexure C of the proposed revised access arrangement must be amended to reflect the prices approved in Table 126. The Authority has not adjusted the ancillary service volumes proposed by ATCO.

2373. To be consistent with the Operating Expenditure chapter of this Final Decision, the Authority has set its approved ancillary services operating expenditure using the same approved tariff prices and volumes presented in Table 126 for the 2015 to 2019 period.

2374. The Authority notes that it is not able to recalculate the avoidable and standalone costs of its Final Decision approved ancillary service tariffs. However, the Authority reasonably expects that its ancillary tariffs are between the avoidable and standalone costs.

2375. Table 126 shows the Authority's revised ancillary service volumes and revenues for the fourth access arrangement period.

[1071] ATCO's revised proposal tariff model only provides a total forecast for ancillary service tariff revenue. It does not provide a split by each specific ancillary service tariff. The Authority requested that ATCO provide the tariff price, volume and revenue for each ancillary service tariff used by ATCO to calculate its total forecast. ATCO subsequently provided the Authority a split of the required information in ERA95 on 16 June 2015.

[1072] As provided by ATCO in ERA95.

Table 126 Authority's Final Decision Approved Ancillary Service Volumes and Revenues (AA4)

	Oct to Dec 2015	2016	2017	2018	2019
Applying a meter lock					
Charging parameter ($/activity)	40.25	40.25	40.25	40.25	40.25
Activity volume (activity)	670	2,758	2,841	2,926	3,014
Revenue (Real $ millions at 30 June 2014)	0.03	0.11	0.11	0.12	0.12
Removing a meter lock					
Charging parameter ($/activity)	15.77	15.78	15.78	15.78	15.78
Activity volume (activity)	592	2,440	2,513	2,589	2,666
Revenue (Real $ millions at 30 June 2014)	0.01	0.04	0.04	0.04	0.04
Deregistering a delivery point					
Charging parameter ($/activity)	105.37	105.37	105.37	105.37	105.37
Activity volume (activity)	524	2,181	2,202	2,224	2,247
Revenue (Real $ millions at 30 June 2014)	0.06	0.23	0.23	0.23	0.24
Disconnecting a delivery point					
Charging parameter ($/activity)	90.25	90.25	90.25	90.25	90.25
Activity volume (activity)	244	993	1,013	1,034	1,054
Revenue (Real $ millions at 30 June 2014)	0.02	0.09	0.09	0.09	0.10
Reconnecting a delivery point					
Charging parameter ($/activity)	120.20	120.20	120.20	120.20	120.20
Activity volume (activity)	236	964	983	1,003	1,023
Revenue (Real $ millions at 30 June 2014)	0.03	0.12	0.12	0.12	0.12

Source: ERA, GDS Tariff Model, September 2015.

Final Decision

2376. The Authority's Final Decision is not to approve ATCO's revised proposal ancillary service tariff prices and revenues. The Authority has set the ancillary service prices as per Table 126. The Authority has not adjusted ATCO's revised proposal ancillary service volumes.

Required Amendment 15

Annexure C of the proposed revised access arrangement must be amended to reflect the ancillary service tariff prices in Table 126.

Ancillary Service Tariff Variation Mechanism

Regulatory Requirements

2377. Rules 92 and 97 of the NGR set out requirements for an access arrangement to include a mechanism for variation of reference tariffs during an access arrangement period. Rules 92 and 97 of the NGR are reproduced above under the Haulage Tariff Variation Mechanism chapter of this Final Decision.

ATCO's Proposed Revisions

2378. ATCO initially proposed to vary ancillary service tariffs in the fourth access arrangement period based on the Wage Price Index (**WPI**) for Western Australia.[1073] ATCO's ancillary service tariff variation mechanism for the third access arrangement period varied tariffs based on the Consumer Price Index (**CPI**) – Weighted Average of Eight Capital Cities.

Draft Decision

2379. ATCO did not provide an explanation for its proposed change to the ancillary service tariff variation mechanism pursuant to which ancillary service tariff variations are determined by reference to the WPI. Moreover, ATCO stated in its initial revised access arrangement information that it proposed to vary ancillary service tariffs by CPI. Contrary to this, however, Annexure C of the initially proposed revised access arrangement stated that ATCO proposed to vary ancillary service tariffs by WPI.[1074]

2380. Pursuant to rule 72(1)(k) of the NGR, the service provider's access arrangement information must include a rationale for any proposed reference tariff variation mechanism. The Authority rejected ATCO's proposed ancillary service tariff variation mechanism which increases ancillary service tariffs by WPI given the lack of rationale provided by ATCO as to the need for this change. The Authority decided that ATCO's ancillary service tariff variation mechanism should continue to be based on CPI – Weighted Average of Eight Capital Cities.

ATCO's Response to the Draft Decision

2381. ATCO has accepted the Authority's requirement that the ancillary service tariff variation mechanism continue to be based on CPI – Weighted Average of Eight Capital Cities. ATCO has updated Annexure C of the proposed revised access arrangement to reflect the change to the CPI – Weighted Average of Eight Capital Cities.

Submissions

2382. The Authority has not received any submissions in relation to ATCO's proposed ancillary service tariff variation mechanism in its proposed revised access arrangement.

[1073] ATCO Gas Australia, Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 17 March 2014, Annexure C, p. 45.

[1074] ATCO Gas Australia, *Access Arrangement Information*, 17 March 2014, p. 284.

Considerations of the Authority

2383. The Authority notes that ATCO has updated Annexure C of the proposed revised access arrangement to reflect the change to the CPI – Weighted Average of Eight Capital Cities.

2384. The Authority also notes that ATCO has amended clause 1 of Annexure C in its revised proposal to state that ancillary reference service tariffs are from 1 July 2015. The Authority notes that as the commencement date for the new tariffs is 1 October 2015, ancillary reference service tariffs should be set from 1 October 2015, and not 1 July 2015 or 1 January 2015. Clause 1 of Annexure C must be amended to state that new ancillary tariffs begin from 1 October 2015 as follows:

> **1. REFERENCE TARIFFS**
>
> Subject to the Reference Tariff Variation Mechanism, for ancillary reference services ancillary reference service tariffs from 1 October 2015 (in 30 June, 2014 dollars) are:

2385. The Authority notes that the mechanism provided by ATCO does not contain the correct periods of CPI to account for inflation. Additionally, as the new tariffs do not commence until 1 October 2015, the Authority has introduced an additional ancillary service tariff variation mechanism for the commencement date until 31 December 2015 and updated the ancillary services tariff variation mechanism for the correct periods of CPI for 1 January 2016 to 31 December 2019.

2386. In addition to the amendment required for clause 1, the Authority has amended clause 2(a) of Annexure C of the proposed revised access arrangement as the Authority has not accepted ATCO's ancillary service haulage tariff variation mechanism.

2387. The Authority has amended clause 2(a) of Annexure C of the proposed revised access arrangement as follows:

> **2. REFERENCE TARIFF VARIATION MECHANISM**
>
> (a) Other than the costs referred to at clause 1.1(d) of this Annexure C (which will be calculated at the time the costs are incurred), the Reference Tariffs referred to in clause 1 of this Annexure C may be increased by ATCO Gas Australia on 1 October 2015 by applying the Reference Tariff Variation Mechanism set out in this clause 2.

$$C^{j}_{2015} \leq C^{j}_{1} \frac{\mathrm{CPI}_{Sep\,2014}}{\mathrm{CPI}_{Mar\,2013}}$$

Where

C^{j}_{2015} is the value of the ancillary services tariff component j from the first day of the variation period which is 1 Oct 2015;

C^{j}_{1} is the value of the ancillary services tariff component j at 1 October 2015 in 30 June 2014 dollar;

j is the relevant ancillary services tariff component, with $j = 1 \text{ to } 5$;

$\mathrm{CPI}_{Sep\,2014}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 30 September 2014 as a proxy to 31 December 2015 CPI;

$\text{CPI}_{Mar\,2013}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 31 March 2013 as a proxy to 30 June 2014 CPI.

Other than the costs referred to at clause 1.1(d) of this Annexure C (which will be calculated at the time the costs are incurred), the Reference Tariffs referred to in clause 1 of this Annexure C may be increased by ATCO Gas Australia on 1 January of each Year, beginning in 2016, during the duration of this Access Arrangement by applying the Reference Tariff Variation Mechanism set out in this clause 2.

$$C_t^j \leq C_1^j \frac{\text{CPI}_{Sep\,(\text{t-1})}}{\text{CPI}_{Mar\,2013}}$$

Where

C_t^j is the value of the ancillary services tariff component j and from the first day of the variation period which is 1 January of year t;

C_1^j is the value of the ancillary services tariff component j at 1 October 2015, in 30 June 2014 dollar

j is the relevant ancillary services tariff component, with $j = 1 \text{ to } 5$;

$\text{CPI}_{Sep\,(\text{t-1})}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 30 September year $(t-1)$ as a proxy to 31 December year t CPI;

$\text{CPI}_{Mar\,2013}$ is the value of the CPI All Groups, Weighted Average of Eight Capital Cities for 31 March 2013 as a proxy to 30 June 2014 CPI.

Final Decision

2388. The Authority maintains its decision that ATCO's ancillary service tariff variation mechanism should continue to be based on CPI – Weighted Average of Eight Capital Cities. The Authority rejects ATCO's revised proposal ancillary services tariff variation mechanism.

Required Amendment 16

The proposed revised access arrangement must be amended to reflect paragraphs 2384 and 2387.

Other Access Arrangement Provisions

Application Procedure

Regulatory Requirements

2389. Rule 112 of the NGR provides that a prospective user 'may' request a scheme pipeline service provider to provide a pipeline service for the prospective user.

> 112. Requests for access
>
> 1) A prospective user may request a scheme pipeline service provider to provide a pipeline service for the prospective user.
>
> 2) The request must be made in writing and must:
>
> a) state the time or times when the pipeline service will be required and the capacity that is to be utilised; and
>
> b) identify the entry point where the user proposes to introduce natural gas to the pipeline or the exit point where the user proposes to take natural gas from the pipeline or, if the requested service is a haulage service, both entry and exit point; and
>
> c) state the relevant technical details (including the proposed gas specification) for the connection to the pipeline, and for ensuring safety and reliability of the supply of natural gas to, or from, the pipeline.
>
> 3) The service provider must, within 20 business days after the date of the request, respond to the request:
>
> a) by informing the prospective user:
>
> (i) whether the service provider can provide the requested pipeline service; and
>
> (ii) if so, the terms and conditions on which the service provider is prepared to provide the requested pipeline service;
>
> b) by informing the prospective user that the service provider needs to carry out further investigation to determine whether it can provide the requested pipeline service and setting out a proposal for carrying out the further investigation including:
>
> (i) a statement of the nature of the investigation; and
>
> (ii) a plan (including a time schedule) for carrying out and completing the investigation; and
>
> (iii) a statement of the reasonable costs of the investigation the prospective user would be required to meet.
>
> 4) If the service provider informs the prospective user that it cannot provide the requested pipeline service, the service provider must:
>
> a) provide the prospective user with written reasons explaining why the requested pipeline service cannot be provided; and
>
> b) if there is some prospect that it will become possible to provide the requested service at some time in the future – give details (which must be as specific as the circumstances reasonably allow) of when capacity to provide the requested service is likely to become available and, if possible, nominate a specific date.
>
> 5) If the service provider responds to the request by proposing further investigation, the following provisions apply:

a) if the parties have not agreed on the service provider's proposal or some negotiated modification of it within 20 business days after the date of the response – the service provider is taken to have rejected the prospective user's request; and

b) if the parties agree on the service provider's proposal or on some negotiated modification of it within 20 business days after the date of the response – the service provider must carry out the investigation in accordance with the agreement and, on the conclusion of the investigation, inform the prospective user whether it can, or cannot, provide the requested pipeline service and comply with other relevant requirements of this rule.

ATCO's Proposed Revisions

2390. In its initial proposal, ATCO sought an amendment to the access arrangement application procedure. Clause 5.5(a) of the current access arrangement lists preconditions to, and restrictions on, the provision of services. ATCO's proposed revised access arrangement added a new precondition that the prospective user satisfied the service provider's reasonable minimum prudential and insurance requirements (clause 5.5(a)(x)).[1075]

2391. Clause 5.5(b) of the proposed revised access arrangement purported to grant ATCO the right to remove, add to or vary one or more of the pre-conditions listed in clause 5.5(a).

Draft Decision

2392. In its Draft Decision, the Authority noted that clause 5.5(a)(x) of the proposed revised access arrangement appeared to restate the elements of clause 1(a)(iii)(B) of the revised proposed template haulage contract (service agreement). This led the Authority to be concerned about inconsistent wording and the tendency for duplication to complicate the ongoing task of maintaining consistency in an access arrangement. Accordingly, the Authority required clause 5.5(a)(x) of the proposed revised access arrangement to be deleted.

2393. The Authority noted that several paragraphs listed under clause 5.5(a) in the current access arrangement were similar to clause 5.5(a)(x) in that they set out preconditions that the Authority considered better left to be addressed in the template haulage contract (service agreement).

2394. The Authority noted that clause 5.5(a)(vi) required the prospective user to satisfy ATCO that it will comply with the approved System Pressure Protection Plan – a precondition very similar to the condition precedent set out in clause 1(a)(iii)(A) in the revised proposed template haulage contract. Accordingly, the Authority decided that clause 5.5(a)(vi) of the proposed revised access arrangement should be deleted.

2395. Also, the Authority highlighted that clause 5.5(a)(xi) committed the user to comply with gas quality specifications under the service agreement. The Authority considered this commitment superfluous, given the user obligations imposed under clause 6 of the revised proposed template haulage contract, and required 5.5(a)(xi) to be deleted.

[1075] ATCO Gas Australia, Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 17 March 2014, Clause 5.5, pp. 12-14.

2396. The Authority identified a separate concern in respect of clause 5.5(b) of the proposed revised access arrangement. The clause purported to allow ATCO to modify the preconditions and requirements for providing access to reference services.

2397. The Authority considered that ATCO's proposed clause 5.5(b) granted broad powers to the service provider to introduce additional preconditions. Noting that the service provider would already be protected by an extensive set of preconditions, the Authority saw no reason why this discretion was required. Therefore, the Authority required clause 5.5(b) to be deleted.

ATCO's Response to the Draft Decision

2398. ATCO accepted the requirement to delete clauses 5.5(a)(vi), 5.5(a)(x), 5.5(a)(xi) and 5.5(b) in the proposed revised access arrangement. ATCO's acceptance of this amendment was contingent on the continuation of similar protections in the template service agreement.

Submissions

2399. The Authority did not receive any submissions that related to the application procedure for the proposed revised access arrangement or in response to the Draft Decision.

Final Decision

2400. The Authority's concerns in relation to clause 5.5 of the proposed revised access arrangement have been addressed.

Capacity Trading Requirements

Regulatory Requirements

2401. The NGR provides for capacity trading requirements.

> 105. Capacity trading requirements
>
> 1) Capacity trading requirements must provide for transfer of capacity:
>
> a) if the service provider is registered as a participant in a particular gas market – in accordance with rules or Procedures governing the relevant gas market; or
>
> b) if the service provider is not so registered, or the relevant rules or Procedures do not deal with capacity trading – in accordance with this rule.
>
> 2) A user may, without the service provider's consent, transfer, by way of subcontract, all or any of the user's contracted capacity to another (the third party) with the following consequences:
>
> a) the transferor's rights against, and obligations to, the service provider are (subject to paragraph (b)) unaffected by the transfer; but
>
> b) the transferor must immediately give notice to the service provider of:
>
> i) the subcontract and its likely duration; and
>
> ii) the identity of the third party; and
>
> iii) the amount of the contracted capacity transferred.

3) A user may, with the service provider's consent, transfer all or any of the user's contracted capacity to another (the third party) with the following consequences:

   a) the transferor's rights against, and obligations to, the service provider are terminated or modified in accordance with the capacity trading requirements; and

   b) a contract arises between the service provider and the third party on terms and conditions determined by or in accordance with the capacity trading requirements.

4) The service provider must not withhold its consent under subrule (3) unless it has reasonable grounds, based on technical or commercial considerations, for doing so.

5) An adjustment of rights and liabilities under subrule (3) does not affect rights or liabilities that had accrued under, or in relation to, the contract before the transfer took effect.

6) The capacity trading requirements may specify in advance conditions under which consent will or will not be given, and conditions to be complied with if consent is given.

ATCO's Proposed Revisions

2402. ATCO proposed minimal revisions to the current access arrangement in relation to capacity trading requirements.[1076] The proposed changes updated the service provider's name from WAGN to ATCO Gas Australia and updated cross-references to clauses in the template haulage contract.

Draft Decision

2403. ATCO's proposed inclusion of clause 14.3(c)(iii) in the template haulage contract (discussed further below) prompted a comparison between clauses 14.2 and 14.3 of the revised proposed template haulage contract and clause 6 of the proposed revised access arrangement. The Authority found inconsistencies between the two. Specifically:

- template haulage contract clause 14.2 had a similar meaning to access arrangement clause 6.3(a), but different wording. Likewise, revised proposed template haulage contract clauses 14.3(a); 14.3(c)(i); 14.3(c)(ii); 14.3(c)(iv); and 14.3(b); had similar meanings, though different wording, to access arrangement clauses 6.3(b); 6.4(a)(i); 6.4(a)(ii); 6.4(a)(iii); 6.3(c); and 6.3(b) respectively.
- access arrangement clause 6.3(b)(ii) did not appear to have a corresponding equivalent in the template haulage contract.
- template haulage contract clause 14.3(c)(iii) did not appear to have a corresponding equivalent in the access arrangement.

2404. The Authority considered that the overlap on these matters in clause 6 of the access arrangement and clause 14 of the revised proposed template haulage contract complicated the task of interpretation.

2405. The Authority noted the requirement under rule 48(f) of the NGR that an access arrangement set out the capacity trading requirements. The Authority considered the

[1076] ATCO Gas Australia, Access Arrangement for the Mid-West and South-West Gas Distribution System, 17 March 2014, clause 6, p. 15.

requirement would be met by the inclusion of the detailed capacity trading requirements in either, rather than in both, clause 6 of the access arrangement or clause 14 of the template haulage contract. Further, the Authority concluded that it was likely to be most convenient to the parties for their haulage contract to set out any capacity trading requirements within the agreement.

2406. Accordingly, the Authority decided that clause 6.1 of the proposed revised access arrangement should be retained, but amended to explain that reference services include qualified rights for a user to transfer capacity. Further, the Authority required clauses 6.2 to 6.4 of the access arrangement to be deleted.

ATCO's Response to the Draft Decision

2407. In its response to the Draft Decision, ATCO stated that it had accepted Required Amendment 20, with some modifications. However, it deleted clauses 6.2 to 6.4 of the proposed revised access arrangement (as required) and its amendment to clause 6.1 was identical to the wording of Required Amendment 20 (subject to the terminology changes arising from Required Amendment 44).

Submissions

2408. The Authority did not receive any submissions that related to capacity trading requirements for the proposed revised access arrangement or in response to the Draft Decision.

Final Decision

2409. The Authority's concerns with respect to clause 6 of the proposed revised access arrangement have been addressed.

Extension and Expansion Requirements

Regulatory Requirements

2410. The NGR provides for extension and expansion requirements.

> 104 Extension and expansion requirements
>
> 1) Extension and expansion requirements may state whether the applicable access arrangement will apply to incremental services to be provided as a result of a particular extension to, or expansion of the capacity of, the pipeline or may allow for later resolution of that question on a basis stated in the requirements.
>
> 2) Extension and expansion requirements included in a full access arrangement must, if they provide that an applicable access arrangement is to apply to incremental services, deal with the effect of the extension or expansion on tariffs.
>
> 3) The extension and expansion requirements cannot require the service provider to provide funds for work involved in making an extension or expansion unless the service provider agrees.

2411. Extension and expansion requirements are defined under section 2 of the NGL(WA).

> 2. Extension and expansion means –
>
> a) the requirements contained in an access arrangement that, in accordance with the Rules, specify—

i) the circumstances when an extension to, or expansion of the capacity of, a covered pipeline is to be treated as forming part of the covered pipeline; and

ii) whether the pipeline services provided or to be provided by means of, or in connection with, spare capacity arising out of an extension to, or expansion of the capacity of, a covered pipeline will be subject to the applicable access arrangement applying to the pipeline services to which that arrangement applies; and

iii) whether an extension to, or expansion of the capacity of, a covered pipeline will affect a reference tariff, and if so, the effect on the reference tariff; and

b) any other requirements specified by the Rules as extension and expansion requirements; …

2412. In addition to the definitions under section 2 of the NGL(WA), the NGL(WA) also provides for extension and expansion requirements.

> 18. Certain extensions to, or expansion of the capacity of, pipelines to be taken to be part of a covered pipeline
>
> For the purposes of this Law—
>
> a) an extension to, or expansion of the capacity of, a covered pipeline must be taken to be part of the covered pipeline; and
>
> b) the pipeline as extended or expanded must be taken to be a covered pipeline, if, by operation of the extension and expansion requirements under an applicable access arrangement, the applicable access arrangement will apply to pipeline services provided by means of the covered pipeline as extended or expanded.

2413. Under rule 100 of the NGR, the extension and expansion policy must also be consistent with the National Gas Objective.

ATCO's Proposed Revisions

2414. ATCO proposed only minimal revisions to the current access arrangement in relation to extension and expansion requirements.[1077]

2415. The changes relate to updating the service provider's name from WAGN to ATCO Gas Australia, and the capitalising of the term Business Days, as this term is defined in the proposed access arrangement glossary.

2416. All expansions of the capacity of the covered GDS are to be covered under the access arrangement. Expansions would not affect reference tariffs during the access arrangement period.

2417. All extensions of medium and low pressure pipelines of the covered GDS are to be covered under the access arrangement. Such extensions would not affect reference tariffs during the access arrangement period.

[1077] ATCO Gas Australia, Access Arrangement for the Mid-West and South-West Gas Distribution System, 17 March 2014, clause 7, p. 17.

2418. ATCO will apply to the Authority in writing in relation to extensions of high pressure pipelines of the covered GDS. The Authority would then decide whether or not such extensions are to be covered under the access arrangement.

Draft Decision

2419. The Authority noted that neither the access arrangement nor the access arrangement information included definitions of what constitutes a low pressure, medium pressure or high pressure pipeline.

2420. The glossary in the access arrangement information included a definition of what constitutes a Medium Pressure/Low Pressure System but this did not distinguish between what is medium and what is low pressure; the definition groups the two together.

2421. The glossary in the access arrangement information contained a definition for a High Pressure Pipeline Extension but not what is a high pressure pipeline. The definition of a High Pressure Pipeline Extension was as follows:

> High Pressure Pipeline Extension - means for the purpose of the Template Haulage Contract an extension to <Service Provider> Covered Pipeline with a direct connection to a transmission pipeline that provides reticulated gas to a new development or an existing development not serviced with reticulated gas.

2422. Clause 7 of the Access Arrangement on Extensions and Expansion Requirements distinguishes between High Pressure Pipeline Extensions (clause 7.1) and extensions of medium and low pressure pipelines (clause 7.2).

2423. Extensions under clause 7.2 of the Access Arrangement treats medium and low pressure pipelines as part of the covered pipeline and, accordingly, they are also covered by the Access Arrangement.

2424. Under the proposal, if ATCO proposed an extension under clause 7.1 of the Access Arrangement using high pressure pipelines of the covered pipeline it must apply in writing to the Authority for a decision on whether the proposed extension will be taken to form part of the covered pipeline and will be covered by the Access Arrangement.

2425. The Authority noted that taking into account the proposed clause 7 of the Access Arrangement and the definition of a High Pressure Pipeline Extension, an extension using high pressure that does not have a direct connection to a transmission pipeline would not fall into either clause 7.1 or 7.2.

2426. Accordingly, the Authority required amendments to both the Access Arrangement and the glossary to ensure that all pipelines are adequately defined and all extensions to the different pipeline categories are captured under either clause 7.1 or 7.2 of the Access Arrangement.

2427. The Authority considered that there may be high pressure pipeline extensions, which are not directly connected to a transmission pipeline, which are of a significant size that warrant a consideration of whether these pipelines should be covered, while others may warrant automatic coverage. The Authority determined that any high pressure pipeline extensions greater than 1,000kPa and over 25km in length should also be captured by clause 7.1 of the proposed Access Arrangement.

ATCO's Response to the Draft Decision

2428. In its response to the Draft Decision, ATCO stated that it agrees that greater clarity is required on which high pressure pipelines are covered by clause 7.1, however, it proposed an alternative threshold.

2429. ATCO proposed that the definition of a High Pressure Pipeline Extension be amended to include not only an extension with a direct connection to a transmission pipeline but also extensions to the covered pipeline with a Maximum Allowable Operating Pressure of greater than 1,920kPa.

2430. ATCO stated that it has proposed a threshold of 1,920kPa as it is the threshold for the distribution system in ATCO's Distribution Licence.

2431. ATCO has proposed to rename clause 7.2 as 'Other extensions' and this will include all extensions of the Covered Network not captured in Clause 7.1, being high pressure pipeline extensions without a direct connection to a transmission pipeline or with a Maximum Allowable Operating Pressure of below 1,920kPa, medium and low pressure extensions. These extensions will automatically be treated as part of the covered network.

Submissions

2432. The Authority did not receive any submissions that related to the extension and expansion requirements of the proposed revised access arrangement or in response to the Draft Decision.

Final Decision

2433. The Authority's concerns with respect to clause 7 have been addressed by ATCO in the proposed revised access arrangement.

Changing Receipt Points and Delivery Points

Regulatory Requirements

2434. The NGR provides for changing receipt and delivery points.

> 106. Change of receipt or delivery point by user
>
> (1) An access arrangement must provide for the change or a *receipt or delivery point* in accordance with the following principles:
>
> a) a user may, with the service provider's consent, change the user's receipt or delivery point;
>
> b) the service provider must not withhold its consent unless it has reasonable grounds, based on technical or commercial considerations, for doing so.
>
> (2) The access arrangement may specify in advance conditions under which consent will or will not be given, and conditions to be complied with if consent is given.

ATCO's Proposed Revisions

2435. ATCO proposed only minimal revisions to the current access arrangement in relation to changing receipt points and delivery points.[1078]

2436. The changes related to updating the service provider's name from WAGN to ATCO Gas Australia, and updating cross-references to clauses in the Template Haulage Contract (Service Agreement).

Draft Decision

2437. The Authority considered and accepted ATCO's proposed minor revisions to the changing of receipt points and delivery points of the current access arrangements in the Draft Decision.

Submissions

2438. The Authority did not receive any submissions that related to the changing of receipt points and delivery points of the proposed revised access arrangement or in response to the Draft Decision.

Final Decision

2439. As outlined in the Draft Decision, the Authority accepts ATCO's proposed minor revisions to the changing of receipt points and delivery points for the proposed access arrangement.

[1078] ATCO Gas Australia, Access Arrangement for the Mid-West and South-West Gas Distribution System, 17 March 2014, clause 8, p. 19.

Fixed Principles

Regulatory Requirements

2440. Rule 99 of the NGR provides for an access arrangement to include fixed principles.

> 99. Fixed principles
>
> 1) A full access arrangement may include a principle declared in the access arrangement to be fixed for a stated period.
>
> 2) A principle may be fixed for a period extending over 2 or more access arrangement periods.
>
> 3) A fixed principle approved before the commencement of these rules, or approved by the [ERA] under these rules, is binding on the [ERA] and the service provider for the period for which the principle is fixed.
>
> 4) However:
>
> a) the [ERA] may vary or revoke a fixed principle at any time with the service provider's consent; and
>
> b) if a rule is inconsistent with a fixed principle, the rule operates to the exclusion of the fixed principle.

ATCO's Proposed Revisions

2441. ATCO Initially proposed to have four Fixed Principles in its access arrangement – 11.1, 11.2, 11.3 and 11.4. ATCO proposed to retain Fixed Principle 11.1 (previously 11(a)), which is due to expire on 25 August 2015 for a further ten years. ATCO proposed to maintain Fixed Principle 11.2 (previously 11(b)), which is due to expire on 1 January 2021 and has added a new fixed principle to Fixed Principle 11.2. ATCO has added two new fixed principles 11.3 and 11.4.[1079]

2442. Fixed Principle 11.1 of ATCO's proposed access arrangement sets out the fixed principles approved by the Authority on 25 August 2005 for a period of 10 years. ATCO has proposed to retain the following Fixed Principles for a further 10 years:

> (a) the financing structure (being a 60/40 debt/equity ratio) that has been assumed for the purposes of determining the Rate of Return for the ATCO GDS;
>
> (b) the straight-line method of depreciation for each group of assets referred to in part 9; and
>
> (c) that FRC costs that are incurred, or are expected to be incurred, in the delivery of Reference Services are included as a component of Operating Expenditure;
>
> (d) the inclusion of:
>
> (i) Higher Heating Value (**HHV**) Costs that are Conforming Capital Expenditure in the Opening Capital Base for the ATCO GDS at the Revision Commencement Date; and

[1079] ATCO Gas Australia, Access Arrangement Information for the Mid-West and South-West Gas Distribution System, 17 March 2014, p. 296.

(ii) in Total Revenue HHV Costs that are Operating Expenditure for the Next Access Arrangement Period in respect of the ATCO GDS,

in respect of which Reference Tariffs have been varied as a Cost Pass Through Event.

2443. Fixed Principle 11.2 of ATCO's proposed access arrangement sets out the fixed principles approved by the Authority for a period of 10 years commencing on 1 January 2011. ATCO did not address Fixed Principle 11.2 in its access arrangement information or supporting information. ATCO has added a new Fixed Principle 11.2 (a) in its access arrangement. ATCO has not provided any reasoning for adding this new fixed principle. Fixed Principle 11.2 contains the following:

a. the Cost Pass Through Events and variation mechanism set out in clause 3 of Annexure B;

b. the inclusion of:

(i) Physical Gate Point Costs that constitute Conforming Capital Expenditure in the Opening Capital Base for the ATCO GDS for the Next Access Arrangement Period; and

(ii) Physical Gate Point Costs that constitute Conforming Operating Expenditure in Total Revenue for the Next Access Arrangement Period in respect of the ATCO GDS,

in respect of which Reference Tariffs have been varied as a Cost Pass Through Event.

2444. Fixed Principle 11.3 of ATCO's proposed revised access arrangement sets out a new fixed principle for the calculation of depreciation from 1 July 2015 until 1 January 2030 under ATCO's proposed transition from Current Cost Accounting (**CCA**) to Historical Cost Accounting (**HCA**).

2445. Fixed Principle 11.4 of ATCO's proposed revised access arrangement sets out a new fixed principle for the application of revenue over/under recovery under ATCO's proposed revenue yield price control for B2 and B3 tariff class customers in the fifth access arrangement period.

Draft Decision

2446. The Authority considered ATCO's proposed amendments to its fixed principles in its Draft Decision. The Authority accepted ATCO's proposal to retain Fixed Principles 11.1 (b) and (d) until 25 August 2025. The Authority accepted ATCO's proposal that the fixed principles relating to straight-line depreciation and HHV costs remain relevant and provide stability for the business and customers across regulatory periods.

2447. The Authority did not accept ATCO's proposal to retain Fixed Principles 11.1 (a) and (c) until 25 August 2025. The Authority considered that the financing structure in Fixed Principle 11.1 (a) and Full Retail Contestability costs in Fixed Principle 11.1 (c) are no longer relevant.

2448. The Authority did not accept ATCO's proposal to add a new fixed principle to Fixed Principle 11.2. The Authority considered that Fixed Principle 11.2 should remain as it was approved in the current access arrangement and not include a new fixed principle for cost pass through events and the reference tariff variation mechanism.

2449. The Authority did not accept ATCO's proposed Fixed Principle 11.3 for the transition of Depreciation over two access arrangements. As the Authority did not accept ATCO's proposed approach to transition depreciation from CCA to HCA in its Draft Decision the Authority did not accept ATCO's proposed Fixed Principle 11.3.[1080]

2450. The Authority did not accept ATCO's proposed Fixed Principle 11.4, which allows ATCO to recover revenue associated with the revenue yield price control for B2 and B3 customers from the fourth access arrangement period in the fifth access arrangement period. As the Authority did not accept ATCO's proposed revenue yield price control for B2 and B3 customers in its Draft Decision the Authority did not accept Fixed Principle 11.4.[1081]

2451. The Authority required ATCO to include an additional fixed principle to its access arrangement as a result of its proposed change to the methodology for calculating the return on debt. The fixed principle would bind the Authority and ATCO to apply an adjustment to the debt risk premium set for the fifth access arrangement period. This adjustment would account for any differences between the regulatory debt risk premium set at the start of the fourth access arrangement period and the annually updated debt risk premia that applies in each of the second to fifth years of the fourth access arrangement period. The approach to make this adjustment is set out in Appendix 7 of the Draft Decision.[1082]

ATCO's Response to the Draft Decision

2452. ATCO has implemented the Authority's required amendment 22 in part, with some modifications. ATCO:

- accepts the Authority's requirement not to retain Fixed Principles 11.1(a) and 11.1(c);
- has not addressed the Authority's required amendment to Fixed Principle 11.2 (a);
- does not accept the Authority's decision not to accept Fixed Principle 11.3, which allows ATCO to transition its proposed change in depreciation method over two access arrangement periods;
- does not accept the Authority's decision not to accept Fixed Principle 11.4, which allows ATCO to recover the revenue impact of its proposed revenue yield price control for B2 and B3 customers;
- has not included the Authority's required fixed principle which will account for the difference between the forecast and the actual debt risk premium;
- proposed two new fixed principles to determine the methodology for calculating the cost of debt in the fifth access arrangement period.

1080 Economic Regulation Authority, Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 14 October 2014, p. 234.

1081 Economic Regulation Authority, Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 14 October 2014, pp. 282-284.

1082 Economic Regulation Authority, Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 14 October 2014, pp. 420-423.

2453. ATCO has not removed Fixed Principle 11.2(a) from its proposed revised access arrangement. ATCO has not addressed Fixed Principle 11.2 in its access arrangement information or supporting information.

2454. ATCO maintains that Fixed Principle 11.3 is still required and has therefore not been removed. ATCO has resubmitted its transition method to depreciation so that the change in methodology occurs over more than one access arrangement period. ATCO maintains its view that the preferred depreciation methodology is to apply straight line depreciation in nominal terms to the historic cost of the asset (the HCA approach).

2455. ATCO maintains that Fixed Principle 11.4 should be included in the revised access arrangement. ATCO has resubmitted the revenue yield price control. ATCO states that it has provided further evidence to support its implementation in its response to required amendment 16 (Haulage Tariff Variation Mechanism) in Chapter 14.[1083]

2456. ATCO has not accepted the inclusion of the Authority's fixed principle for calculating the return of debt and proposes its own two new fixed principles to apply to the next access arrangement. ATCO considers that the Authority's annual update does not reflect the efficient debt management strategy of a benchmark efficient entity. ATCO submits that it is necessary for the cost of debt to be based on a well-defined debt management strategy for a benchmark efficient firm and ATCO's proposed hybrid approach reflects such a strategy. ATCO states that this strategy will determine the starting point for the benchmark efficient debt management strategy to be implemented in the next access arrangement period starting in January 2020. In determining the cost of debt methodology to be used in the fifth access arrangement period, it will be necessary to have regard to the methodology used in the current access arranging period. For this reason, ATCO's two new fixed principles are as follows:

> 11.5 Debt Risk Premium Fixed Principle
>
> The following principles are declared as fixed principles for the Next Access Arrangement Period commencing on or about 1 January 2020.
>
> Where the return on debt for the Next Access Arrangement Period (commencing on or about 1 January 2020) is estimated using a methodology that is the same as that used in the Current Access Arrangement Period (commencing 1 July 2014) the provisions of this Access Arrangement that implement that methodology will continue into the Next Access Arrangement Period.
>
> Where the return on debt for the Next Access Arrangement Period is estimated using a methodology that is different from that used in the Current Access Arrangement Period, the adoption of the methodology for the Next Access Arrangement Period shall have regard to the application and effect of the methodology in the Current Access Arrangement Period.

Submissions

2457. The Authority has not received any submissions in relation to ATCO's proposed Fixed Principles in ATCO's initial proposal, the Authority's Draft Decision or ATCO's revised proposal. Public submissions in relation to the subjects referred to in the fixed principles are discussed under the appropriate chapters.

[1083] ATCO Gas Australia, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, pp. 249-253.

Considerations of the Authority

2458. The Authority has assessed ATCO's proposed revised modifications to its fixed principles in section 11 of its access arrangement.

2459. ATCO has not removed Fixed Principle 11.2 (a) from its revised access arrangement, as required by the Authority in its Draft Decision. ATCO has not provided any reasoning for the addition of Fixed Principle 11.2(a) to an existing fixed principle in its access arrangement information or supporting information. The Authority notes that it rejected the same proposal by WAGN in the third access arrangement review, which WAGN accepted.[1084]

2460. The Authority maintains its view from the Draft Decision that ATCO should remove Fixed Principle 11.2(a) from its revised access arrangement and Fixed Principle 11.2 should remain as approved by the Authority in the third access arrangement. The Authority maintains its view from the third access arrangement that cost pass through events and the reference tariff variation mechanism should not be fixed over more than one access arrangement period as this would not be consistent with the NGO particularly, the promotion of efficient investment in natural gas services. The Authority considers that ATCO has not provided any new evidence as to why it considers that cost pass through events and the reference tariff variation mechanism should now be added to an existing Fixed Principle.

2461. The Authority does not accept ATCO's proposed Fixed Principle 11.3 for the transition of Depreciation over two access arrangements. As stated in paragraphs 2074 to 2076 in this Final Decision, the Authority does not accept ATCO's proposed approach to transition depreciation from CCA to HCA over two access arrangements. Therefore, the Authority does not accept ATCO's proposed Fixed Principle 11.3.

2462. The Authority did not accept ATCO's proposed Fixed Principle 11.4, which allows ATCO to recover revenue associated with the revenue yield price control for B2 and B3 customers from the fourth access arrangement period in the fifth access arrangement period. As stated in paragraphs 2323 to 2337 the Authority does not accept ATCO's proposed revenue yield price control for B2 and B3 customers in this Final Decision. Therefore, the Authority does not accept ATCO's proposed Fixed Principle 11.4.

2463. The Authority considers that it is no longer necessary to have a fixed principle for estimating the cost of debt. For this Final Decision, the Authority has determined to adopt a hybrid trailing average approach, annually updated, for estimating the return on debt for the fourth access arrangement period as discussed in paragraphs 1519 to 1533. The Authority requires ATCO to annually update the value of the debt risk premium using the tariff variation formula set out in Haulage Tariff Variation Mechanism section of this Final Decision. In the Draft Decision, the tariff variation formula did not make this adjustment. Instead, this adjustment was to be made at the start of the fifth access arrangement period, which required the insertion of a fixed principle. The Authority considers that this fixed principle is no longer required.

2464. The Authority does not accept ATCO's proposed Fixed Principle 11.5 which provides that it is necessary to have regard to the methodology used in the current access arrangement period when estimating the return on debt for the next access

[1084] WA Gas Networks Pty Ltd, Draft Decision on WA Gas Networks Revisions Proposal for the access arrangement for the Mid-West and South-West Gas Distribution Systems, 2010, p. 210.

arrangement period. The Authority considers that rule 87(11)(d) of the NGR adequately covers this requirement.

2465. In response to the Authority's consultation notice on 21 August 2015, ATCO identified an issue with it not recovering costs associated with a cost pass-through event between November 2018 and December 2019 due to a proposed change to the haulage reference tariff variation formula to incorporate approved cost pass-through amounts. The Authority incorporated cost pass-through events in the tariff variation mechanism following ATCO's notification of its omission to request an allowance for taxation on cost pass-throughs in the Access Arrangement. The Authority's consideration of the tariff variation mechanism is described in the Haulage Tariff Variation Mechanism section of this Final Decision.

2466. Given the Authority has decided to include the recovery of cost pass-through events in the tariff variation mechanism and that the last variation is on 1 January 2019, the Authority considers it reasonable that ATCO be able to recover applicable cost pass-through events for the period 1 November 2018 (approximately the date when ATCO must submit its 1 January 2019 tariff variation) and the conclusion of the access arrangement period 31 December 2019. The Authority considers that this should be dealt with in the next access arrangement review and has incorporated a Fixed Principle 11.3. The Authority will also allow a time value for money adjustment to Conforming Operating Expenditure to ensure that ATCO is not disadvantaged for the delay in recovering Conforming Operating Expenditure.

Required Amendment 17

Fixed Principles 11.2(a), 11.3, 11.4 and 11.5 must be removed from the proposed revised access arrangement.

A new Fixed Principle 11.3 to be added to the proposed revised access arrangement as follows:

11.3 The following principle expires at the end of the next access arrangement:

(i) The inclusion of additional conforming expenditure associated with a Cost Pass-Through Event for the period 1 November 2018 to 31 December 2019. The expenditure must meet the requirements of clause 2 of Annexure B of this current access arrangement;

(ii) In compliance with clause 11.3(i), AGA must provide a report to the ERA on the cost pass-through, and that report shall contain the following information:

- a statement of reasons for the variation of the Reference Tariff as a result of the Cost Pass Through Event;
- supporting calculations demonstrating consistency with the requirements of clause 2 of Annexure B;
- supporting information substantiating the amount and nature of the costs proposed to be passed through by the varied Reference Tariff; and
- the date or dates on which it is proposed by ATCO Gas Australia that the varied Reference Tariff shall come into effect.

The ERA will consider ATCO Gas Australia's application for Cost Pass-Through Events during this period in its review of the next access arrangement. ERA may require ATCO Gas Australia to provide further substantiation of the amounts and the nature of the costs that ATCO Gas Australia proposes to be passed through by the varied Reference Tariffs and requiring ATCO Gas Australia to provide that further substantiation by a date specified in the ERA's request. The ERA will advise if it approves or does not approve the cost pass-throughs detailed in ATCO Gas Australia's report and provide reasons for its decision. ATCO Gas Australia may account for the timing difference between incurring Conforming Operating Expenditure and the start date for the tariff variation, through a time value of money adjustment.

Other Terms and Conditions

2467. ATCO's access arrangement contains other terms and conditions which are included as annexures to the access arrangement. These terms and conditions are detailed in the System Pressure Protection Plan and Template Haulage Contract discussed below.

System Pressure Protection Plan

2468. The System Pressure Protection Plan outlines the manner in which prospective users will ensure that they do not jeopardise system pressure by not supplying enough gas at receipt points on a sub-network whilst simultaneously being unable to reduce the delivery of gas it takes at its delivery points.

Regulatory Requirements

2469. The NGR require an access arrangement proposal to detail the terms and conditions for each reference service.

> 48. Requirements for full access arrangement (and full access arrangement proposal)
>
> 1) A full access arrangement must:
>
> 2) …
>
> d) specify for each reference service:
>
> i) the reference tariff; and
>
> ii) the other terms and conditions on which the reference service will be provided; and
>
> 3) …

ATCO's Proposed Revisions

2470. ATCO did not propose any material changes to the System Pressure Protection Plan from the current access arrangement.

Draft Decision

2471. The Authority noted that ATCO did not propose any material changes to the approved System Pressure Protection Plan, and that it received no submissions in relation to it during the public consultation for the proposed revised access arrangement.

2472. The Authority assessed ATCO's System Pressure Protection Plan and decided to approve the Plan as submitted.

Submissions

2473. The Authority has not received submissions in relation to ATCO's system pressure protection plan in the proposed access arrangement.

Final Decision

2474. As the Authority received no further amendments from ATCO to the System Pressure Protection Plan and no submissions in response to the Draft Decision on the Plan, the Authority has, as outlined in the Draft Decision, approved ATCO's System Pressure Protection Plan as submitted.

Template Haulage Contract [Template Service Agreement]

Regulatory Requirements

2475. As noted in paragraph 2469, the NGR require an access arrangement proposal to detail the terms and conditions for each reference service.

2476. As per rule 100 of the NGR, the Authority must be satisfied that any proposed amendments to reference service terms and conditions are consistent with the NGO.

ATCO's Proposed Revisions

2477. ATCO initially proposed an amended template haulage contract with a large number of amendments, including additional or deleted provisions. ATCO has proposed further modifications to this document since the Draft Decision, however, the document is now referred to as the 'template service agreement'. The renaming of the document was required by the Authority in its Draft Decision and accepted by ATCO in its response. Both the initial proposed revisions and the revisions proposed in response to the Draft Decision will be addressed issue by issue, below.

Considerations of the Authority

2478. The Authority has reviewed the template service agreement, including ATCO's proposed revisions, and identified terms and conditions that fall into the following four categories:

- Amended provisions to improve clarity while leaving the substance of the document unchanged;
- Amended provisions that change the substantive meaning of the document in ways that do not raise concerns for the Authority, and that have not been raised in stakeholder submissions;
- Amended provisions that change the substantive meaning of the document, and that raise concerns for the Authority or that have been raised in a stakeholder submission; and
- Existing provisions that the Authority has determined to be inconsistent with the NGO.

2479. In its Draft Decision, the Authority approved ATCO's proposed amendments that fall under the first two categories above.

2480. In the following sections of this Final Decision, the Authority sets out its consideration of issues arising from the last two categories of provisions in ATCO's revised proposed template service agreement.

General Remarks

2481. In the Draft Decision, the Authority made general remarks to explain its approach.

Commercial matters

2482. In its Draft Decision, the Authority clarified its position on new terms to govern the fine detail of interactions between the parties – terms that might go beyond the core requirements of a contract for access to the GDS. The Authority explained that it

would approach such terms with a view to balancing the desire to facilitate quicker access through greater prescription with the desire to avoid unforeseen effects by leaving terms for negotiation.

2483. The Authority noted that it previously rejected some of the proposed amendments put to it during this current review as concerning commercial matters. Further, in some cases, and with the benefit of new information, the Authority has arrived at a different conclusion about how to strike the balance between the competing goals of expediting access and avoiding unforeseen effects.

2484. The Authority's approach in this Final Decision continues to seek to strike a balance between the competing goals of expediting access and avoiding unforeseen adverse effects.

Status quo

2485. At paragraphs 1319 to 1322 of the Draft Decision, the Authority acknowledged that it attached some weight to the status quo and explained why it did so. The Authority explained that it sought to minimise the scope for unforeseen effects, which it considered were more likely to arise from a change to the status quo than from maintaining it.

2486. In this Final Decision, the Authority continues to attach some weight to the status quo.

Overlapping or duplicate provisions

2487. At paragraphs 1323 to 1325 of the Draft Decision, the Authority explained its approach to provisions that overlap with, or potentially duplicate, other provisions of the access arrangement or other instruments governing the conduct of the parties. The Authority noted its general preference to minimise overlap and duplication to allow rights and obligations to be interpreted as simply and unambiguously as possible. However, the Authority stated that it recognised that there may be instances where it is justified to allow overlap or duplication. For instance, the Authority suggested that it might allow provisions to overlap or duplicate other provisions in a case where the service provider requires a particularly high level of protection against a particular risk and the Authority is satisfied that the scope for inconsistency or conflict is minimal.

2488. In this Final Decision, the Authority retains its general preference to minimise overlap and duplication. However, the Authority has moderated its position on some provisions that it had determined overlapped with other provisions, in the light of further information and explanation from ATCO.

Alignment between individual contracts and the access arrangement

2489. At paragraphs 1341 to 1344 of the Draft Decision, the Authority revisited questions raised in the third access arrangement review concerning the nature of individual service agreements governing access to regulated services. The Authority addressed its previous position on these matters and set out the basis for an adjusted position for the purposes of the current review. The Authority's adjusted position is described below.

2490. There is an important difference between the terms and conditions for reference services defined by the access arrangement (of which the template service agreement forms a part) and an executed bilateral agreement. The template service

agreement is effectively a regulated standing offer, which provides a basis on which users can negotiate a contract. This standing offer is necessarily subject to amendments approved by the Authority and the requirement to offer it does not survive the expiry of the access arrangement. The bilateral agreement arises when the user either accepts the standing offer or a negotiated modified offer. Thereafter, the bilateral agreement retains a connection to the access arrangement only to the extent provided in that contract.

2491. The Authority notes that the meaning and status of the term "reference services" has been a source of some confusion and disagreement in the process of setting the template service agreement. If a service agreement is not amended to maintain consistency with the access arrangement, then the services defined in that agreement could become inconsistent with the reference services defined in the access arrangement. Indeed, one might argue that if there is any substantive difference between an individual service agreement and the template service agreement, then services provided for in the individual agreement should be classified as non-reference services.

2492. The Authority does not have a settled view on where the threshold lies between reference and non-reference services. However, the Authority does not consider that this question is likely to have much bearing on how the parties approach their negotiation of an individual service agreement. In that negotiation, the parties should be focussed on defining the terms of service most appropriate in the circumstances. The question of whether or not the resulting services can continue to be considered "reference services" is secondary to this objective.

2493. Setting aside the question of where the threshold between reference and non-reference services lies, the Authority considers that the template service agreement must provide the basis for a notional user to acquire services exclusively on the terms currently defined in the access arrangement. The template service agreement should be drafted with this notional user in mind, even though the service provider and the Authority may expect users to negotiate on different terms in their individual service agreements.

2494. These considerations have informed the Authority's views for this Final Decision when assessing the suitability of the template service agreement.

Conditions precedent

Clauses which commence upon execution

2495. In its initial proposal, ATCO expanded the list of clauses to be excluded from the general principle created by clause 1(a) of the template service agreement that the contract "has no force or effect until each and all of the…conditions precedent…are satisfied or waived". The additional excluded clauses were:

- Clause 15, concerning Default and Termination;
- Clause 16, concerning Security and Insurance;
- Clause 17, concerning Liability of Parties;
- Clause 18, concerning Representations and Warranties;
- Clause 19, concerning Dispute Resolution; and
- Clause 20, concerning Notices and Addresses for Notices.

2496. In its Draft Decision, the Authority disallowed most of the proposed amendments to clause 1(a). For most of the excluded terms, ATCO had not identified reasons why, prior to the satisfaction of the conditions precedent, the excluded clauses should be regarded as in-force contractual terms that come into force upon execution of the contract, while the remaining provisions were dependent upon the conditions precedent being met. The one exception was that the Authority recognised that disputes may arise in the interpretation of whether conditions precedent have been met and, in such an instance, one or both parties might reasonably seek to rely on the dispute resolution process under clause 19.

2497. Accordingly, the Authority required the deletion of references in clause 1(a) to clauses 15, 17, 18, and 20 (Required Amendment 23 of the Draft Decision).

2498. In its response to the Draft Decision, ATCO did not accept the requirement to delete from clause 1(a) the references to clauses 15, 17, 18, and 20. ATCO gave reasons in each case as follows.

- ATCO argued that clauses 15 and 17 should become operative from execution because "it is possible a party may be in default of an obligation that applies from execution but prior to satisfaction of a condition precedent" and gave the obligation to provide security (clause 16) and privacy and confidentiality obligations as examples.
- ATCO argued that clause 18 should become operative from execution because representations and warranties are fundamental to the assessment and allocation of risk in the formation of a contract. Further, ATCO submitted that the warranties needed to be "capable of being given as condition precedent".[1085]
- ATCO argued that clause 20 should become operative from execution because certain clauses of the contract in force from the date of execution and prior to satisfaction of conditions precedent include notice provisions or requirements for certain matters to be communicated. Since clause 20 specifies the requirements for such notices and communications, ATCO reasoned that giving it immediate effect would provide certainty for the benefit of both parties.

2499. The Authority has not received public submissions in relation to clause 1 of the revised proposed template service agreement.

2500. In respect of clauses 15 and 17, the Authority has not been satisfied that, prior to the commencement of the contract proper, the parties would normally require access to the remedies that arise from clause 15 and that may allow recovery of damages defined in clause 17.

2501. The Authority notes that the provision of security (satisfying clause 16.2) is already a condition precedent in the template service agreement (see clause 1(a)(iv)). This illustrates what the Authority considers to be the better approach to managing the risks for the parties during the contract initiation phase of their relationship. That is, the parties should specify the things they require to be in place before they are to be considered bound to the rights and obligations defined under the contract.

[1085] ATCO Gas Australia Pty Ltd, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 267.

2502. As a result, the Authority has decided to reject ATCO's proposed amendment to exclude clauses 15 and 17 from the operation of clause 1(a).

2503. The Authority regards the arguments for and against allowing clause 18 to operate from the date of execution as being finely balanced. ATCO clearly sees the representations and warranties in clause 18 as conditions precedent to the commencement of the contract. The Authority considers that a valid alternative approach is to require conditions precedent to be spelt out in clause 1. While the second approach would be somewhat clearer, the Authority recognises the substantive equivalence of these two approaches. In the absence of stakeholder objections, the Authority has decided to allow ATCO's proposed amendment to exclude clause 18 from the operation of clause 1(a).

2504. With regards to clause 20, the Authority is satisfied by ATCO's arguments regarding the usefulness of having defined notice requirements that operate upon execution of the contract. The Authority has decided to allow ATCO's proposed amendment to exclude clause 20 from the operation of clause 1(a).

Service provider's minimum prudential and financial requirements

2505. In its submission in response to the Draft Decision, Kleenheat suggested that clause 1(a)(iii)(B) should be amended to read "acting reasonably" after "minimum prudential and financial requirements specified by Service Provider".[1086] This represents a new issue that was not considered in the Draft Decision.

2506. The Authority notes that the preamble to subparagraph (B) reads "demonstrates, to <Service Provider>'s reasonable satisfaction, that:" before listing the requirement to meet the service provider's prudential and financial requirements. The preamble introduces the requirement for the service provider to be reasonable in evaluating whether the condition has been met. The Authority recognises that this is a separate matter to the question of whether the condition was reasonable to begin with.

2507. The Authority accepts subparagraph (B) could be improved by making it subject to a requirement that the prudential and financial bar set by the service provider is itself reasonable. The wording proposed by Kleenheat appears to be well suited to that purpose.

2508. Accordingly, the Authority requires that clause 1(a)(iii)(B) be amended by inserting the words "acting reasonably" after "minimum prudential and financial requirements specified by Service Provider".

Ability to deliver gas for the duration of the contract

2509. In its initial proposal, ATCO expanded an existing condition precedent described in clause 1(a)(iii)(D), such that the user would be required to demonstrate that it will remain able to deliver the gas for the duration of the contract.

2510. In its Draft Decision, the Authority noted that it had previously considered and rejected an identical amendment to that proposed by ATCO in clause 1(a)(iii)(D). The

[1086] Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat Gas Submission on the Draft Decision and Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution System Access Arrangement, 12 January 2015, p. 2.

Authority had previously rejected such an amendment because of the difficulty associated with the user predicting its long term ability to maintain compliance.

2511. In its response to the Draft Decision, ATCO agreed to remove the phrase "and will for the duration of this Haulage Contract [Service Agreement] remain," from clause 1(a)(iii)(D). For the sake of consistency, ATCO also made the same amendment to clause 1(a)(iii)(A) and deleted clause 18.1(a). However, ATCO sought to retain essentially the same level of protection as would previously have been afforded by those clauses, by including clause 3(b), which stipulates that:

> "<User> is and will at all times:
>
> (i) remain a member of and a "user" for the purposes of the Retail Market Scheme;
>
> (ii) comply with the Retail Market Scheme; and
>
> (iii) ensure that it remains able to, deliver Gas to the Receipt Point or Receipt Points on the relevant Sub-network or Sub-networks from which <User> is to receive Gas at one or more Delivery Points under this Haulage Contract [Service Agreement], in volumes sufficient to meet <User>'s Gas receipt requirements at each Delivery Point."[1087]

2512. ATCO stated that clause 1(a)(iii)(D) relates to certain User obligations under the REMCo Rules and noted that the user obligations under the REMCo rules must be met at all times that the User is operating in the Network. On that basis, ATCO claimed that it was consistent with the NGO to require the User to meet those obligations at all times.

2513. The Authority has not received public submissions in relation to clause 1(a)(iii)(D). However, during the third access arrangement review process, Alinta made a submission to the Authority on an amendment proposed by WAGN, which appears to be identical to ATCO's proposed amendment in clause 1(a)(iii)(D). Paragraph 1232 of the Authority's Draft Decision in that review noted that:

> "Alinta submitted that the condition set out in clause 1.1(a)(ii)(E) should relate only to the status of the user's ability to deliver gas at the time for the satisfaction of the condition only and not for the duration of the haulage contract [service agreement]. The demonstration of future compliance is 'so difficult as to be misconceived'."[1088]

2514. The Authority accepts that any User will need to ensure that it can supply gas to cover the requirements of its customers. The Authority is also more comfortable with framing this as a continuing obligation of the user as a party to the contract, rather than as a condition precedent to the commencement of that contract. Accordingly, the Authority accepts ATCO's amended clause 1(a)(iii)(D) and accepts the additional amendments discussed above regarding continuing compliance.

Obligation to notify

2515. In its initial proposal, in clause 1(d), ATCO excluded several conditions precedent from its obligation to notify the user of the satisfaction of each condition. Among these was clause 1(a)(iv), which requires the user to have given valid security to ATCO in accordance with clause 16.2.

[1087] ATCO Gas Australia Pty Ltd, *Annexure F: Template Service Agreement*, 27 November 2014, p. 4.

[1088] Alinta Pty Ltd, WA Gas Networks – October 2010 Revised Access Arrangement for the Mid-West and South-West Gas Distribution Systems, 5 November 2010, p. 29.

2516. In its Draft Decision, the Authority required ATCO to remove its exclusion of clause 1(a)(iv) on the grounds that it was appropriate for ATCO to have an obligation to notify the user that the condition precedent established by clause 1(a)(iv) had been met. By removing the reference in clause 1(d) to clause 1(a)(iv), ATCO would be obligated to notify the user that the security provided by the user was judged by ATCO to satisfy clause 16.2.

2517. In its response to the Draft Decision, ATCO accepted that part of Required Amendment 23 relating to clause 1(d).

2518. The Authority has not received public submissions in relation to clause 1(d).

2519. The Authority's concerns with respect to clause 1(d) have been addressed.

Unintentionally deleted subparagraphs

2520. In its response to the Draft Decision, ATCO presented two versions of the revised proposed template service agreement, one with amendments marked and the other clean. In the clean version, clause 1(a)(iii) contains only subparagraphs (C), (D) and (E), whereas in the marked-up version, subparagraphs (A) and (B) are also present, although with the numbering deleted. The result of the numbering being deleted is that the text of subparagraphs (A) and (B) has been compressed into subparagraph (C), which makes subparagraph (C) incomprehensible.

2521. The Authority considers that the reformatting of clause 1(a)(iii) noted above was a simple typographical error, which must be corrected. The Authority requires that subparagraphs (A) and (B) of clause 1(a)(iii) be reinstated and the associated text removed from subparagraph (C).

2522. The Authority also notes another typographical error in subparagraph (A): the word "Plan" should appear at the end of the phrase "…with the Approved System Pressure Protection".

Required Amendment 18

Clause 1 of the revised proposed template service agreement should be amended as follows:

(a) Other than this clause 1 and clauses ~~15,~~ 16, ~~17,~~ 18, 19, 20, 21, 22 and 23 this Service Agreement has no force or effect until…

…

(iii) <User> demonstrates, to <Service Provider>'s reasonable satisfaction, that:

(A) <User> is able to comply with the Approved System Pressure Protection Plan;

(B) <User>'s prudential and financial standing meets the minimum prudential and financial requirements specified by <Service Provider>, acting reasonably;

(C) ~~<User> is able to comply with the Approved System Pressure Protection<User>'s prudential and financial standing meets the minimum prudential and financial~~

~~requirements specified by <Service Provider>~~ <User> has obtained the insurances required under clause 16.3;

Right of termination on expiry or revision of access arrangement

User's right of termination on expiry or revision of access arrangement

2523. In its initial proposal ATCO sought to delete clause 2(c)(i) of the current template service agreement, which provides that the template haulage contract will end when the Access Arrangement expires or is revised and the user does not agree to continue on the basis of different terms and conditions flowing from an access arrangement revision. In its place, ATCO proposed clause 13.5(a), under which, if the access arrangement expired or was revised, the user would have the right to terminate if it did not agree to a revised service agreement as proposed by the service provider under a change notice.

2524. In its Draft Decision, the Authority determined that the template service agreement must grant the user the right to terminate on revision or expiry of the access arrangement and, as such, that clause 13.5(a) was a necessary replacement for deleted clause 2(c)(i). The Authority based this conclusion on the following line of reasoning.

- The template service agreement must provide for a notional user to be able to access services on entirely regulated terms and conditions;
- However, the access arrangement is subject to periodic revision so an individual service agreement could become inconsistent with the regulated terms and conditions provided in the access arrangement.
- The notional user would therefore require either the right to terminate upon revision to the access arrangement (and then reapply for access) or a provision requiring ongoing amendment of the service agreement to maintain consistency.
- The Authority did not favour drafting the template service agreement to require ongoing amendment and hence the termination right was taken to be the best option.

2525. The Authority indicated that, in many cases, it would expect the parties to negotiate the removal of clause 13.5(a) and enter into long-term service agreements that both parties could be confident of extending beyond a single access arrangement period. The Authority explained that clause 13.5(a) could be used as a starting point for that negotiation, in but is intended to provide for the requirements of the notional user seeking access exclusively on regulated terms and conditions.

2526. The Authority noted that no equivalent argument existed in favour of a right for the Service Provider to terminate on revision of the access arrangement. In the case of access arrangement revisions, the service provider would retain an ongoing obligation to provide access. The Authority noted that if the service provider elected to terminate a service agreement, this would simply see the user making a fresh application for access.

2527. The Authority expressed the view that the proposed clause 13.5(a) appeared to have much the same meaning and effect as current clause 2(c)(i) and it accepted both the deletion of clause 2(c)(i) and the insertion of clause 13.5(a).

2528. In its response to the Draft Decision ATCO confirmed that clause 13.5(a) included "what is in clause 2(c)(i) of the current template haulage contract [service agreement]".[1089] However, ATCO also pointed out that clause 13.5(a) incorporates the Change Notice provisions from proposed clause 13.2, which the ERA had, in Required Amendment 25, instructed ATCO to remove.

2529. No public submissions were received in relation to the deletion of clause 2(c)(i) of the current template haulage contract, or proposed clause 13.5(a).

2530. The Authority now recognises that clause 13.5(a) cannot remain as currently drafted, if clause 13.2 is to be deleted (as the Authority has continued to require). Accordingly, the Authority requires the clause to be amended in accordance with Required Amendment 19, such that it no longer relies on the change notice process described in clause 13.2.

2531. The Authority also notes that it has decided to include an automatic amendment provision in Required Amendment 19 that ensures the default position is that the service agreement remains aligned with the access arrangement. The inclusion of this provision raises the question – does the notional user still require a termination right in the event of revisions to the access arrangement? Such a right would no longer appear to be justified on the basis of the Authority's original reasoning (as summarised at paragraph 2524).

2532. Despite the fact that the Authority no longer sees clause 13.5(a) as being required to ensure the user's default right of access to regulated terms and conditions, it still considers the clause to be necessary. In the absence of a termination clause of this type, it appears that the template service agreement would result in a perpetual contract. Many types of contracts are without an explicitly defined end date. For instance, periodic leases often take this form. However, such contracts tend to impliedly expire and renew in such a manner as to periodically afford the parties the ability to exit the contract without attracting breach of contract liabilities.

2533. The Authority considers that a user's right of access could be compromised if its default option (absent further negotiation) was a service agreement that would persist in perpetuity. The Authority considers it likely that users may require a more limited commitment and the current termination right for the user defined by clause 2(c)(i) serves that end. With clause 13.5(a) amended as set out in Required Amendment 19 the term of the contract need be no longer than the access arrangement period, if the user wishes.

2534. Noting its views in relation to the service provider's rights of termination as discussed below, the Authority considers that the circumstances in which the user has the right to terminate should be broadened to include the termination of the access arrangement. This amendment is included in Required Amendment 19.

Required Amendment 19

Clause 13.5(a) of the revised proposed template service agreement should be amended as follows:

[1089] ATCO Gas Australia Pty Ltd, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 268.

If the Access Arrangement terminates or expires or is revised under the Access Laws ~~and <User> does not agree to continue this Service Agreement on the basis of the Service Agreement being varied to incorporate the changes set out in the <Service Provider>'s Change Notice~~, <User> may terminate this Service Agreement by giving 20 Business Days' written notice to <Service Provider>, without further liability for either Party (except as regards to rights and obligations (if any) that have already accrued prior to termination and are (expressly or by implication) to survive termination).

Service provider's right of termination on expiry or termination of access arrangement

2535. In its initial proposal, ATCO sought to insert clause 13.5(b), which provided that, if the access arrangement expired or was terminated without making provision for how the service agreement would terminate, the service provider would have the right to terminate the service agreement.

2536. The Authority did not see the need for a default termination right for the service provider in the case of access arrangement expiry. The Authority pointed out that a long dated contract would be likely to require extensive negotiation by the parties in any event. Furthermore, the Authority considered that in the case of a contract covering only a single access arrangement period, the commercial risks arising from the remote possibility of mid-period expiry did not appear sufficient to warrant a general right to terminate. For these reasons, the Authority required that clause 13.5(b) be deleted.

2537. In its response to the Draft Decision, ATCO did not agree to delete clause 13.5(b). ATCO pointed out that clause 13.5(b) complements clause 13.5(a) in the event that the access arrangement ceases, by providing a reciprocal right for the Service Provider to terminate the agreement. ATCO argued that if this provision was not included, the Service Provider may be bound to continue to provide services under the agreement on onerous terms or in circumstances where it may not be possible to provide certain services any longer.

2538. ATCO also noted that clause 13.5(b) was consistent with the Victorian examples referred to by the Authority.

2539. In its submission in response to the Draft Decision, Kleenheat stated that it agreed with the Authority's comments that clause 13.5(b) should be deleted. Kleenheat provided no additional reasoning in support of its approval for the deletion.[1090]

2540. The Authority has considered ATCO's arguments for retaining clause 13.5(b) and noted Kleenheat's support for the deletion of the clause. The Authority now accepts that there is no clear justification for granting the user a unilateral right to terminate in cases where the network ceases to be covered. The better approach, the Authority has concluded, is to make this right reciprocal.

2541. It is reasonable to expect that the termination or expiry of the access arrangement would be attended by certain changes in the competitive environment in which the GDS is operated. Whether arising because of an end to coverage or because light-hand regulation was to be applied instead, the end of the access arrangement would

[1090] Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat Gas Submission on the Draft Decision and Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution System Access Arrangement, 12 January 2015, p. 2.

suggest that a judgment had been made that users required a lower level of support in obtaining access to pipeline services. For instance, if the access arrangement was discontinued because increased competition for pipeline services emerged, the relative market power of users could be assumed to have increased.

2542. The Authority considers that if the access arrangement is to be terminated or will expire, this event will reflect significant changes in the circumstances in which access is negotiated. The Authority now believes that it would be inappropriate to provide a unilateral right for the user to terminate under those circumstances. Instead, the right should be reciprocal and should extend to the service provider.

2543. The Authority has also confirmed that provisions similar to 13.5(b) are contained within the terms and conditions of the Victorian distributors.

2544. In view of the above, the Authority has been persuaded to allow clause 13.5(b).

Effect of future changes to the access arrangement

2545. In its initial proposal, ATCO sought to include three new clauses (clause 13.2, 13.3 and 13.4), which described how the service agreement signed by the parties would be amended consequent to amendments to the access arrangement, as follows.

- Clause 13.2 set out a procedure for the service provider to determine whether to modify the service agreement in response to changes to reference services and provided for the user's right to challenge the service provider's interpretation of the changes required to the access arrangement.
- Clause 13.3 asserted that the service agreement would be amended to reflect changes to the terms and conditions of the access arrangement and specified a mechanism to this end.
- Clause 13.4 provided that clauses 13.2 and 13.3 would apply on each revision of the Access Arrangement.

2546. ATCO also proposed clause 22.3, which stated that “This Haulage Contract [service agreement] may only be amended by written agreement of the parties.”

2547. In its Draft Decision, the Authority returned to the arguments presented during the third access arrangement period review, concerning the connection between individual service agreements and the access arrangement itself.

2548. In the Final Decision for the third access arrangement review, the Authority had disallowed similar amendments to clauses 13.2 to 13.4. The Authority had concluded that reference services are provided to a user not pursuant to a contractual obligation but a statutory obligation defined by the access arrangement.

2549. In its Draft Decision for the fourth access arrangement review, the Authority took a different view on the need to maintain consistency, in perpetuity, between the access arrangement and an individual service agreement for reference services. The Authority accepted that it was permissible under the NGL for a clause of the template service agreement to specify whether and how the contract should be amended upon a change to the access arrangement. While the Authority concluded that the template service agreement could be drafted to provide for its own amendment, it considered the question of whether and how it should do so to be separate matters.

2550. The Authority noted that changes to an access arrangement can result in substantial changes to reference service pricing, and terms and conditions. In view of this, the

Authority considered it highly desirable for the parties to share a common understanding of how those changes will affect an individual service agreement.

2551. The Authority noted that the regulated terms and conditions for Victorian distributors Multinet and SP Ausnet explicitly addressed how changes to the access arrangement would affect the terms of the service agreement. In those instruments, it was taken to be the intention of the service provider and the user that the terms of their contract would reflect the regulated terms approved in the access arrangement. Further, the document stipulated that changes to the regulated terms would be automatically reflected in the bilateral contract, subject to any contrary written agreement or exclusion clauses adopted by the parties.

2552. The Authority explained that it expected users and the service provider to recognise that the access arrangement will change in the future, and would seek to define how this would affect the service agreement. However, the Authority also noted that different parties may seek different arrangements to respond to changes to the access arrangement.

2553. The Authority pointed out that, if the parties were unable to agree on a mutually acceptable amendment provision, then it would be open to the user to rely on the termination rights provided by proposed clause 13(a) (replacing current clause 2(c)(i)) in the event of an amendment. The user could then rely on the fact that it would be entitled to a new service agreement on the terms and conditions of the approved revised access arrangement.

2554. The Authority stated that it wished to encourage the parties to explicitly consider and define, in light of their individual requirements, how the service agreement would be affected by changes in an access arrangement. On this basis, the Authority declined to approve a default amendment approach but required that the template service agreement be amended to flag the matter for consideration by parties negotiating an agreement. Accordingly, the Authority required clauses 13.2, 13.3 and 13.4 to be deleted and for clause 22.3 to be amended to include a placeholder for the parties to set out the consequences of revisions to the access arrangement for the individual agreement.

2555. In its response to the Draft Decision, ATCO did not accept the requirement to delete clauses 13.2 to 13.4.

2556. ATCO claimed that the clauses provided a comprehensive, cost-effective and clear means for the parties to the agreement to consider and manage necessary changes that flow from revisions to the access arrangement.

2557. ATCO cited the Authority's Draft Decision at paragraph 1346, in which the Authority wrote:

> "A user may wish to acquire services exclusively on the terms currently defined in the access arrangement. The template haulage contract [template service agreement] should be drafted with this notional user in mind, even though the service provider and the Authority may fully expect users to negotiate away from this starting position in their individual haulage contracts. The question for the Authority then must be which template haulage contract terms will achieve this result while placing the minimum constraint on the parties' ability to negotiate away from the access arrangement if they wish."

2558. ATCO appears to have accepted this view, although it read into it additional implications going beyond the Authority's intended point. ATCO claimed that a

consequence of this view was that the template service agreement must be in a form that is capable of acceptance without amendment by a notional user. ATCO noted that the effect of the required amendment to clause 22.3 would be to make this the only clause in the template service agreement that was not capable of being accepted without amendment. ATCO asserted that having a placeholder in the document instead of a comprehensive and flexible mechanism was less clear and failed to provide the balance of certainty and flexibility that ATCO's proposed approach would do.

2559. ATCO also suggested that a contract for reference services had to remain consistent with the terms defined in the access arrangement. Specifically, ATCO wrote:

> "…the degree to which amendments to the template haulage contract [template service agreement] can be negotiated and agreed by the parties is limited only by the requirement that in so far as the haulage contract [service agreement] is for reference services, any amendments must be consistent with the terms currently defined in the access arrangement."[1091]

2560. ATCO then turned to the question of whether its proposed amendment provisions should be preferred over the approach taken by the Victorian gas distributors, SP Ausnet and Multinet. ATCO pointed out that the regulated terms and conditions for SP Ausnet and Multinet were specifically for supply of reference services and provided a "default position". By "default position", it appears ATCO was referring to the automatic amendment of the agreement in response to changes to the access arrangement terms and conditions. ATCO contrasted this with its proposed "enhanced procedure for variation by way of a change control process as set out in clause 13.2, 13.3 and 13.4".[1092]

2561. ATCO pointed out that the parties and any interested third parties have the ability to participate in the access arrangement revision process and thereby contribute to the process of settling the form of the template service agreement. Presumably, ATCO was implying that by this means the parties could ensure that the terms of their individual service agreements would not be modified in unacceptable ways due to changes in the access arrangement.

2562. ATCO claimed several benefits from their proposed approach, specifically that:

- having the amendment process defined in the template service agreement would expedite access;
- the process proposed by ATCO was clear and the mechanism would provide a cost effective means of managing change and variations to contracts;
- the process assists the parties with identifying and agreeing to changes in the risk profile of both parties that may result from revisions to the access arrangement.

2563. No public submissions were received in relation to clauses 13.2, 13.3, 13.4 and 22.3.

2564. The Authority recognises ATCO's concern that the use of a placeholder inviting the parties to negotiate a term bilaterally does not provide a template that is capable of

---

1091 ATCO Gas Australia Pty Ltd, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 270.

1092 ATCO Gas Australia Pty Ltd, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 270.

immediate acceptance by a notional user. The Authority notes that the template haulage contract [service agreement] currently defined in the access arrangement does establish a precedent for the use of a placeholder in the template (see clause 16.1). However, the Authority concedes that the use of this placeholder reflected a particular view about "commercial terms and conditions" and the transition to specifying a template service agreement (see paragraphs 1353 to 1358 of the Final Decision in the third access arrangement review). The Authority can see that the use of a placeholder may create an additional negotiation challenge for the parties, which must be considered against the benefits and risks of a more prescriptive approach.

2565. The Authority acknowledges that the most obvious starting point for a regulated standing offer may be for it to provide for a service agreement that continues to be amended to ensure ongoing consistency with the regulated terms and conditions. The Authority also accepts that defining in the template service agreement a procedure for amending the service agreement in response to changes in the access arrangement is likely to provide the first two of the three benefits claimed by ATCO (see paragraph 2562).

2566. Accordingly, the Authority accepts that the template service agreement should include provisions that detail how the service agreement will be amended in response to a change in the access arrangement. This change in position requires the Authority to consider whether the specific amendments proposed by ATCO to this end are suitable.

2567. The Authority is concerned that clauses 13.2 to 13.4 are overly complex. Further, clause 13.2 provides for an exercise of judgment on the part of the Service Provider which appears to the Authority to be unnecessary. The Authority is not persuaded of the merits of ATCO's proposed "enhanced procedure for variation" or of the need for any kind of proactive change control process in the template service agreement.

2568. ATCO claimed that its proposed approach would assist the parties with identifying and agreeing to changes in the risk profile of both parties. This claim is inconsistent with what the Authority takes to be the legitimate purpose of clauses 13.2 to 13.4. Reference services provide for the allocation of risks to be predetermined by the independent regulator. If the service agreement is to remain consistent with the regulated terms and conditions for reference services then the parties must take the risk allocation set out in the access arrangement as a given. If the amendment clauses are intended to ensure continuing consistency between the service agreement and the access arrangement, it is difficult to see why they should provide for any intervening exercise of judgment or further agreement.

2569. The Authority prefers the approach taken in the regulated terms and conditions for the Victorian distributors SP Ausnet and Multinet. The clause provides for the service agreement to be automatically amended (without the requirement for the parties to execute any form of documentation). As a result, all changes to the access arrangement would need to be read into the service agreement. This may seem cumbersome, but it avoids the problem of identifying the threshold beyond which a change to terms and conditions renders a reference service a non-reference service (see paragraphs 2491 and 2492).

2570. The Authority requires that clauses 13.2 to 13.4 be deleted and replaced with a revised clause 22.3, as set out in Required Amendment 20.

Required Amendment 20

Clauses 13.2, 13.3 and 13.4 of the revised proposed template service agreement should be deleted.

Clause 22.3 of the revised proposed template service agreement should be deleted and a new clause 22.3 inserted as follows:

22.3 Amendment

(a) Subject to the remainder of this clause 22.3, this Service Agreement may only be amended or supplemented in writing, executed by the parties in the same manner as the parties executed this Agreement.

(b) It is the intention of the <Service Provider> and-<User> that the terms and conditions of this Service Agreement reflect so far as possible the Reference Service Terms and Conditions.

(c) It is therefore agreed that if there is any change to the Reference Service Terms and Conditions then the terms and conditions of this Service Agreement will, subject to any agreement in writing between the parties, and excluding clauses that state that they are not subject to this clause 22.3, be automatically amended (without the requirement for the parties to execute any form of documentation) such that they are the same as the Reference Service Terms and Conditions.

(d) In this clause 22.3 the Reference Service Terms and Conditions means the terms and conditions upon which the Service Provider will provide Reference Services as set out in the Access Arrangement (including the Template Service Agreement).

Effect of "Regulatory Events"

2571. In its initial proposal, ATCO included a new provision, clause 13.6, setting out a process whereby the service provider may advise the user of changes to the service agreement that it considers necessary to respond to a regulatory event. This provision defined regulatory event as a change to a law or the Retail Market Scheme that affects the operation of the service agreement.

2572. In its Draft Decision, the Authority acknowledged the potential for regulatory events to arise that could change the circumstances in which services are provided. However, the Authority was concerned that proposed clause 13.6 (now proposed clause 13.7), which allowed for a contract to be adjusted in response to an unspecified future change in circumstances, could have unforeseen effects.

2573. The Authority preferred to leave it to the parties to negotiate provisions setting out the response to specified regulatory events, since they were likely to be in the best position to determine whether and how adjustments should be provided for. Accordingly, the Authority required clause 13.6 to be deleted.

2574. After reviewing similar contracts among Victorian gas distributors, the Authority decided that the contract should make clear that the parties' contractual obligations are over-ridden by laws (including subordinate legislation), to the extent of any inconsistency. The Authority required that proposed clause 13.6 be replaced with

text (drawn from the Victorian example), that makes clear the primacy of statutory obligations.

2575. In its response to the Draft Decision, ATCO has accepted the text required by the Authority, but also proposes to retain the provision that it initially proposed, now as proposed clause 13.7.

2576. ATCO claims that its proposed clauses 13.1 to 13.6 were drafted as a comprehensive set, which described the means by which changes to services (13.1), changes to the access arrangement (13.2 to 13.5) and changes by way of Regulatory Events (13.6) are to be implemented as amendments to the service agreement. In this way, ATCO argued, the process set out in clause 13.6 (now 13.7) adds certainty, saves the parties cost and time, and meets the NGO.

2577. No public submissions were received in relation to proposed clause 13.7 (previously, proposed clause 13.6).

2578. The Authority recognises the potential benefit of detailing in the template service agreement how particular events will be responded to by the parties. Regulatory events have the potential to substantially alter the conditions under which services are provided. The uncertainty surrounding these events creates risks that the parties may wish to mitigate by providing the ability for the contract to be amended in response to regulatory events.

2579. However, the Authority considers that the definition of regulatory events, within proposed clause 13.7, is so broad that there is considerable scope for the inclusion of this provision in the template service agreement to have unforeseen effects.

2580. The Authority is still of the view that the parties should be given full latitude to make their own judgements regarding how to manage the risks associated with regulatory events. The parties should be left to determine whether they require a regulatory events variation clause at all and if so, what events should be accommodated and what procedure must be followed on occurrence of those events. Alternatively, the parties can agree to retain a permanent link between their agreement and the complete set of terms and conditions prescribed in the access arrangement. Then if a change in circumstances arises with the potential to cause serious detriment, the service provider can seek an access arrangement variation under rule 65 of the NGR.

2581. Accordingly, the Authority requires proposed clause 13.7 to be removed.

Required Amendment 21

Clause 13.7 of the revised proposed template service agreement should be deleted.

User obligations in relation to maintaining system pressure

2582. In its initial proposal ATCO sought amendments to the template service agreement relating to the obligations of parties with respect to maintaining gas pressure within specifications.

2583. In proposed clause 5.3(b), ATCO introduced the requirement for the parties to comply with rule 182 of the Retail Market Rules in relation to system pressure in a sub-network.

2584. In its Draft Decision, the Authority noted that the Retail Market Rules provided mechanisms to ensure compliance – for instance compliance with rule 182. The Authority also pointed out that a network operator may have a right to commence civil proceedings for damages against a user for a breach of rule 182 of the Retail Market Rules in circumstances where it can be shown, on the balance of probabilities, that the breach actually caused loss to the network operator.

2585. The Authority considered it unnecessary to grant ATCO the additional protection of an express contractual obligation for the user to comply with the Retail Market Rules, enforceable by way of an action for damages for breach of contract. The Authority was also wary of conflicts emerging between the system pressure obligations and enforcement mechanisms existing under the service agreement and the Retail Market Rules, respectively.

2586. Further, the Authority restated its general preference to avoid overlaps of the kind that would arise from the inclusion of proposed clause 5.3(b) and noted that it hadn't identified any particular factors that would offset this preference. Accordingly, the Authority required that clause 5.3(b) of the proposed template service agreement be deleted.

2587. In its response to the Draft Decision, ATCO accepted the need to avoid conflicts or overlaps between provisions of the Law and the terms of the template service agreement. Accordingly, ATCO accepted the requirement to delete clause 5.3(b), contingent on the inclusion of several modifications elsewhere in the template service agreement.

2588. ATCO sought an express clause stating that the enforcement rights of the parties under the contract would be 'without prejudice' to any rights of the parties under a statutory enforcement regime. To this end, ATCO proposed an amendment to clause 15.6; adding the words "and without prejudice to any rights of the Party under any statutory enforcement regime". ATCO also noted that the inclusion of the Authority's clause 13.6, as set out in required amendment 26, formed part of the basis on which ATCO would accept the deletion of clause 5.3(b).

2589. The Authority's concerns with respect to clause 5.3(b) have been addressed.

Deregistration of Delivery Points

2590. In its initial proposal, ATCO sought to amend clause 5.6, which required the service provider to deregister a delivery point under certain conditions. This would replace the current requirement for the service provider to give notice specifying the procedure for deregistration of a delivery point, while leaving it for the user to request deregistration.

2591. In its Draft Decision, the Authority noted that proposed clause 5.6 would require the service provider to automatically deregister a delivery point when the end date for that delivery point has been reached. This change would also remove the liability currently borne by users to pay any charges or fees payable in respect of the delivery point. In the absence of any objections from users, the Authority determined the proposed change to be acceptable.

2592. The Authority identified further amendments consequential to the inclusion of clause 5.6. These were; Schedule 1, clause 9(a); Schedule 2, clause 9(a); Schedule 3, clause 8(a); Schedule 4, clause 7(a); and Schedule 5, clause 7(a).

2593. The Authority also identified a separate issue regarding liabilities in the event of a failure to deregister a delivery point. Schedule 1, clause 9(c); Schedule 2, clause 9(c)(i); Schedule 3, clause 8(d); Schedule 4, clause 7(c); and Schedule 5, clause 7(c) all absolve the service provider of liability in the event of a failure to permanently deregister a delivery point.

2594. Given the revised deregistration process that ATCO proposed in clause 5.6, the Authority considered that it was no longer appropriate to exclude liabilities on the service provider arising from its failure to deregister a delivery point. Accordingly, the Authority required that Schedule 1, clause 9(c); Schedule 2, clause 9(c)(i); Schedule 3, clause 8(d); Schedule 4, clause 7(c); and Schedule 5, clause 7(c) all be deleted.

2595. All of these changes were set out in Required Amendment 28 of the Draft Decision.

2596. In its response to the Draft Decision, ATCO accepted without qualification, the changes set out in Required Amendment 28.

2597. No public submissions were received in relation to clause 5.6 or the adopted changes set out in Required Amendment 28 of the Draft Decision.

2598. As a result, the Authority reiterates its acceptance of clause 5.6 and has approved ATCO acceptance of the changes set out in Required Amendment 28 of the Draft Decision.

Right to amend gas quality specifications

2599. In its initial proposal ATCO sought to introduce clause 6.2 into the template service agreement. This clause granted the service provider the right to unilaterally amend the gas quality specifications, subject to it following the notification requirements and the need to maintain consistency with any law.

2600. In its Draft Decision, the Authority noted that users possess limited power to modify the gas specifications that suppliers are required to meet. The Authority also considered that changes to gas specification requirements require careful and coordinated consideration across the industry, rather than unilateral judgements made by a single gas distribution service provider.

2601. Accordingly, the Authority was not persuaded that it is either necessary or appropriate for the service provider to have a unilateral right to amend the gas quality specifications. The Authority therefore required clause 6.2 to be deleted.

2602. In its response to the Draft Decision, ATCO explained that it was not its intention to introduce a right for itself to unilaterally amend the gas quality specifications. Instead, the purpose of clause 6.2 was to ensure that there was an effective, clear and quick means of addressing and implementing changes to gas specifications as required by law. As an example, ATCO noted that gas quality specifications had to be amended to accommodate gas from the Macedon gas field during the second and third access arrangement periods.

2603. ATCO presented an amended version of clause 6.2, in which the qualifying phrase “as required or permitted by law” was inserted.

2604. No public submissions were received in relation to clause 6.2. However, Kleenheat commented on the definition of gas quality specifications. Kleenheat noted that the

term gas quality specifications had a general definition rather than referring to Annexure A. By "general definition", it appears Kleenheat was referring to the fact that the term is defined by reference to regulation.[1093]

2605. The Authority accepts that ATCO intends for clause 6.2 to simply allow it to maintain consistency with the statutory rules applicable to its industry relating to gas quality specifications. Further, the proposed qualification to its right to amend the gas quality specifications is an improvement, in the Authority's view.

2606. The Authority does not accept ATCO's proposed amendment to clause 6.2. However, on further considering the operation of clause 6.2, the definition of "gas quality specifications" and Annexure A of the template service agreement, the Authority recognises that some amendments are necessary.

2607. The Dictionary defines "Gas Quality Specifications" to mean "the gas quality specifications prescribed by the Gas Standards Regulations". However, this definition is inconsistent with Annexure A, which reads:

> 1. Subject to clause 2 of this Annexure A, "Gas Quality Specifications" in this Service Agreement means the specifications, standards and requirements described at (a) and (b) of this clause 1 and where there are conflicting specifications, standards or requirements the most stringent specification, standard or requirement applies:
>
> a) regulations 5 and 6 of the Gas Standards Regulations; and
>
> b) the Western Australian standard specification as defined in the Gas Supply (Gas Quality Specifications) Regulations 2010.
>
> 2. The specifications, standards and requirements for maximum water content, maximum hydrogen sulphide and hydrocarbon dewpoint in the Gas Quality Specifications referred to in clauses 1(a) and 1(b) of this Annexure A are replaced with the following requirements:
>
> [table listing three values for the cited parameters]

2608. By the Dictionary definition of "gas quality specifications", any change under the *Gas Standards Act 1972* would be automatically reflected in the gas quality specifications. By the definition in Annexure A, any change to either the *Gas Standards Regulations* or the *Gas Supply (Gas Quality Specifications) Regulations*, except changes relating to the three separately specified parameters, would be reflected automatically. Assuming that changes at law are effected through amendments to existing legislation or regulation, it appears to the Authority that it is relatively unlikely that the service provider will need to actively amend the gas quality specifications.

2609. The Authority still holds the view that gas quality specifications are an important potential market barrier and that decisions about gas quality can have significant upstream and downstream consequences.

2610. If the need to actively amend the gas quality specifications does arise and the service provider lacks the unilateral discretion to effect the change, the Authority notes that the service provider can apply for a variation of the access arrangement under section 65 of the NGR. The Authority recognises that using this variation process is substantially less convenient to the service provider than making the changes unilaterally. However, the Authority is informed by the seemingly small probability

[1093] Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat email in response to request for further information regarding its public submission of 12 January 2015, 15 March, 2015, p. 3.

that amending the specifications will be necessary and the potential importance of any changes to the industry.

2611. Accordingly, the Authority requires that clause 6.2 of the template service agreement be deleted.

2612. The inconsistency between the two definitions for gas quality specification needs to be resolved. The Authority notes that it previously considered the arguments for including Annexure A during the third access arrangement review in 2010. The Authority accepted Annexure A in its current form for the reason that it would address concerns that gas from the Parmelia Pipeline should not be denied entry into the GDS.

2613. Unfortunately, the existing definition for "Gas Quality Specification" within the current template haulage contract [template service agreement] contains a material typographical error as follows: "Gas Quality Specification has the meaning given to that term in 0." Consequently, it's unclear from the current template haulage contract where the term was intended to take its meaning. The template haulage contract initially proposed by WAGN during the third access arrangement review, did not contain the same typographical error and defined the term as having the meaning given in Annexure A. Based on the Final Decision from that review, this appears to have been the intended definition of the term.

2614. The definition in the Dictionary of "Gas Quality Specification" should be amended to incorporate the definition created by Annexure A.

2615. The Authority requires clause 6.2 to be deleted.

Required Amendment 22

Clause 6.2 of the revised proposed service agreement should be deleted.

Clause 23.1 of the revised proposed service agreement should be amended as follows:

"Gas Quality Specification":

has the meaning given to that term in Annexure A ~~means the gas quality specifications prescribed by the Gas Standards Regulations~~.

Obligations and rights of the parties in cases of off-specification gas

2616. In its initial proposal, ATCO introduced clause 6.5, by which it sought to allocate most of the risk in relation to damage arising from off-specification gas to the user. The proposed wording required the user to relinquish all claims against the service provider and to indemnify the service provider against damage to itself and against claims brought by third parties against the service provider.

2617. Further, by introducing clause 6.6, ATCO sought to ensure that it retained the discretion to convey off-specification gas where it "reasonably believes that the conveyance is necessary for the safety or protection of persons or property". At 6.6(b), the clause went on to preclude service provider liability for damage to the user arising "in relation to or connection with such conveyance".

2618. In its Draft Decision, the Authority noted that clause 6.5 appeared to entirely unburden ATCO of all liabilities with respect to damage arising from the conveyance or delivery of off-specification gas. The Authority pointed out that the clause would have the effect of shielding the service provider from the consequences of its negligence or default in respect of the delivery of off-specification gas where this would otherwise attract liability under clause 17.1.

2619. The Authority considered a potential argument for shielding the service provider from risks arising in situations where off-specification gas is introduced. The Authority speculated that, if ATCO cannot control the quality of gas in its network, then perhaps it might be reasonable to conclude that ATCO could not itself be responsible for damage arising as a result of the delivery of this off-specification gas. However, the Authority reasoned that if this were the case, there would be no basis for ATCO to require a provision precluding its own liability in cases of off-specification gas.

2620. The Authority was not prepared to rule out the possibility of ATCO's negligence or default giving rise to damage even in situations where others were responsible for gas being off-specification in the first place. The Authority gave the following hypothetical examples to illustrate how ATCO's own negligence might cause or contribute to damage and then lead to a reasonable expectation of liability.

- ATCO might owe users a general obligation to keep pace with standard industry practice in terms of monitoring gas quality and, at some point, failure to do so might be considered negligent and liabilities for damage might reasonably apply.
- ATCO might deliver off-specification gas at an unacceptably high or low pressure and if damage to the user arose on account of the delivery pressure, ATCO should not be excused from its negligence or default on account of the composition of the gas.

2621. In view of these considerations, the Authority required clause 6.5 to be redrafted to ensure that ATCO retained liabilities for its own negligence or default.

2622. For similar reasons, the Authority concluded that clause 6.6(b) also went too far in protecting ATCO from liability arising from the conveyance of off-specification gas.

2623. The Authority considered that ATCO's general liability for damage arising from its own negligence or defaults should be limited as specifically as possible and only where appropriate. Consistent with the approach adopted for clause 6.5, the Authority concluded that, if the service provider exercised its discretion under clause 6.6(a) in a negligent manner, then it should be subject to the general liability provisions set out in clause 17. Again, the Authority considered that the hypothetical examples reproduced at paragraph 2620 were useful in understanding how the service provider might still bear some responsibility for damage even where the deficient composition of gas was due to the initial fault of others.

2624. The Authority required clause 6.6(b) to be redrafted to include the qualification "where the loss, damage, cost or expense is a result of the gas being Off-specification Gas".

2625. In its response to the Draft Decision, ATCO partially accepted the Authority's required amendment to clause 6.5 by amending clause 6.5(b) to cover instances where off-specification gas is delivered into the GDS due to the service provider's default.

2626. ATCO accepted the required amendment to clause 6.6(b), which it claimed was consistent with its proposed modification to clause 6.5(b).

2627. Kleenheat noted in its submission of 21 May 2014 that clause 6.5 (among other clauses) could significantly increase the risk to the user. Kleenheat requested that the Authority ensure that the allocation of risk under the revised proposed template service agreement was fair and reasonable.

2628. The Authority is not satisfied that ATCO's modified proposal for clause 6.5 has addressed the problems identified with this provision. To be clear, the Authority is not concerned with the situation in which the service provider is responsible for the introduction of off-specification gas. As noted above, the Authority identified hypothetical situations in which it might be appropriate to expect the service provider to retain liability for its own negligence, where others are at fault for introducing off-specification gas.

2629. Accordingly, the Authority requires clause 6.5 to be amended to ensure that the service provider continues to face some risk for damage due to its negligence or default, in situations where off-specification gas is introduced into the system due to the fault of other parties.

2630. The Authority's concerns with respect to proposed clause 6.6(b) have been addressed.

Required Amendment 23

Clause 6.5 of the revised proposed template service agreement should be renumbered as clause 6.4 and amended as follows:

(a) Subject to clauses 6.4(b), <User> hereby:

(i) releases <Service Provider> from any claim <User> has or may have against <Service Provider> as a result of any gas delivered by any person into the ATCO GDS being ~~in respect of any~~ Off-specification Gas ~~delivered by any person into the ATCO GDS~~;

(ii) indemnifies <Service Provider> against all loss, damage, cost or expense suffered or incurred by <Service Provider> as a result of any gas delivered, or attempted to be delivered, by <User> or a Related Shipper of <User> into the ATCO GDS being ~~in relation to or connection with any delivery or attempted delivery of~~ Off-specification Gas ~~into the ATCO GDS by <User> or a Related Shipper of <User>~~; and

(iii) indemnifies <Service Provider> against any loss, damage, cost or expense suffered or incurred by <Service Provider> in relation to or connection with any claim brought by any person against <Service Provider> as a result of any gas delivered, or attempted to be delivered, by <User> or a Related Shipper of <User> into the ATCO GDS being ~~in respect of any delivery or attempted delivery of~~ Off-specification Gas ~~into the ATCO GDS by <User> or a Related Shipper of <User>~~.

(b) Clause 6.4 (a) does not apply to the extent that ~~in respect of any~~ Off-specification Gas was delivered or sought to be delivered into the ATCO GDS as a result of <Service Provider>'s negligence or default; or

(c) Any amount <User> is obliged to indemnify <Service Provider> under clause 6.4 (a)(ii) or (iii) will be reduced in proportion to the extent that <Service Provider>'s negligence or default caused or contributed to the loss, damage, cost or expense to be indemnified by <User>.

Liability for indirect damage

2631. In its initial proposal, ATCO put forward a variety of amendments relating to liabilities for damage. These included changes to the general liability provisions contained in clause 17 and changes imposing liabilities on the user for indirect damage in specific circumstances, namely:

- off-specification gas (clause 6.5(a)), gas balancing (clause 6.7(b)) and maximum pressure (clause 6.8(b));
- failure to comply with instruction during Emergencies (clause 6.11(e)(ii)); and
- in the event of a breach of selected user representations and warranties (clause 18.3(b)).

2632. In the Draft Decision, the Authority considered the case for allowing the template service agreement to impose liabilities on the user for indirect damage. It addressed the question separately for each of the three sets of changes listed under paragraph 2631.

2633. In respect of 6.5(a), 6.7(b), and 6.8(b), the Authority considered the practice among Victorian distributors. The Authority found that the regulated terms and conditions for Victorian distributors Multinet and SP Ausnet provide a precedent for imposing liability for indirect damage on users for similar types of failures, whereas this was not the case for Envestra.

2634. The Authority noted that uncapped indemnities, especially extending to indirect damage, can represent a significant business risk, especially where the ability of the liable party to control the risk is constrained. Furthermore, the Authority pointed out, such liabilities are outside the scope of typical business insurance policies. The Authority expressed concern that the risks and liabilities inherent in ATCO's proposed terms for 6.5(a), 6.7(b) and 6.8(b) were of this kind. On this basis, the Authority expressed reluctance to impose uncapped indemnities covering indirect damage.

2635. Accordingly, the Authority required that clauses 6.5(a), 6.7(b) and 6.8(b) be amended to remove references to indirect damage.

2636. In respect of clause 6.11(e)(ii), the Authority noted that Required Amendment 20 of its Draft Decision for the third access arrangement review removed terms that made the user liable for indirect damage arising from its failure to comply with instructions relating to an emergency. The Authority had not identified any reason to disturb the pre-existing liability arrangements, and noted the opportunities for the parties to negotiate modified liability allocations if they saw fit. The Authority maintained this position in its Final Decision.

2637. In its deliberations for the Draft Decision of the present review, the Authority gave special consideration to the issues surrounding proposed clause 6.11(e)(ii), in light of the additional importance of obligations relating to emergencies. The Authority acknowledged that it might be reasonable to attach a special priority to the compliance by users with ATCO's instructions in an emergency. The Authority recognised that extending the user's liability to include indirect damage would provide an additional incentive for users to comply. Further, the Authority considered that users would be expected to be able to comply with the service provider's reasonable instructions, meaning users would have a high degree of control over the commercial risks arising from clause 6.11(e)(ii).

2638. While the Authority recognised the desirable incentives that would be provided by clause 6.11(e)(ii), it held the same concerns regarding the insurability of the liability as in the case of clauses 6.5(a), 6.7(b) and 6.8(b). In the Authority's view, the template service agreement required users to have insurances to cover their liabilities (clause 16.3), yet clause 6.11(e)(ii) would impose a liability that users may not be able to insure. The Authority held the view that this could impede access and, accordingly, required that clause 6.11(e)(ii) be amended to remove the reference to indirect damage.

2639. The Authority noted that clause 6.9(c)(ii) in the proposed amended template service agreement retained a pre-existing requirement for the user to indemnify the service provider against claims for indirect damage. Consistent with its position on clauses 6.5(a), 6.7(b), 6.8(b) and 6.11(e)(ii), the Authority required that the reference to indirect damage be removed from clause 6.9(c)(ii).

2640. The Authority did not accept ATCO's proposal to make certain user representations and warranties subject to liability for indirect damage under clause 18.3(b). The Authority considered that its required amendments made this clause redundant, and that it should be deleted.

2641. In its response to the Draft Decision, ATCO challenged the basis for rejecting clauses that provided for the user to take on liabilities for indirect damage. Firstly, ATCO submitted that it was entirely consistent with the NGO that the template service agreement be drafted to provide certainty. Further, ATCO argued that it would be for the long term benefit of consumers to allocate risks to the party best able to manage those risks. ATCO noted that its initial proposal included reference to underlying risk allocation and management principles.

2642. Secondly, ATCO did not accept that users were required to have insurances to cover their losses. ATCO accepted that there were many risks that either cannot be insured against or for which insurance availability or cost would depend on the nature of the particular user. However, ATCO asserted that insurability should be considered, among other factors, when determining where risks should be allocated and how they should be managed under the contract. ATCO considered that it was the controllability, not the insurability, of the risks that should be considered as the primary assessment of allocation of risk between the parties. ATCO went on to note that the insurability of particular risks was subject to many factors that would be peculiar to individual users, whereas controllability of risk was subject to the legal and operating environment.

2643. Notwithstanding these objections, ATCO extensively modified its proposal to remove references to indirect damage. These changes eliminated liability for indirect damage in the case of the following events:

- The user fails to maintain a balance between gas delivered into and drawn out of the network (clause 6.7(b));
- The user fails to ensure that pressure of gas delivered into the network remains below the maximum pressure (clause 6.8(b));
- The user fails to comply with instructions during Emergencies (clause 6.11(e)(ii)); and
- Selected user representations and warranties are breached (clause 18.3(b)).

2644. In two cases, ATCO retained provisions to exclude the operation of clause 17.3. As a result, user liabilities for indirect damage were retained in the case of the following events:

- The user is responsible for delivering off-specification gas into the network (clause 6.5(a)); and
- The user fails to ensure compliance with its system pressure protection plan (clause 6.9(c)(ii)).

2645. In its submission of 21 May 2014, Kleenheat noted that clauses 6.5, 6.7(b), 6.8(b) and 6.11(d) could significantly increase the risk to the user and requested that the Authority ensure that the allocation of risk under the revised proposed service agreement contract was fair and reasonable.[1094]

2646. In its submission of 21 May 2014, Alinta made a general remark about the liability provision (clause 17). Alinta considered that the clause was too broad, and did not allocate liability where the risk was best controlled. Alinta stated on page 9 of its submission that "all of the liability is placed on the user whereas Alinta considers the Service Provider is the party best able to control the risk."[1095]

2647. The Authority notes ATCO's arguments about how to consider insurability in assessing risk allocations. ATCO appears to consider that insurability is not a necessary condition, based on commercial practice. The Authority, on the other hand, based its view that liabilities must be insurable on the fact that current clause 14.3(a)(i) (now proposed clause 16.3(b)(i)) requires the user to have insurance cover for its third party liabilities.

2648. The Authority appreciates that in typical commercial settings, parties will take on many different types of risks and many of those risks will be uninsured. The Authority is concerned in the present case about a conflict between a positive requirement under the contract for the user to be fully insured for third party liabilities and the explicit extension of the user's liabilities under the contract to include risks likely to be uninsurable.

2649. With respect to the question of controllability, the Authority recognises that ATCO does not have control over the risks of off-specification gas delivery, nor control over the risk of user non-compliance with its system pressure protection plan. It is also the case that the user is unlikely to have full or even primary direct control over these risks. One might argue that the user can contract to pass these risks through to its agents and suppliers, who may have more direct control over these risks. The Authority can see merit in this line of reasoning, but it is not satisfied that users can effectively pass through the risks associated with indirect damage – in situations where they are already locked-in to long term contracts that do not allow them to do so (and do not allow them any opportunity to renegotiate the existing terms in this regard) or where they have the opportunity to enter into a new contract (or vary existing terms) but are dealing at a disadvantage to their supplier due to an inequality of bargaining power.

1094 Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat Gas Submission on the Proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement, 21 May 2014, p. 3.

1095 Alinta Energy, Issues Paper on proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement, 21 May, 2014, p. 9.

2650. The Authority's intent was, and remains, to ensure that the user does not bear liabilities for indirect damage under all of the clauses discussed, including clauses 6.5 and 6.9. The Authority recognises that Required Amendment 30 of the Draft Decision was poorly drafted to ensure the desired result. ATCO has complied with the literal meaning of Required Amendment 30, but, by leaving in the clauses excluding clause 17.3 (these clauses were already part of the initial proposal), ATCO's amendments did not give effect to the Authority's intent.

2651. Consistent with the original intention of Required Amendment 30 of the Draft Decision, the Authority requires that clauses 6.5(c) and 6.9(d) of ATCO's revised proposed template service agreement be deleted.

Required Amendment 24

Clauses 6.5(c) and 6.9(d) of the revised proposed template service agreement should be deleted.

Delivery facilities maintenance and operation

2652. In its initial proposal, ATCO sought an amendment to clause 7.7(d)(ii), replacing the phrase "in the reasonable course of", with the phrase "acting reasonably in the course of".

2653. In its Draft Decision, the Authority considered that ATCO's proposed amendment to 7.7(d)(ii) was likely to better reflect the intended meaning. The Authority noted that a previous use of the phrase "in the reasonable course of" in clause 7.7(a) had not been amended, and considers that the advantages of ATCO's proposed amendment to 7.7(d)(ii) were equally relevant to clause 7.7(a).

2654. Accordingly, the Authority accepted ATCO's amendment of clause 7.7(d)(ii) and required that the same modification be extended to 7.7(a) by replacing the words "in the reasonable course of" with the words "acting reasonably in the course of".

2655. No public submissions were received in relation to clause 7.7.

2656. In its response to the Draft Decision, ATCO accepted the Authority's required amendment to clause 7.7(a).

2657. The Authority's concerns with respect to proposed clause 7.7(a) have been addressed.

Service provider obligations regarding curtailment

2658. In its initial proposal, ATCO sought an amendment to clause 8.1, replacing the phrase "default of the user" with the phrase "User's negligence or breach of this Haulage Contract [Service Agreement]". The changes qualified ATCO's obligation to use reasonable endeavours to minimise the magnitude and duration of any Curtailment.

2659. In its Draft Decision, the Authority required this qualification to be removed. The Authority considered it desirable for the service provider to always use reasonable endeavours to minimise the magnitude and duration of any Curtailment, irrespective of whether the user had been negligent.

2660. However, the Authority recognised that the service provider did have contractual rights to curtail deliveries under specific circumstances. The Authority felt that the meaning of clause 8.1 would be clearer if it made specific reference to those rights.

2661. Accordingly, the Authority required clause 8.1 to be amended to remove the exclusions for negligence and breach, and instead make the service provider's obligations subject to its rights under clauses 15.5(b), 16.1 and 16.2(i).

2662. In its submission dated 12 January 2015, Kleenheat noted in relation to clause 8.1 that the words "Service Agreement" should be deleted.[1096] Alinta noted in its submission of 21 May 2014 that the service provider was best placed to determine priority for delivery of gas and advise where curtailments should occur.[1097]

2663. In its response to the Draft Decision, ATCO accepted the Authority's required amendment to clause 8.1. In its revised proposed template service agreement, ATCO has not applied the required amendment verbatim, but the Authority is satisfied that ATCO's wording complies with the required amendment in substance.

2664. The Authority's concerns with respect to proposed clause 8.1 have been addressed. However, the Authority accepts Kleenheat's suggestion that the words "Service Agreement" should be deleted from clause 8.1, as this appears to have been a simple typo.

Required Amendment 25

Clause 8.1 of the revised proposed template service agreement should be amended as follows:

<Service Provider> will, in its operation and maintenance of the ATCO GDS, use reasonable endeavours to minimise the magnitude and duration of any Curtailment of Gas deliveries to <User>~~Service Agreement~~ subject to <Service Provider>'s rights under clauses 15.5(b), 16.1 and 16.2(i)

Disputing invoices and past payments

2665. In its initial proposal, ATCO included clause 10.3, setting out the rights, obligations and processes that apply when the user disagrees with an invoice prior to payment. The processes set out in clause 10.3, once complete, would lead to the dispute resolution processes provided for in clause 19. In turn, clause 19 imposed minimum thresholds for the activation of the dispute resolution provisions.

2666. ATCO also proposed clause 10.4, setting out the rights, obligations and processes that apply once an invoice has been paid, if either party subsequently forms the view that a past payment was incorrect. The process differed depending on who claimed the error. Clauses 10.4(b) and 10.4(c) specified the process for the user to claim an error in a past payment, with ultimate recourse to clause 19 (subject to the limits on

[1096] Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat Gas Submission on the Draft Decision and Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution System Access Arrangement, 12 January 2015, p. 3.

[1097] Alinta Energy, Issues Paper on proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement, 21 May, 2014, p. 9.

small amounts). Clause 10.4(d) specified the process for the service provider to claim an error in a past payment, but made no provision for the user to challenge that claim.

2667. In its Draft Decision, the Authority recognised that the parties were likely to wish to specify in any service agreement clear processes for resolving payment disputes. On this basis, the Authority was prepared to accept provisions detailing these matters in the template service agreement and it then proceeded to assess the suitability of proposed clauses 10.3 and 10.4 specifically.

2668. The Authority examined the limitations imposed by clause 19.1(c) on the minimum value of any payment claim dispute. The Authority decided that it was undesirable to limit a user's ability to challenge invoices. The Authority considered that ATCO should have an incentive to ensure all invoices are accurate. In the Authority's view, by limiting the user's ability to sustain a challenge to an invoice, clause 19.1(c) would operate to limit that incentive for ATCO.

2669. In the case of disputed past payments, the Authority decided that it was appropriate to apply threshold limits, like those imposed by clause 19.1(c). The Authority considered that a user should have an incentive to assess the accuracy of invoices in an effective and timely manner. In the Authority's view, limiting the user's ability to dispute past payments to those cases where a material sum was involved, would provide an appropriate incentive of this kind.

2670. The Authority required the template service agreement to be modified such that the threshold limits imposed under clause 19.1(c) no longer applied to clause 10.3, but accepted the application of clause 19.1(c) to clause 10.4.

2671. As a separate matter, the Authority considered clause 10.4 unreasonably asymmetrical, in favour of the service provider. The Authority noted that, in the event that an error in past payments was identified, the user could raise this in accordance with clauses 10.4(b) and 10.4(c), while the process for the service provider was described in clause 10.4(d). Where the user claimed a payment error, 10.4(c) permitted ATCO to reject this, leaving the user recourse to arbitration under clause 19. However, if the service provider claimed a payment error, the Authority noted that 10.4(d) merely provided for the user to be notified of the value of the error and the accrued interest. The Authority considered that this implies that ATCO would have the right to insist on the correction of the notified payment error, irrespective of the user's agreement and with no further recourse for either party to dispute resolution.

2672. The Authority concluded that clause 10.4 should create symmetrical rights and obligations regarding the dispute of past payments. The Authority required clause 19 to be amended such that the same processes, rights and obligations applicable to user-issued retrospective error notices would apply for retrospective error notices issued by the service provider.

2673. In its response to the Draft Decision ATCO, accepted the principle that the rights and obligations of the parties in cases of disputed payment claims should be symmetrical. ATCO proposed amendments to clause 10.4 which made clauses 10.4(b) and 10.4(c) equally applicable to both the user and the service provider, depending on who issued the retrospective error notice. ATCO also modified 10.4(d).

2674. ATCO explained the reasoning behind its proposal to impose the minimum amount thresholds established by clause 19.1(c). ATCO stated that its proposal would promote efficiency and minimise cost by requiring that the number of disputes be

minimised by aggregating claims to a reasonable value. A reasonable value, ATCO implied, would be one that justified the expense and time of engaging in the dispute resolution process.

2675. ATCO extensively amended the definition of the minimum value thresholds in clause 19.1(c), such that dispute resolution processes could only commence where:

- "there is any single line item or multiple line items and the single line item or multiple line items total less than $5,000 in any rolling 3 month period;[or]
- if a single line item or multiple line items total equal to or greater than $5,000 at any time; and
- there is any single line item or multiple line items of any total for any period greater than 3 months."[1098]

2676. Kleenheat claimed in its submission of 21 May 2014 that clause 10.3(b) was inconsistent with clause 10.4. Kleenheat argued that the former clause implied that the user was barred from subsequently disputing an incorrect payment claim and that the latter allowed for an error to be corrected at a later date. Kleenheat reiterated this point in its submission of 12 January 2015.

2677. Kleenheat objected in both its submissions[1099] to *"de minimis"* limits on a user's ability to challenge an invoice when reading clause 19.1(c) which it considered to be an unacceptable limitation to its right to dispute payments.

2678. Kleenheat also submitted that clause 19 should be made subject to clause 10. Following a request from the Authority for clarification, Kleenheat explained that clauses 19.2 and 19.3 only apply if the relevant steps (being, in substance, dispute resolution procedures) in clause 10 had been followed. Whereas clause 19.1(a) currently states that any dispute must be resolved in accordance with clauses 19.2 and 19.3, the clause should be qualified such that the special case of disputes arising under clause 10 is recognised.

2679. The Authority refers to its comments in the Draft Decision at paragraphs 1458 and 1459 in which it concluded that Kleenheat's objection that clause 10.3(b) was inconsistent with clause 10.4 was incorrect. The Authority does not consider the clauses to be inconsistent, but recognises that a minor amendment to clause 10.3(b) could readily address Kleenheat's concerns.

2680. Accordingly, the Authority requires clause 10.3(b) to be amended to remove the reference to deemed agreement and instead require the user to pay the invoice in full, in accordance with clause 10.2, and pursue any objection to the invoice under clause 10.4 instead.

2681. The Authority has not changed its view on the merits of allowing minimum value limits in the case of disputed past payments and disallowing these limits in the case of

---

1098 ATCO Gas Australia Pty Ltd, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 279.

1099 Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat Gas Submission on the Draft Decision and Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution System Access Arrangement, 12 January 2015, p. 3 and its 21 May 2014 submission.

invoices. Accordingly, the Authority requires that clause 19.1(c) be amended to achieve this result.

2682. The Authority notes that the definition of the minimum value threshold that it considered at the Draft Decision stage has now been amended by ATCO in its response. Following a query from the Authority on the interpretation of the revised definition, ATCO requested the removal of clause 19.1(c)(iii) "there is any single line item or multiple line items of any total for any period greater than 3 months" as it was erroneously included.[1100]

2683. The Authority has considered the further amended minimum value thresholds in the context of disputed past payments. The Authority considers ATCO's revised thresholds to be reasonable for past payments to ensure that all erroneous payments can be submitted for dispute resolution while at the same time minimising costs of engaging in a dispute resolution process for both parties.

2684. The Authority is satisfied that ATCO's revisions to clause 10.4(b) and 10.4(c) ensure equal rights and obligations for each party, regardless of whether the past payment is disputed by the user or the service provider. However, the Authority considers that clause 10.4(d) has been rendered redundant by the amendments to clauses 10.4(b) and 10.4(c). Furthermore, clause 10.4(d), as amended, doesn't make sense, since "the Recipient" cannot be, by the definition provided in 10.4(b), the party providing the notice.

2685. Accordingly, the Authority accepts the amendments to clauses 10.4(b) and 10.4(c) and requires clause 10.4(d) to be deleted.

2686. The Authority accepts Kleenheat's view that clause 19.1(a) should be amended to reflect the fact that disputes in relation to invoices and payments are to be resolved in accordance with clauses 10.3 and 10.4 as well as clause 19.

[1100] ATCO Gas Australia, Email Response to ERA79, 26 March 2015.

Required Amendment 26

Clause 10.3 of the revised proposed template service agreement should be amended as follows:

(b) If <User> does not give <Service Provider> a Payment Dispute Notice in respect of a Payment Claim within the period specified in clause 10.3(a)(i), then, clause 10.2 will apply and, if the User wishes to dispute the Payment Claim, it must do so in accordance with clause 10.4. ~~<User> will be deemed to have agreed to the amounts payable set out in the Payment Claim~~.

Clause 10.4(d) of the revised proposed template service agreement should be deleted.

Clause 19.1 of the revised proposed template service agreement should be amended as follows:

(a) Subject to clauses 10.3, 10.4, 19.1(b) and 19.1(c), any dispute arising between the Parties out of or in connection with this Service Agreement must be resolved in accordance with clauses 19.2 and 19.3.

(c) Where a Party seeks the correction of a payment error after payment, pursuant to clause 10.4, the ~~A~~ Party may only give a notice under clause 19.2(a) to initiate dispute resolution processes under this Service Agreement ~~in relation to a disputed or erroneous Payment Claim~~ where:

(i) there is any single line item or multiple line items and the single line item or multiple line items total less than $5,000 in any rolling 3 month period; or

(ii) if a single line item or multiple line items total equal to or greater than $5,000 at any time.

Taxes generally and GST

2687. In its initial proposal ATCO sought to introduce clause 11.1(a), establishing the user's liability for all taxes relating to the transfer of title to gas at a receipt point or a delivery point, in addition to any taxes arising in relation to delivery, transportation or handling of gas outside of the GDS. ATCO proposed clause 11(b), which would make the service provider liable for taxes arising in relation to pipeline services provided within the GDS.

2688. ATCO also proposed:

- Clause 11.2, specifying rights, obligations and processes relating to the payment of GST; and
- Clause 22.5, of which, 22.5(a) would make the user liable for all duty payable on or in connection with the service agreement or subsidiary instrument or payable on transactions effected under the contract.

2689. In its Draft Decision the Authority referred back to the third access arrangement review, in which clauses similar to proposed clauses 11.1, 11.2 and 22.5(a) were considered and ultimately rejected.

2690. In the third access arrangement review, the service provider, WAGN, had submitted that its reference tariffs had been calculated exclusive of any stamp duty that may be payable on the template haulage contract [service agreement]. It argued that it should have the opportunity to recover the efficient cost of providing the reference services, including any taxes incurred as a result of the haulage contract [service agreement], hence the need for a clause equivalent to ATCO's proposed clause 11.1.[1101]

2691. The Authority considered it likely that clause 11.1 had been drafted with an eye to possible future duties or taxes and expressed concern that the clause was too broad in scope. On this basis, the Authority wasn't persuaded that clause 11.1 struck a suitable balance between delivering expedient network access and avoiding unforeseen effects, and required it to be removed.

2692. The Authority reconsidered the position it had taken in the third access arrangement review on a clause similar to clause 11.2. The Authority acknowledged that the service agreements for at least three of the Victorian gas distributors specified how GST is handled in respect of services provided under regulated haulage contracts [service agreements]. The Authority was also mindful of Alinta's support, expressed during the third access arrangement review, for the provisions proposed by WAGN to specify the treatment of GST under the template haulage contract [template service agreement].

2693. Given its focus on a specific tax, the fact that reference tariffs do not make allowance for GST, the precedents that exist in Victoria and the support expressed by Alinta in 2010, the Authority was satisfied that clause 11.2 was consistent with the NGO.

2694. In its Draft Decision, the Authority noted the position it took in its Final Decision for the third access arrangement review on a similar provision to clause 22.5(a). The Authority's conclusion at that time was that potential liability for stamp duty was a matter for commercial negotiation and not for the Authority to regulate. In that earlier decision, the Authority had rejected WAGN's argument that the terms and conditions should ensure that the service provider could recover the efficient cost of providing the service. The Authority's view at the time had been that the revenue and pricing principles did not apply to the template service agreement, since these terms and conditions did not concern revenue or pricing.[1102]

2695. The Authority noted that the regulated terms and conditions for Victorian gas distributors specified liability to pay stamp duty payable pursuant to the contract. On this basis, the Authority was willing to reconsider its previous rejection of a provision similar to clause 22.5(a), but remained concerned that the clause was too broad and could have unintended consequences.

2696. The Authority required clause 22.5(a) to be amended to distinguish between duties that arise at the level of the bilateral relationship (which should be recoverable from the user) as distinct from those arising at the corporate or system level (which need to be considered in the access arrangement review process).

1101 WAGN, Response to Draft Decision, 8 October 2010, p. 104.

1102 Economic Regulation Authority, Final decision on WA Gas Networks Pty Ltd proposed revised access arrangement for the Mid-West and South-West Gas Distribution Systems, 28 February 2011, paragraph 1202.

2697. In its response to the Draft Decision ATCO defended the need for clause 11.1 and indicated that the focus of the clause was principally to deal with duty liabilities, rather than broader tax liabilities. Accordingly, ATCO proposed to address the ERA's concerns by narrowing the scope of the clause to refer to "duty" rather than "taxes" and, more specifically, duty arising in respect of defined events or instruments. ATCO also proposed an additional amendment to expressly confirm that the user is not liable for any duty that may be assessed as payable for any transfer or assignment by the service provider under clause 14.8.

2698. ATCO rejected the suggestion, made by the Authority in its Draft Decision that in drafting clause 11.1 it was looking to possible future duties or taxes. Instead, ATCO pointed out that any future duty or tax changes would be addressed through the amendment processes proposed in clause 13.

2699. ATCO deleted clause 22.5(a), as opposed to amending as the Authority had required in its Draft Decision.

2700. In its submission of 12 January 2015, Kleenheat wrote that it was concerned about the inclusion of clauses 9.3(b) and 11.1 (a)(vi), particularly where these items relate to obtaining leases, licences and easements. Following a request for further information about this concern, Kleenheat suggested that the words "or other suitable access rights" may be more appropriate, as in some cases it may be impractical for users to obtain leases, licences and easements.[1103]

2701. The Authority continues to have concerns about the breadth of clause 11.1 and the need to ensure that it only results in reasonable liabilities for the user. Clause 11.1(a)(i) differs from the following sub-paragraphs in that it does not ensure that the relevant liable event is only one for which the user is responsible. Accordingly, the Authority requires that clause 11.1(a)(i) be amended to make clear that it is only gas transferred on the user's account that is subject to the clause.

2702. The Authority considers that Kleenheat's suggestion to add the phrase "or other suitable access rights" may be relevant to clause 9.3, but will add little to clause 11.1(a)(vi) because that clause already includes the catch-all phrase "other document".

2703. ATCO's deletion of clause 22.5(a) removes the Authority's concerns in respect of that clause.

[1103] Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat email in response to request for further information regarding its public submission of 12 January 2015, 15 March, 2015, p. 4.

Required Amendment 27

Clause 11.1 of the revised proposed template service agreement should be amended as follows.

(a) (i) the transfer of title to Gas by or on behalf of <User> to the <Service Provider> at a Receipt Point"

Obligations if the network ceases to be a covered network

2704. In its initial proposal, ATCO sought to introduce into the template service agreement two provisions governing the contract in the event that the GDS ceased to be a covered network. Proposed clause 13.5(c) required that the parties enter into good faith discussions to renegotiate access. Further, if the GDS subsequently became covered again, clause 13.5(d) would require that the parties enter into good faith discussions to renegotiate the service agreement.

2705. In its Draft Decision, the Authority required the deletion of clauses 13.5(c) and 13.5(d) in two separate required amendments (Required Amendment 24 and Required Amendment 35). The duplication of this requirement was unintentional and different reasons were given in both cases.

2706. In the first instance, the Authority explained that it saw no benefit in clauses 13.5(c) and 13.5(d) that merely commit the parties to enter into good faith negotiations. The Authority thought such commitments were likely to be unenforceable and that the provisions should, therefore, be deleted.

2707. In the second instance, the Authority concluded that neither clause was within the Authority's current jurisdiction to approve. The Authority noted that, under the NGL(WA) and the NGR, the Authority's jurisdiction to approve terms and conditions for access to reference services is limited to covered networks. The Authority reasoned that it could not make the template service agreement endure past the time that the access arrangement ceased.

2708. In its response to the Draft Decision, ATCO accepted the required amendment. It noted that the Authority had given different reasons in different parts of the decision for requiring the deletion of 13.5(c) and 13.5(d), neither of which it accepted.

2709. ATCO agreed to delete the two provisions because it accepted that if the parties have entered into a regulated contract for reference services only, then any other non-regulated or non-reference services could only be included as a result of bilateral agreement.

2710. The Authority has not received any public submissions in relation to clauses 13.5(c) and 13.5(d).

2711. The Authority's concerns with respect to clauses 13.5(c) and 13.5(d) have been addressed. However, in the interests of ensuring consistency with the rest of this Final Decision, the Authority makes the following comments regarding reasons.

2712. The Authority remains of the view that clauses 13.5(c) and 13.5(d) are likely to be unenforceable since they appear to simply commit the parties to try to agree on something at some future point. However, the Authority no longer considers that it

lacks the jurisdiction to approve terms in the template service agreement that would bind the parties beyond the access arrangement. Such a position would appear to be inconsistent with the Authority's understanding of the relationship between the template service agreement and an individual service agreement (see paragraphs 2489 to 2494).

2713. In practice, the instrument that would bind a user and the service provider post-access-arrangement, would be the specific service agreement (that is, contract) between them. Each party's power to enforce the agreement would derive from the law's recognition of a valid contract, not from the status of a statutory scheme regulating the development of standing offers.

2714. Having reconsidered the issues, the Authority favours ATCO's reasoning in accepting the deletion of clauses 13.5(c) and 13.5(d). The Authority has noted previously (see paragraph 2493) that the template service agreement should accommodate a user who seeks access exclusively to reference services. To the extent that clauses 13.5(c) and 13.5(d) were actually enforceable, they might compromise this notional user's ability to obtain access solely to reference services, since services provided post-access-arrangement cannot be reference services.

Capacity Trading

2715. In its initial proposal, ATCO sought to include a new clause 14.3(c)(ii), which provided that the service provider could withhold consent for the transfer of capacity between parties where the transferee had not complied with the service provider's conditions or requirements.

2716. In its Draft Decision, the Authority pointed out that the regulated preconditions for access to reference services already afforded the service provider considerable protections. In particular, the Authority noted that Clause 14.3(c)(ii) of the template service agreement already allowed the service provider to insist on the compliance of the transferee with one or more of the preconditions set out in the access arrangement.

2717. The Authority was not persuaded that the service provider required the additional protection that proposed clause 14.3(c)(iii) would provide. Accordingly, the Authority required that clause 14.3(c)(iii) be deleted.

2718. In its response to the Draft Decision, ATCO accepted the requirement to delete 14.3(c)(iii) on the following two conditions:

- Clause 14.3(c)(ii) remains as proposed by ATCO and
- Required amendments 19 and 20 are dealt with as proposed by ATCO.

2719. No public submissions were received in relation to 14.3(c)(iii) or any other capacity trading provision.

2720. ATCO's deletion of clause 14.3(c)(iii) removes the Authority's concerns in respect of that clause. The Authority's position on ATCO's response to required amendments 19 and 20 has been dealt with above. The Authority has not identified any concerns with either of the two conditions on which ATCO based its acceptance of the deletion of clause 14.3(c)(ii).

Novation

2721. In its initial proposal, ATCO sought to introduce clause 14.8, granting it the discretion to assign its rights or novate its obligations under the service agreement on giving reasonable written notice to the user.

2722. In its Draft Decision, the Authority acknowledged that ATCO's proposed replacement of clause 12.6(c) in the current template haulage [service agreement] contract with the clause 14.8 of the revised proposed template service agreement was intended to clarify rather than change the meaning of that provision. The Authority's interpretation was that the rights sought by ATCO under clause 14.8 were those it required to ensure it can transfer a service agreement to a new service provider in the event that it sells all or part of the GDS.

2723. Noting that gas distributors in Victoria benefit from similar rights to those sought by ATCO by means of clause 14.8, the Authority concluded that it was reasonable for ATCO to have the right to sell the GDS, free from unreasonable constraints, such as a requirement for individual user consents. However, the Authority was not satisfied that ATCO's chosen terminology was optimal to achieve this result.

2724. Having considered a 2009 guidance note prepared by the Australian Government Solicitor, the Authority concluded that the term "novate" would normally imply the involvement and consent of both the original parties to the contract as well as the new party. Since ATCO wished to avoid the requirement to obtain the user's consent to the contractual transfer, the Authority concluded that ATCO's use of "novate" was at odds with the normal legal interpretation of the term.

2725. In its submission dated 21 May 2014, Kleenheat expressed doubt in its submission about ATCO's supposed right under clause 14.8 to novate its obligations merely by providing written notice. Kleenheat argued that the novation of contractual obligations is supposed to require the consent of the three parties involved. These parties would be ATCO, the user and the party assuming ATCO's obligations.

2726. To avoid doubt, the Authority required clause 14.8 to be amended to replace the term "novate" with the term "transfer".

2727. In its response to the Draft Decision, ATCO accepted the requirement to replace the term "novate" with the term "transfer". ATCO went slightly further by also inserting the word "transfer" into the headings at clauses 14 and 14.8.

2728. In its submission dated 12 January 2015, Kleenheat stated that its concerns around the transfer of obligations under Clause 14.8 remained unaddressed. The Authority sought further information from Kleenheat about the basis for this concern. Kleenheat responded as follows:

> "At law, an assignment of a party's contractual rights can be legally effective without the consent of the counterparty, but a transfer of obligations will only have legal effect with the consent of the counterparty (ie. a tripartite novation arrangement). The reason for this is that it is not reasonable for a party to have a new counterparty performing obligations without its consent. Accordingly, while an assignment of rights can have legal effect with notice and no consent, the same cannot occur in relation to contractual obligations. Kleenheat suggests that clause 14.8 be amended so that it is consistent with clause 14.4(a) – ie. "Service Provider may novate this Service Agreement to a Third

> Party with User's prior written consent, and such consent must not be unreasonably withheld." [1104]

2729. The Authority now accepts that it is a common law principle that a party may not transfer to a third party contractual obligations owed to the counterparty, without the counterparty's consent. Transfer of this kind, if consented to by the counterparty, amounts to novation, but novation requires consent.

2730. Upon further reviewing the regulated terms and conditions for Envestra and SP Ausnet and Multinet, the Authority now notes that only Envestra's contract purported to allow for unilateral transfer of the service provider's obligations. In the case of SP Ausnet and Multinet, the right was expressed as a right to novate obligations subject to the user's consent, which was not to be unreasonably withheld.

2731. The Authority accepts that its previous amendments to clause 14.8 created the risk that the clause would be over-ridden by a court applying the common law principle that the transfer of obligations requires the beneficiary's consent. Accordingly, the Authority requires clause 14.8 to be amended to be consistent with the common law position, while safeguarding the service provider from vexatious interference, in the same manner as in clause 14.4(a).

Required Amendment 28

Clause 14.8 of the revised proposed template service agreement should be amended as follows:

<Service Provider> may assign its rights or ~~transfer~~ novate its obligations under this Service Agreement, with <User>'s prior written consent, and such consent must not be unreasonably withheld ~~on giving reasonable written notice to <User>~~.

Security for performance

2732. In its initial proposal ATCO proposed amendments to clause 16.2, modifying existing provisions and setting out additional rights and obligations in respect of a bank guarantee to be provided by the user. Under the amendments proposed to clause 16.2(a):

- the user would be required to provide a bank guarantee (currently ATCO has discretion to require a bank guarantee);
- the guarantee would have to be "substantially in the form set out at Annexure B" (currently no form is specified); and
- value of the bank guarantee would have to cover three months' worth of charges (currently two months).

2733. ATCO also added new provisions in the form of proposed clauses 16.2(b) to 16.2(h) prescribing the operation and administration of security guarantees and clarifying related rights and consequences.

[1104] Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat email in response to request for further information regarding its public submission of 12 January 2015, 15 March, 2015, p. 3.

2734. In its Draft Decision, the Authority identified two general issues with clause 16.2, as proposed by ATCO. The first concerned the apparent change in the requirement to provide a bank guarantee. The second issue concerns the reasonableness of proposed detailed provisions governing the operation of the bank guarantee mechanism.

2735. The Authority noted that ATCO would currently be entitled, without qualification, to require a bank guarantee. Further, ATCO's proposed revision would require the provision of the bank guarantee, unless ATCO waived that requirement. The Authority did not see a significant practical difference between these two situations. However, the Authority noted that the change might signal a change in ATCO's intended business practices. Whereas previously it may have exercised its right to require a bank guarantee selectively, the revised wording might suggest that ATCO would require bank guarantees as a matter of course during the fourth access arrangement period. Given this, the Authority gave greater weight to the need to ensure that the provisions governing bank securities were balanced and reasonable.

2736. To assist it in evaluating the reasonableness of the proposed bank guarantee provisions, the Authority reviewed recently approved terms and conditions for three gas distributors in Victoria. This review identified different approaches to security guarantees and formed part of the basis on which the Authority determined to allow a detailed treatment of the rights, obligations and processes surrounding security guarantees within the template service agreement.

2737. The Authority did not object to ATCO seeking to prescribe in some detail a regime governing the provision of security guarantees, including: the prescription of a form (Annexure B); an increased cap; or any of the changes set out in clauses 16(b) to 16.2(h). However, the Authority was concerned that the prescriptive and potentially onerous provisions introduced by ATCO in clause 16.2 could become unreasonable, in the absence of any risk assessment obligation on ATCO.

2738. Accordingly, the Authority offered ATCO the following two options for revision, namely:

- to remove all of the proposed amendments to clause 16.2; or
- to limit its entitlement to require a bank guarantee to circumstances where the user presents an unacceptable credit risk.

2739. To provide further guidance to ATCO on how an amended version of clause 16.2 might define an acceptable credit risk, the Authority pointed to clause 7.8(a) of the approved terms and conditions for the Victorian gas distributors SP Ausnet and Multinet.

2740. In its response to the Draft Decision, ATCO has accepted the second of the two options offered by the Authority. ATCO proposed an amended clause 16.2, which now contains a set of provisions governing security guarantees similar to the provisions in the approved terms and conditions for the Victorian gas distributors SP Ausnet and Multinet.[1105]

2741. Alinta commented in its submission, dated 21 May 2014, that it was unreasonable for all users to be required to provide a bank guarantee, asserting on page 9 that:

[1105] Multinet Gas Pty Ltd, National Gas Law Access Arrangement. Part C – Terms and Conditions, April 2013, p. 22.

> "previously, a Bank Guarantee was only required where there was a material adverse change in a User's financial condition." In respect of the amendment requiring guarantees to be in the form of Annexure B, Alinta argued that the form of guarantees should be open to negotiation since different banks would have different requirements.[1106]

2742. In its submission dated 12 January 2015, Kleenheat commented that the "security regime under Clause 16.2 appears excessive". The Authority sought additional information from Kleenheat regarding this objection. In response, Kleenheat indicated that it was, in fact, comfortable with the Authority's proposal for clause 16.2 (apparently this means comfortable with the option adopted by ATCO). However, Kleenheat suggested adding words to allow the parties to agree other suitable security.[1107]

2743. The Authority is satisfied that the proposed amendments to clause 16.2, while considerably more prescriptive than the existing terms governing security, strike a suitable balance between expediting access and avoiding unforseen effects. In forming this view, the Authority has noted Alinta's objections, but decided that the cost, inconvenience and constraints imposed by the revised clause 16.2 are proportionate. The Authority considers that the parties are free to agree alternative security arrangements at any time and therefore there is little value is adding a term to explicitly allow for this.

2744. However, the Authority has noticed drafting issues in the template service agreement relating to clause 16.2(b) which makes an incorrect reference to clause 1.1(a)(1)(C)(v). Clause 1.1(a)(1)(C)(v) does not exist in the template service agreement. Clause 16.2(b) refers to clause 1.1(a)(1)(C)(v) in the context of the calculation of the bank guarantee. This calculation is described at clause 16.2(a)(v). The Authority requires that the correct reference to the amount to be determined for a bank guarantee in clause 16.2(a)(v) is inserted in place of clause 1.1(a)(1)(C)(v) in clause 16.2(b). The Authority also noticed a missing space between Reference Services in clause 16.2(b) which should be corrected.

Representations and warranties

2745. Whereas currently the template haulage contract [template service agreement] provides a placeholder for the parties to insert agreed representations and warranties, in its initial proposal, ATCO put forward detailed new provisions in clause 18, regarding representations and warranties. Proposed clause 18.1 set out numerous representations and warranties provided by the user to the service provider. Proposed clause 18.2 set out separate representations and warranties made by the service provider to the user.

2746. In its Draft Decision, the Authority noted that similar detailed provisions had been sought by WAGN during the third access arrangement review and rejected by the Authority in its Final Decision from that review. The Authority considered that terms concerning commercial matters should be left to bilateral negotiation. In place of the proposed representations and warranties, the Authority inserted a placeholder for provisions that the user and the service provider could negotiate. For the Draft Decision, the Authority reconsidered its previous approach and determined to

---

1106 Alinta Energy, Issues Paper on proposed Revisions to the Mid-West and South-West Gas Distribution System Access Arrangement, 21 May, 2014, p. 9.

1107 Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat email in response to request for further information regarding its public submission of 12 January 2015, 15 March, 2015, p. 4.

evaluate the individual representations and warranties by seeking to balance the goals of expediting access and avoiding unforeseen effects.

2747. The Authority categorised the user representations and warranties into several groups as follows:

- Representations and warranties that reiterate obligations already owed by the user pursuant to other provisions of the template service agreement or by law. Clauses 18.1(a), (b) concerning adherence to the System Pressure Protection Scheme, 18.1(c) concerning compliance with laws, 18.1(k) concerning unfettered access, 18.1(l) concerning insurances, 18.1(m) concerning the Retail Market Scheme and 18.1(o) concerning title to gas, were all placed in this category.
- Representations and warranties that provide a second layer of protections, over and above the bank guarantee provisions, against the risk of not being paid. Clause 18.1(f) fell into this category.
- Other representations and warranties concerning matters that may be associated with general commercial risks for the service provider. These were clauses 18.1(d) and (j) concerning licences, approvals and easements, 18.1(e) concerning power to contract, 18.1(g) concerning ongoing breaches of laws or obligations, 18.1(h) concerning pending or threatened legal proceedings, 18.1(i) concerning status as a trustee, 18.1(n) concerning third party compliance with the retail market scheme, and 18.1(p) concerning the right to supply gas into the GDS for distribution.

2748. The Authority considered that the first group of provisions – those reiterating obligations already owed by the user – would provide minimal benefit, but would complicate the task of contractual interpretation and could give rise to ambiguities. Even if all representations and warranties were consistent with the other provisions of the template service agreement, the Authority believed that these reiterating clauses risked making it more difficult to ascertain the precise rights and obligations of the parties. The Authority concluded that if the protections afforded elsewhere in the document were inadequate, then ATCO should propose modifications to those provisions. Accordingly, the Authority required that Clauses 18.1(a), (b), (c), (k), (l), (m), and (o) be deleted.

2749. With respect to the second group of provisions, the Authority was concerned that the provision of a second layer of protections against the risk of not being paid may be excessive. Noting that the service provider has rights to credit risk protection in the form of a bank guarantee, the Authority was not persuaded that the service provider also required a guarantee from the user regarding the priority of debts. Accordingly, the Authority required clause 18.1(f) to be deleted.

2750. Turning to the last of the three groups of provisions – those bearing on general commercial risk – the Authority found that only some of these provisions were consistent with the NGO. Stepping through reasons for each provision in turn, the Authority ultimately required the deletion of clauses 18.1(d), (h), (j), (n) and (p).

2751. ATCO's response to the Authority's required amendments to clause 18 has presented many different reasons, often specific to individual clauses. To provide a clearer treatment of the positions of both ATCO and the Authority on each provision, the discussion of these clauses is broken out under separate headings below.

Adherence to the System Pressure Protection Plan (proposed clauses 18.1(a), (b))

2752. In its response to the Draft Decision, ATCO accepted that clause 6.9 (a) already imposed an obligation on the user to have in place and abide by an Approved System Pressure Protection Plan, a breach of which is a default under clause 15. Further, ATCO acknowledged that the User can be required under clause 16.1(b) to provide written evidence of compliance, a breach of which gives rise to remedies. Finally, ATCO recognised that proposed clause 1(a)(iii)(A), if retained in the template service agreement as a condition precedent, also offered some protection from the same class of breaches. For these reasons, ATCO accepted that the protections afforded by these existing contractual provisions were sufficient and it accepted the deletion of clause 18.1(a).

2753. ATCO accepted that clause 6.9(b) already included an obligation to notify of known or suspected breaches of the Approved System Pressure Protection Plan. On this basis, it accepted that the existing contractual provisions were sufficient and it accepted the deletion of clause 18.1(b).

2754. The Authority's concerns regarding clauses 18.1(a) and (b) have been addressed.

Compliance with laws (proposed clauses 18.1(c) and 15.1(c))

2755. In its response to the Draft Decision, ATCO noted that there were no other terms of the template service agreement that directly required the User's compliance with the access arrangement or the service agreement. However, ATCO noted that clause 15.1(c) provides that a failure by a party to perform or observe any one or more of its obligations under the service agreement is a default. ATCO suggested that it could accept the deletion of proposed clause 18.1(c) provided that clause 15.1(c) was expanded to cover obligations under the access arrangement, including any obligation implied by the operation of law.

2756. The Authority considers that the protection afforded by clause 18.1(c), to the extent that there is any, would appear to arise by virtue of turning the general obligation to comply with laws into an obligation owed by the user to the service provider. The Authority considers that substantially the same obligation is already created by clause 18.1(d) (formerly clause 18.1(g) in the revised proposed template service agreement considered during the Draft Decision). On this basis, the Authority considers that clause 18.1(c) can be deleted, without necessitating compensating amendments elsewhere in the document.

2757. The Authority also rejects ATCO's proposed modifications to clause 15.1(c) for reasons discussed later at paragraphs 2878 to 2885.

Has necessary authorisations, licences, permits etc (proposed clauses 18.1(d), 18.2(a))

2758. In the Draft Decision, the Authority expressed concern that proposed clause 18.1(d) (now revised proposed clause 18.1(a)) was so broadly worded that there appeared to be scope for the clause to be breached as a result of minor oversights on the part of the user. Further, the Authority considered that an obligation of this type should apply reciprocally and that, if the term was to be reciprocal, this could be left to the parties to reduce the risk of unforeseen effects.

2759. The Authority considered it preferable for the parties to specify any authorisations, licences, permits, consents, certificates, authorities and approvals of particular

importance. For these reasons, the Authority required proposed clause 18.1(d) and proposed clause 18.1(j) to be deleted.

2760. ATCO sought to retain proposed clause 18.1(d). ATCO noted that the obligations set down in proposed clause 18.1(d) were already reciprocal, by virtue of clause 18.2(a). ATCO argued that the terms provided clarity, mutuality and efficiency of access (presumably by minimising negotiation time). ATCO also pointed out that the regulated terms and conditions for the Victorian distributors, Multinet and SP Ausnet, contain a narrower version of the same representation and warranty provided by proposed clause 18.1(d).

2761. ATCO proposed a revised clause 18.1(a) (to replace 18.1(d)), which is based on proposed clause 18.2(a). In both revised proposed clause 18.1(a) and 18.2(a), ATCO has included the word "material" before listing the set of instruments that the user was required to obtain.

2762. The Authority concedes that it overlooked clause 18.2(a) when commenting on making proposed clause 18.1(d) reciprocal. Further, the Authority is satisfied that the insertion of the word "material" makes both clauses more reasonable. Accordingly, the Authority accepts the revised proposed clause 18.1(a) (previously proposed clause 18.1(d)).

Non-contravention of constituent documents (proposed clause 18.1(e), 18.2(b))

2763. In its Draft Decision, the Authority was prepared to accept proposed clause 18.1(e) (now revised proposed clause 18.1(b)) provided it was made reciprocal.

2764. ATCO rejected the required amendment to make proposed clause 18.1(e) (now revised proposed clause 18.1(b)) reciprocal, on the basis that the obligation already applied reciprocally when read together with clause 18.2(b).

2765. The Authority concedes that it overlooked clause 18.2(b) when commenting on making 18.1(e) reciprocal. The Authority accepts revised proposed 18.1(b) (previously proposed clause 18.1(e)).

Equal rank of debts (proposed clause 18.1(f))

2766. In its response to the Draft Decision, ATCO rejected the required amendment to delete proposed clause 18.1(f).

2767. ATCO pointed out that there may be cases where it was not entitled to obtain a bank guarantee but the user did not pay – requiring ATCO to undertake recovery proceedings. ATCO noted that in such cases, proposed clause 18.1(f) provided a complementary protection for ATCO where an insolvency event occurs in the absence of a bank guarantee. ATCO submitted that this was neither unreasonable nor onerous.

2768. However, the Authority considers ATCO's proposed clause 18.1(c) (previously proposed clause 18.1(f)) may be considered unreasonable to the extent it seeks to do so in the form of a warranty by one party alone (User), including about some matters (subordination) over which the other party (ATCO) has control. As a result, the Authority had decided to accept ATCO's revised proposed clause 18.1(c) but with the addition of the following:

> The parties acknowledge and agree that, without limiting this clause in any way, except for debts mandatorily preferred by Law, no debt owed by <User> to the <Service

> Provider> at any time under this Service Agreement, is, or is to be taken to be, subordinated in any way to any other debt owed by <User> at any time to any person, unless the <Service Provider> otherwise expressly agrees or declares that it to be so subordinated. Nothing in this Service Agreement is, or is to be taken to be, such an agreement or declaration by the <Service Provider> to subordinate a debt owed by <User> to the <Service Provider>.

Ongoing breaches of laws (proposed clause 18.1(g), 18.2(c))

2769. In its Draft Decision, the Authority was prepared to accept proposed clause 18.1(g) (now revised proposed clause 18.1(d)) provided it was made reciprocal.

2770. In its response to the Draft Decision, ATCO rejected the required amendment to make proposed clause 18.1(g) reciprocal, on the basis that the obligation already applied reciprocally when read together with clause 18.2(c).

2771. The Authority concedes that it overlooked clause 18.2(c) when commenting on making proposed clause 18.1(g) reciprocal. Accordingly, the Authority accepts the revised proposed clause 18.1(d).

No pending legal action (proposed clause 18.1(h), 18.2(d))

2772. In its Draft Decision, the Authority expressed concern that proposed clause 18.1(h) requires of the user a representation and warranty that it would not be within the user's control to maintain compliance with. The Authority was concerned that a user could be placed in breach of the clause if a third party were to bring a vexatious action against it, or merely threaten action. Accordingly, the Authority required that proposed clause 18.1(h) be deleted.

2773. The Authority was sympathetic towards the desire of either party to be made aware of legal proceedings that could affect their interests but it concluded that a different approach would be required to that put forward in proposed clause 18.1(h). Specifically, the Authority signalled that it might consider provision for pre-contractual disclosure and an ongoing notification of legal proceedings. The Authority also indicated its preference for such obligations to be reciprocal.

2774. In its response to the Draft Decision, ATCO rejected the requirement to delete proposed clause 18.1(h), retaining it as revised proposed clause 18.1(e).

2775. ATCO pointed out that the obligation was already reciprocal, by virtue of clause 18.2(d) and that both clause were subject to the qualifier "…will, or might reasonably be expected to, materially affect…".

2776. While it declined to remove proposed clause 18.1(h), ATCO took up the Authority's suggestion of a notification obligation by proposing new clause 18.4, which would, among other things, impose a positive obligation on each party to notify the other party as soon as possible when any representation or warranty was rendered untrue.

2777. The Authority remains of the view that it is only partially within the control of either party to ensure that it is not the subject of legal action. ATCO provided a credible defence that revised proposed clause 18.1(e) is crafted to prevent exposure to frivolous claims, because of the qualifying text requiring materiality. However, it remains the case that if either party was sued by a third party, for anything besides an obviously frivolous claim, this would place them in breach of the warranty. In turn, this would qualify as a default under clause 15.1(e).

2778. The Authority is not prepared to approve a clause that would expose either party to the risk of being in default when the trigger event may not be within the control of that party and where the threshold of risk to the other party appears low (specifically, the words “might reasonably be expected to”). The Authority is only prepared to allow a reciprocal obligation for both parties to continuously disclose any pending or threatened legal action. To do this, the Authority proposes to further qualify revised proposed clause 18.1(e), giving a warranty to the effect that no relevant action or proceeding will remain undisclosed. Clause 18.2(d) is required to be amended in the same manner.

Has all leases licences and easements (proposed clause 18.1(j), 18.1(k))

2779. In its Draft Decision, the Authority rejected proposed clause 18.1(j) on the basis that it was preferable for the parties to specify the requirements that they considered particularly important. The Authority rejected proposed clause 18.1(k) on the basis that it overlapped with other provisions in the template service agreement in a potentially confusing manner and that the warranty was unnecessary in any case.

2780. In its response to the Draft Decision, ATCO pointed out that it was not practical or possible to identify which of a lease, licence or easement is required for each Delivery Point or other facilities as the requirement will vary depending on the specific location and nature of each Delivery Point or other facility. Further, ATCO pointed out that for the user to meet its obligations under clauses 5, 7.7 and 9.3 in respect of Delivery Points and other facilities these same requirements would need to be met.

2781. ATCO agreed to delete clause 18.1(k) if the Authority would allow an amendment to clause 9.3(b) to make it clear that reasonable endeavours to provide unfettered access to land, included the responsibility to obtain the necessary leases, licences and easements.

2782. The Authority notes ATCO’s arguments for retaining revised proposed clause 18.1(g) (previously proposed clause 18.1(j)). The Authority finds that ATCO’s argument in support of revised proposed clause 18.1(j) is indicative of its superfluousness, as the service agreement already imposes the same requirements under clauses 5, 7.7 and 9.3. Further, the Authority finds ATCO’s desire to specify detailed requirements of how users are to conduct their business to be unreasonable.

2783. The underlying or substantive obligation referred to in revised proposed clause 18.1(g) is for the user to ensure that it can construct, operate and maintain the delivery points. The additional obligations imposed by the clause effectively tells the user how to meet its obligations. ATCO has not identified the particular problem with leases, licences and easements that makes it appropriate for the user to provide a warranty that this particular aspect of its operations is in-hand. The user already has every incentive to do what is necessary and efficient to meet its substantive obligations.

2784. The Authority is not persuaded that revised proposed clause 18.1(g), is necessary. Most of the protection afforded by revised proposed clause 18.1(g) would already be available under revised proposed clause 18.1(a) and the additional benefit does not appear to justify the risk of unintended consequences associated with requiring a warranty about an operational matter of indirect consequence to the service provider. Accordingly, the Authority requires revised proposed clause 18.1(g) to be deleted.

2785. The Authority’s concerns with respect to proposed clause 18.1(k) has been addressed by ATCO through the removal of this clause. However, ATCO has sought

to reword clause 9.3(b) which was identified by the Authority in its Draft Decision as overlapping the provision of 18.1(k). Kleenheat was concerned with ATCO's changes to clause 9.3(b) relating to obtaining leases, licences and easements. The Authority has decided to approve ATCO's changes to clause 9.3(b), given that ATCO has reworded clause 9.3(b) to account of the aspects of clause 18.1(k) that did not overlap.

Has adequate insurances (proposed clause 18.1(l))

2786. In its Draft Decision, the Authority required the deletion of proposed clause 18.1(l) due to its overlap with other provisions of the template service agreement.

2787. In its response to the Draft Decision, ATCO noted that the Victorian gas distributors' regulated terms and conditions impose similar obligations on both parties. However, ATCO was prepared to delete clause 18.1(l) provided that clause 16.3(a) was amended to require each party to obtain adequate insurance to meet its obligations in relation to insurance under the service agreement.

2788. The Authority notes that the requirement to have insurance no longer takes the form of a warranty. This should mean that, subject to the insertion of a materiality threshold in clause 15.1(c), breaches of this requirement that did not exceed the threshold would not give rise to a risk of being in contractual default.

2789. On its face, the fact that the insurance adequacy obligation has been made reciprocal is a positive development. However, it isn't clear to the Authority that the clause results in ATCO taking on any meaningful insurance obligation. Clauses 16.3(b) to 16.3(d) speak only to the insurance requirements imposed on the user.

2790. The Authority notes that the regulated terms and conditions for SP Ausnet and Multinet contain the following term:

> 13.4 Each party must obtain adequate insurance covering any liability which it may incur under this Agreement. A party must provide the other party with proof of the currency of this insurance and details of the adequacy of the insurance cover, on the other party's reasonable request from time to time.[1108]

2791. The regulated terms and conditions for Envestra contain the following terms:

> 34.7 Insurance Required
>
> Envestra must obtain and maintain insurance throughout the term against whatever risks a person carrying on a business of managing and operating a gas delivery network would prudently insure, with reputable insurers
>
> 34.8 Insurance Information
>
> Whenever reasonably requested by the Network User, Envestra must give the Network User a certificate of currency for the insurance
>
> 34.9 Notification
>
> Envestra must promptly notify the Network User if Envestra fails to obtain or maintain any insurance required under this Agreement.

2792. The Victorian distributors are made subject by their regulated terms and conditions to comprehensive insurance obligations of a kind that are completely absent from ATCO's template service agreement. Given this precedent and the extensive

[1108] Clause 13.4, Multinet terms and conditions, April 2013.

financial obligations imposed on the user, including detailed insurance requirements, the Authority considers it appropriate to impose some general insurance obligations on ATCO. The Authority considers that Envestra's terms and conditions offer the best basis for drafting provisions to impose these obligations.

2793. Accordingly, the Authority notes the deletion of proposed clause 18.1(l), accepts revised proposed clause 16.3(a) and requires the inclusion of a new clause 16.3(e), reflecting the elements of Envestra's insurance obligations set out at paragraph 2791.

Compliance with retail market scheme (proposed clauses 18.1(m) and 18.1(n))

2794. In its Draft Decision, the Authority required the deletion of proposed clause 18.1(m) on the grounds that it appeared to reiterate other provisions or protections. The Authority required the deletion of proposed clause 18.1(n) because the need for it wasn't clear and its effect hadn't been explained. The Authority noted that the Retail Market Scheme was complex and no analysis had been presented to show what effect the proposed clause would have.

2795. In its response to the Draft Decision, ATCO emphasised the importance of the Retail Market Scheme for much of the template service agreement. ATCO pointed to clauses 4, 5, 6, 7, 8 and 9, which, it suggested, either largely or entirely relate to obligations arising under the Retail Market Scheme.

2796. ATCO also differentiated between the precondition imposed by clause 1(a)(iii)(E) and the effect of a warranty of continuing compliance. The latter, ATCO noted, would trigger remedies under the contract, whereas the precondition would not.

2797. The Authority now accepts that the warranties required under proposed clauses 18.1(m) and 18.1(n) are reasonable, in light of the importance of ensuring compliance with the Retail Market Scheme. A further drafting consideration is that the three sub paragraphs to clause 3(b) do not all agree with the preamble. Finally, clause 3(b) will be more difficult for the user to find, when looking to identify a full set of representations and warranties.

2798. ATCO has not explained why the previously required deletion of proposed clauses 18.1(m) and 18.1(n) gave rise to a need for clause 3(c). The Authority considers that neither the meaning nor relevance of clause 3(c) is clear. Why users would be contracting with third parties to provide reference services who in turn provide those reference services forward isn't apparent to the Authority. The Authority expects that users will generally prefer to obtain their reference services directly from the service provider. However, where users do on-sell reference services to other users, the misuse of the network by those secondary parties should automatically create liabilities for the user, much as a head tenant assumes responsibility for the violations of sub-tenants. In short, the Authority can find no good basis for including clause 3(c).

2799. The Authority has concluded that proposed clauses 18.1(m) and 18.1(n) should be reinstated, appropriately renumbered and clauses 3(b) and (3c) deleted. Clause 18.1(n) should be reworded along similar lines to clause 3(b)(iii) and inserted as revised proposed clause 18.1(j).

Has title to gas (proposed clause 18.1(o))

2800. In its Draft Decision, the Authority did not allow proposed clause 18.1(o) on the grounds that similar protections were provided elsewhere in the document.

2801. In its response to the Draft Decision, ATCO noted that the regulated terms and conditions for the Victorian distributors Envestra, SP Ausnet and Multinet have terms relating to title to gas that are similar to proposed clause 18.1(o).

2802. ATCO indicated it would accept the deletion of proposed clause 18.1(o), provided an amendment to clause 7.1(a) was allowed, creating an equivalent obligation.

2803. Based on the precedents pointed out by ATCO, the Authority now accepts that a requirement on the user to ensure title to gas is consistent with the NGO. However, the Authority considers that the meaning of ATCO's proposed clause 7.1(a)(i) is unclear. Accordingly, the Authority requires the clause to be split out and reworded to clarify the meaning.

Has ability to deliver gas into the GDS (proposed clause 18.1(p))

2804. In its Draft Decision, the Authority required the deletion of proposed clause 18.1(p) on the grounds that the need for the clause wasn't apparent. The Authority noted that because an ability to deliver the necessary gas was already a condition precedent under clause 1(a)(iii)(D), the user already had obligations for gas balancing (clause 6.7) and maintaining system pressure (clause 6.9).

2805. In its response to the Draft Decision, ATCO pointed out that proposed clause 18.1(p) related to obligations under the Retail Market Scheme and was therefore of central importance to the contract. ATCO also pointed out that clause 1(a)(iii)(D) created merely the precondition of an ability to deliver gas, rather than an ongoing obligation.

2806. ATCO did not delete proposed clause 18.1(p) in its revised proposal, but it repeated its proposal, apparently as an alternative to this clause, to include revised proposed clause 3(b)(iii), which also offered an alternative to proposed clause 18.1(m).

2807. The Authority remains unpersuaded that revised proposed clause 18.1(i) (previously proposed clause 18.1(p)) is necessary and holds to this view irrespective of whether clause 3(b)(iii) is included or not. The Authority considers that the reasoning set out in paragraph 2784 in relation to revised proposed clause 18.1(g) is also relevant in this instance. The ultimate obligation on the user is to ensure delivery of gas and ATCO has not made a case for why it requires terms that descend into the operational detail of how the user will meet that obligation.

2808. Accordingly, the Authority requires revised proposed clause 18.1(i) to be deleted.

Disclosure and notification (proposed clause 18.4)

2809. In its submission of 12 January 2015, Kleenheat suggested that clause 18.4(c) should be amended to extend to all warranties and representations set out anywhere in the service agreement, not just those in clause 18.[1109]

2810. The Authority agrees with Kleenheat's suggestion and requires that clause 18.4(c) be amended to replace "this clause 18" with the phrase "this service agreement".

[1109] Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat Gas Submission on the Draft decision and Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution System Access Arrangement, 12 January, 2015, p. 3.

Required Amendment 29

Revised proposed clauses 3(b) and (3(c) of the template service agreement should be deleted and clause 3(a) should be reformatted accordingly.

Revised proposed clause 7.1(a) of the revised proposed template service agreement should be amended as follows:

(a) At ~~at~~ all times, <User> must ensure that ~~caused to be injected into the ATCO GDS must be provided by <User> ensuring that <User>~~ it has good title to any gas it causes to be injected into the ATCO GDS, free and clear of all liens, encumbrances and claims of a nature inconsistent with <Service Provider>'s operation of the ATCO GDS;

(b) Title to Gas:

~~(i) at all times caused to be injected into the ATCO GDS must be provided by <User> ensuring that <User> has good title, free and clear of all liens, encumbrances and claims of a nature inconsistent with <Service Provider>'s operation of the ATCO GDS;~~

(i~~i~~) delivered into the ATCO GDS at a Receipt Point passes to <Service Provider> at the Receipt Point; and

(ii~~i~~) delivered out of the ATCO GDS to <User> at a Delivery Point passes to <User> at the Delivery Point, subject to any defect to which the title was subject when it passed to <Service Provider> under clause 7.1(a)(i).

Clause 16.2 should be amended as follows:

(b) The Parties acknowledge that any amount determined under clause ~~1.1(a)(1)(C)(v)~~ 16.2(a)(v) is based on a forward estimate of the ~~ReferenceServices~~ Reference Services to be provided under this Service Agreement. If, in <Service Provider>'s reasonable opinion, the amount of the bank guarantee required under clause ~~1.1(a)(1)(C)(v)~~ 16.2(a)(v) has increased since the date of <Service Provider>'s most recent notice under that clause ~~1.1(a)(1)(C)(v)~~ 16.2(a)(v), <Service Provider> may, not more frequently than monthly, give <User> a further notice under clause ~~1.1(a)(1)(C)(v)~~ 16.2(a)(v) specifying a revised amount required to be the subject of a bank guarantee under this Service Agreement, and <User> must provide an additional or replacement guarantee such that this revised amount is guaranteed.

Clause 16.3 of the revised template service agreement should be amended as follows:

(e) <Service Provider> must

(i) obtain and maintain insurance throughout the term against whatever risks a person carrying on a business of managing and operating a gas delivery network, substantially similar to the ATCO GDS, would prudently insure, with reputable insurers.

(ii) give User a certificate of currency for the insurance, whenever reasonably requested.

(iii) promptly notify <User> if <Service Provider> fails to obtain or maintain any insurance required under this Service Agreement.

Clause 18.1 of the revised proposed template service agreement should be deleted and a new clause 18.1 inserted as follows:

18.1 <User> representation and warranties

<User>, by entering into this Service Agreement, represents and warrants to <Service Provider> that:

(a) it has in full force and effect all material authorisations, licences, permits, consents, certificates, authorities and approvals necessary under all Laws to enter into this Service Agreement, to observe its obligations under this Service Agreement, and to allow those obligations to be enforced;

(b) this Service Agreement and any transaction under it do not contravene <User>'s constituent documents or any Law or any of its obligations or undertakings by which it or any of its assets are bound, or cause to be exceeded any limitation on its, or its directors', powers;

(c) its obligations to make payments under this Service Agreement rank at least equally with all unsecured and unsubordinated indebtedness of <User>, except debts mandatorily preferred by Law. The parties acknowledge and agree that, without limiting this clause in any way, except for debts mandatorily preferred by Law, no debt owed by <User> to <Service Provider> at any time under this Service Agreement, is, or is to be taken to be, subordinated in any way to any other debt owed by <User> at any time to any person, unless <Service Provider> otherwise expressly agrees or declares that it be so subordinated. Nothing in this Service Agreement is, or is to be taken to be, such an agreement or declaration by <Service Provider> to subordinate a debt owed by <User> to <Service Provider>;

(d) neither <User> nor any of its Related Bodies Corporate is in breach of a Law affecting any of them or their respective assets, or any obligation or undertaking by which they or any of their assets are bound, which breach will, or might reasonably be expected to, materially affect <User>'s ability to perform its obligations under this Service Agreement;

(e) there is no undisclosed action or proceeding, either pending or threatened, affecting <User> or any of its Related Bodies Corporate or any of their respective assets before a court, referee, governmental agency, commission, arbitrator or other tribunal which will, or might reasonably be expected to, materially affect <User>'s ability to perform its obligations under this Service Agreement;

(f) it is not an agent or trustee (except if and to the extent that it is disclosed as such in the Application that led to this Service Agreement) in relation to this Service Agreement or the Gas to be delivered or received under this Service Agreement;

(g) <User> has good legal and beneficial title to all Gas delivered into the ATCO GDS at a Receipt Point by, for or on account of <User> or a Related Shipper of <User>, free and clear of mortgages, charges and other encumbrances;

(h) it is and will at all times be a "user" for the purposes of the Retail Market Scheme and will at all times comply with the Retail Market Scheme; and

(i) it shall use reasonable endeavours to ensure the compliance of any pipeline operator and any Shipper or Swing Service Provider who delivers Gas to the ATCO GDS on <User>'s behalf, with the Retail Market Scheme and any contract applying in respect of

the relevant Interconnection Arrangements, to the extent necessary to permit the Parties to perform their respective obligations under this Service Agreement.

Revised proposed clause 18.2 should be amended as follows.

(d) there is no undisclosed ~~pending or threatened~~ action or proceeding, either pending or threatened, affecting <Service Provider> before a court, referee, governmental agency, commission, arbitrator or other tribunal which will, or might reasonably be expected to, materially affect its ability to perform its obligations under this Service Agreement.

Clause 18.4 should be amended as follows:

(c) Except as specifically set out in this Service Agreement ~~clause 18~~, each Party acknowledges that in entering into this Service Agreement it has not relied on any representations or warranties about its subject matter.

The Dictionary at clause 23.1 of the template service agreement should be amended as follows:

Shipper: has the meaning given to that term in the Retail Market Rules.

Intellectual property

2811. In its initial proposal, ATCO inserted a new clause 21.1 concerning rights to intellectual property. Clause 21.1(a) provided that documents, tools, software, reports, diagrams, plans and other materials provided by a party remain property of that party. Clause 21.1(b) provided that any of these items created under the service agreement will immediately be the property of ATCO.

2812. In its Draft Decision, the Authority rejected clause 21.1 on the grounds that the Authority was not well placed to predict what intellectual property was likely to be created and how it should be allocated. It was better, the Authority reasoned, to leave the parties to negotiate terms reflecting their individual concerns and priorities regarding intellectual property. Removing the clause would minimise unforeseen effects – a benefit that, in this case, the Authority felt would outweigh that of facilitating access more quickly. Accordingly, the Authority required ATCO to delete proposed clause 21.1.

2813. In its response to the Draft Decision, ATCO did not accept the requirement to remove clause 21.1. ATCO argued that clause 21.1 represented a balanced position that protected each Party's existing intellectual property rights, while protecting the Service Provider's legitimate business interest in any intellectual property created under a service agreement.

2814. ATCO acknowledged that similar provisions are not found in regulated contracts of other gas distribution system operators in Australia, but pointed out that this was not in itself a reason to reject the clause. ATCO suggested that it would be consistent

with the NGO to remove areas of uncertainty in the template service agreement, particularly if there exists, what ATCO called a "market or 'standard' position".[1110]

2815. ATCO argued that the intellectual property created in respect of the services provided under the service agreement, in the absence of express terms in the contract, is only and can only be relevant to those services and that contract. As the provider of the regulated services, ATCO pointed out that it retains the obligations and responsibilities relating to the services provided under the contract at all times.

2816. ATCO submitted that the inclusion of such a clause would not give rise to a risk of unintended consequences. ATCO noted that the template service agreement is simply a standing offer (implying that the parties could, therefore, negotiate out of clause 21.1 if it was inappropriate in a particular case). ATCO also claimed that the term would provide certainty on commercial terms to facilitate quicker access.

2817. ATCO claimed to have taken into account the likely positions of the parties to a service agreement in respect of the minimum intellectual property rights provisions required. It also reviewed Australian government standard intellectual property clauses, including some published by the Victorian Department of Treasury and Finance.

2818. Alinta commented on intellectual property in its submission during the third access arrangement review of the GDS access arrangement, dated 19 April 2010. On page 16, Alinta argued that all documents, tools, software, reports, diagrams, plans and other materials created by the user should be recognised as being owned by the user.[1111]

2819. Kleenheat's submission, dated 12 January 2015, explained that, while Kleenheat was comfortable with clauses 21.1(a) and 21.1(b), clause 21.1(c) wasn't appropriate in a service agreement and should be deleted. Following a request for clarification, Kleenheat explained a user might not be able to grant ATCO access to its systems because of confidentiality issues. Kleenheat suggested that clause 21.1(c) be amended to require the user to use reasonable endeavours to share information.[1112]

2820. The Authority expects that in a bilateral negotiation ATCO would seek to include a clause along the lines of clause 21.1, reflecting its desire to protect any intellectual property rights it may have. If such a clause is included in the template service agreement, then from ATCO's perspective this is likely to make the negotiation process marginally easier. While it is possible that this may serve the objective of improving access to network services, Kleenheat's submission raises the additional possibility that the user and the service provider's views on how intellectual property should be managed and shared will not be perfectly aligned. Creating a default position on how intellectual property matters are to be dealt with could frustrate a user seeking to negotiate terms appropriate to their situation.

1110 ATCO Gas Australia Pty Ltd, Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 27 November 2014, p. 293.

1111 Alinta Gas, WA Gas Networks – Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution Systems. WAGN Template Haulage Contract, 19 April 2010, p. 16.

1112 Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat Gas Submission on the Draft decision and Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution System Access Arrangement, 12 January, 2015, p. 3.

2821. The Authority remains of the view that the intellectual property matters dealt with in clause 21.1 are not appropriate for inclusion in the template service agreement. The Authority considers that there is too great a risk that the clause may have inadvertent consequences, especially given the difficulty inherent in predicting the articulation of any intellectual property that is likely to be created or shared under the service agreement. The Authority considers that the parties will be best placed to identify if and how they need to address intellectual property under the service agreement.

2822. The Authority requires clause 21.1 to be deleted and heading number 21 amended to remove the words "intellectual property".

Required Amendment 30

Heading 21 of the revised proposed template service agreement should be amended as follows:

21~~. INTELLECTUAL PROPERTY,~~ CONFIDENTIALITY AND INFORMATION EXCHANGE

Clause 21.1 of the revised proposed template service agreement should be deleted.

Consistency between access arrangement and retail licence obligations

2823. Gas retailers such as Alinta and Kleenheat must, as a condition of their retail licences, comply with the *Compendium of Gas Customer Licence Obligations* (**Compendium**). The Compendium is a Schedule to all gas licences, and is administered by the Authority. It regulates the conduct of retailers and distributors supplying customers that consume no more than 1TJ of gas per annum.

2824. One of the requirements imposed by the Compendium specifies the retailer's minimum billing frequency to be "at least every 3 months", subject to several exceptions.[1113] The Compendium also requires retailers to base a bill, where reasonably possible, on a meter reading.[1114]

2825. A retailer needs a customer's consumption data (either actual or estimated) within a three month timeframe in order to issue a bill to a customer. However, the access arrangement currently does not oblige ATCO to supply consumption data at this frequency. Schedules 4 and 5 of the proposed amended template service agreement describe the service provider's obligations with respect to meter reading in the case of reference services B2 and B3, respectively.[1115] Clause 4(b) of both schedules reads:

> "<Service Provider> must use reasonable endeavours to read the Meter approximately 4 times each Year at intervals of approximately 100 days."

2826. In the Draft Decision, the Authority concluded that ATCO's obligations with respect to meter reading frequency should be adjusted to align its obligations with the retailer's billing frequency obligations under the Compendium. The Authority

[1113] Clause 4.1(b) of the Compendium of Gas Customer Licence Obligations.

[1114] Clause 4.6(1) and 4.8(1) of the Compendium of Gas Customer Licence Obligations.

[1115] These are the reference services most likely to apply to residential and small business customers, being customers likely to consume less than 1 TJ of gas per annum.

considered that the access arrangement should define more clearly the service provider's obligations with respect to:

- reading the meter; and
- providing data to the user.

2827. The Authority noted in the Draft Decision that, as it understood current practice, ATCO was already providing consumption data on a 90 day cycle, though often based on estimated rather than actual meter readings.

2828. The Authority also noted in the Draft Decision that the service provider's obligation to read the meter must be clearly defined because it provides the reference point picked up by Rule 144(3) of the Retail Market Rules and that the obligation in Clause 4(b) of Schedules 4 and 5 is currently ambiguous, since it implies two different reading frequencies. The Authority deduced from its understanding that ATCO had been supplying consumption data on a 90 day cycle that ATCO probably already planned its reading schedule to deliver reads "approximately four times each year" rather than "at intervals of approximately 100 days".

2829. In the Draft Decision, the Authority decided that an obligation for the service provider to use its best endeavours to read each meter at least every three months would provide a clearer reference point for the purposes of Rule 144(3), and would better align with retailers' billing frequency obligations under the Compendium. The Authority pointed out that a requirement on the service provider to use its best endeavours, should not increase the number of meter readings required.

2830. In the Draft Decision, the Authority also concluded that ATCO should be obliged to provide data to the user at a given frequency. The Authority pointed out that where ATCO failed to carry out an actual meter read, ATCO was still best placed to produce an estimated read, because it possesses historical data that may not be available to a given retailer for the meter in question. Accordingly, the Authority considered it reasonable to impose an unqualified obligation on ATCO to provide consumption data to the user at least every three months.

2831. These conclusions of the Authority were reflected in Required Amendment 41 of the Draft Decision.

2832. ATCO did not accept Required Amendment 41 and instead proposed alternative amendments to address the points raised by the Authority. ATCO did not accept the inclusion of clause 4(c) of Schedule 4 and 5 of the proposed template service agreement. ATCO also proposed the clause 4(b) of Schedule 4 and 5 should be revised to:

> <Service Provider> must use reasonable endeavours to read the Meter at intervals of no less than 88 days and no more than 105 days.

2833. ATCO's objections to the Required Amendment 41 of the Draft Decision included the following:

- The billing frequency obligations imposed on Alinta (at least every 110 days, as per clause 5.1 of its Retail Licence) differed from those imposed on Kleenheat (at least three monthly, as per the Compendium of Gas Customer Licence Obligations).
- The Authority had earlier determined to align Alinta's billing frequency obligation with the Access Arrangement by modifying its Retail Licence.

- The Authority's required amendment would override the Retail Market Rules requirements under which both the retailer (user) and ATCO are obliged to operate, whereas the parts of the Compendium referred to by the Authority bind the user, but not the service provider.
- Whereas the practice currently in place is for meters to be read at intervals of between 88 and 105 days, the requirement to do so at least every 3 months would require the shortening of the read cycle to a frequency of 89 to 92 days, requiring changes to ATCO's billing systems and increased reading costs.

2834. ATCO also corrected the Authority's stated understanding of the prevalence in the use of estimated meter readings by the service provider, writing that:

> "Consumption data is not provided to retailers every 90 days, rather 10,000-12,000 meter readings are provided each business day, each with 90 days of consumption data on average. As explained above, meters are read at frequency intervals of between 88 and 105 days. Of this amount, less than 1% are estimated."[1116]

2835. In its submission of 12 January 2015, Kleenheat indicated that it was uncomfortable with ATCO's proposed amendments to clause 4(b) in Schedules 4 and 5. Following a request for clarification, Kleenheat responded that:

> The comment Kleenheat has provided is in relation to meter reading. The Gas Compendium requires billing no less than every 3 months so the upper limit of 105 days does not facilitate compliance with this requirement. Kleenheat also does not believe a lower limit is necessary.[1117]

2836. The Authority has considered ATCO's response to the Draft Decision and Kleenheat's submission. The Authority notes that ATCO's revision has clarified the extent of the actual meter reading interval that currently operates. Kleenheat's concerns related to the Authority's initial concern regarding the consistency between the template service agreement and the retail licence obligations. The Authority still remains of the view that these obligations should be aligned. However, given that the current obligation under the Compendium binds the retailer and not the distributor, the Compendium would need to change (or ATCO's distribution licence would need to be amended) to impose an obligation on the distributor for meter reading to result in a change to the template service agreement. If the Compendium (or other part of the distribution licence) was amended in this way, ATCO would be obliged to comply which would result in a requirement to vary the template service agreement (this would be possible under rule 65 of the NGR). Any net increase in costs for a change may be considered under the cost pass-through mechanism.

2837. As the Compendium does not impose a meter reading timeframe on the distributor, the Authority accepts that the current maximum timeframe should be used for the template service agreement. The Authority considers that there is no need for a minimum interval period and it should be removed from ATCO's revised proposed clause 4(b). Unless there is a change in the Compendium or any other change in ATCO's distribution licence or the law which requires the GDS operator to read meters at a different frequency, the maximum threshold will remain at "no more than 105 days" as proposed by ATCO.

1116 ATCO Response to the Authority's Draft Decision, p. 295.

1117 Wesfarmers Kleenheat Gas Pty Ltd, Kleenheat email in response to request for further information regarding its public submission of 12 January 2015, 19 March 2015.

2838. The Authority also notes that it is a requirement under the Compendium for a retailer to inform the customer that a given bill is based on an estimation (clause 4.8(2)(a)). While ATCO has informed the Authority that it provides actual meter data in 99 per cent of cases, a small proportion of customers billed by the retailer on the basis of ATCO's data are actually being billed based on estimates. The Authority does not know whether retailers currently identify and declare this on customer bills, given that the retailer has not undertaken the estimations itself. Nonetheless, it is appropriate for the service provider to be required to identify estimated meter reads.

2839. Accordingly, the Authority requires Clause 4 of Schedule 4 and Schedule 5 to be amended to require the Service Provider to identify estimated meter reads.

Required Amendment 31

Clause 4 of Schedule 4 and Schedule 5 of the revised proposed template service agreement should be amended as follows:

(b) <Service Provider> must use reasonable endeavours to read the Meter at intervals of ~~no less than 88 days and~~ no more than 105 days.

(c) Where <Service Provider> provides consumption data based on estimates, it must individually identify each data item that has been estimated.

Glossary / Dictionary

2840. In its initial proposal, ATCO sought to delete the dictionary clauses contained with the current template haulage contract [template service agreement] (clause 21.1) and access arrangement (clause 12.1), with the intention of replacing it with a separate glossary to "provide a uniform reference point for all documents comprising the access arrangement".[1118]

2841. In its Draft Decision, the Authority acknowledged ATCO's reasoning in proposing to delete the dictionaries from both the template service agreement (clause 21.1 of the current version) and access arrangement (clause 12.1 of the current version). It made the point that ATCO's approach was consistent with the Authority's general preference to minimise overlap and duplication.

2842. In spite of its approval for this approach in general, the Authority considered that there was an overriding benefit in retaining definitions within the template service agreement and the access arrangement documents. Owing to the volume of terms that need to be defined, it would not be workable to attempt to interpret either document without reference to the set of definitions. Including definitions within the documents would allow them to be interpreted considerably more conveniently.

2843. In the case of the template service agreement, the Authority also took into account the desirability of making that document easily convertible into an individual service agreement. The Authority considered readily foreseeable that the parties might need to include new or modified definitions. The Authority considered it likely to be

[1118] ATCO Australia, Access Arrangement Information 1 July 2014 - 31 December 2019 (AA4), 17 March 2014, p. 41.

beneficial to have those definitions that are required for the service agreement consolidated in one place.

2844. In its response the Draft Decision, ATCO accepted the requirement to reinstate the glossary in the template service agreement. ATCO opted to include identical sets of definitions in both the access arrangement and the template service agreement and used the term "dictionary" in preference to the current term "glossary".

2845. Kleenheat's public submission of 12 January 2015, stated that the glossary [dictionary] contained a number of redundant entries that were inconsistent with those used in the service agreement and suggested that the glossary [dictionary] be updated to address this. The Authority requested that Kleenheat provide additional detail on its objections here and Kleenheat elaborated as follows:

- some defined terms used in the Haulage Agreement are not actually defined (see, for example, "Claim" and "Party");
- a number of definitions in the Glossary refer to "Template Haulage Agreement";
- the Glossary seems to use the term "Haulage Contract" in some places and "Template Service Agreement" in other places;
- the Glossary should be redrafted such that it only contains defined terms used in the Service Agreement.

2846. The Authority accepts Kleenheat's view that these are problems with the dictionary as currently proposed.

2847. The Authority notes that satisfying Required Amendment 42 from the Draft Decision would necessarily produce some degree of redundancy, but the type of redundancy depends on the approach. The first type of redundancy is to have terms common to both the access arrangement document and the template service agreement defined in two places. That is, such terms would be defined in both the dictionary contained in the access arrangement and in the version contained in the template service agreement.

2848. The second possible type of redundancy arises from using duplicate versions of the dictionary in both documents. Where there are terms used in the access arrangement that are not referred to in the template service agreement, or vice versa, having such a term defined in the dictionary of a document in which that term is not used, is redundant, in the sense of unnecessary.

2849. The Authority is less concerned with the first type of redundancy (which it sees as the price of convenience) than it is with the second type of redundancy (which will reduce convenience). The Authority agrees with Kleenheat's general objection to the inclusion of definitions not referred to in the template service agreement.

2850. Accordingly, the Authority requires the dictionary at clause 23.1 of the template service agreement to be amended such that it contains only terms referred to in the template service agreement. The Authority requires the dictionary at clause 12 of the access arrangement to be amended such that it contains only terms referred to in the access arrangement.

2851. Further, the Authority requires the following amendments to the dictionary at clause 23.1:

- Terms written as defined terms, which are not already defined in clause 23.1 should be rewritten as undefined terms.
- The terms “Template Service Agreement” and Service Agreement should be used in preference to previous terms for these instruments.

Required Amendment 32

Clause 23.1 of the revised proposed template service agreement should be amended as follows:

Terms that do not appear in the revised proposed template service agreement other than in clause 23.1, should be deleted from clause 23.1

Wherever a term, other than a term regarded as a proper noun in common usage, is capitalised in the template service agreement but not defined in clause 23.1, the capitalisation should be removed so that the term is no longer regarded as a defined term.

References to "Template Haulage Agreement" shall be replaced with "Template Service Agreement"

References to "Haulage Contract" shall be replaced with references to Service Agreement, unless there is clear intention to employ the more limited scope of the term "Haulage Contract".

Guaranteed Service Level Scheme

2852. In its initial proposal, ATCO had inserted a footnote on clause 10.6 of the Template Haulage Contract, which read as follows:

> “ATCO Gas Australia operates a Guaranteed Service Level scheme which provides for compensation to Small Use Customers (as defined in s 3 of the Energy Coordination Act 1994 (WA)) who have been inconvenienced by disruption to their gas supply. The specific requirements of this scheme are set out in the Authority’s Gas Compliance Reporting Manual and are a condition of ATCO Gas Australia’s Gas Distribution Licence (Clause 16 – Individual Performance Standards)) and a requirement of s 11M of the Energy Coordination Act 1994 (WA).”

2853. In its Draft Decision, the Authority pointed out that the second sentence of proposed footnote 46 was incorrect. The guaranteed service level scheme is not imposed under ATCO’s distribution licence, but rather has been operated voluntarily by ATCO.

2854. Accordingly, the Authority required that the second sentence of footnote 46 be deleted.

2855. In its response to the Draft Decision, ATCO accepted the required amendment and also proposed to delete clause 10.6 entirely, thereby removing the Guaranteed Service Level scheme from the template service agreement (and therefore from the access arrangement).

2856. No submissions have been received on the Guaranteed Service Level scheme.

2857. The Authority accepts ATCO’s decision to remove the Guaranteed Service Level scheme from the access arrangement. The scheme was always operated on a voluntary basis and there is not regulatory obligation to continue to provide it.

Terminology

2858. In its initial proposal, ATCO had retained the following existing terminology:

- "pipeline services" and "haulage services", rather than "reference services"; and
- "haulage contract", rather than "service agreement";

2859. In its Draft Decision, the Authority concluded that this terminology could be improved.

2860. The Authority considered that the term "reference services" was generally preferable to "pipeline services" since the template service agreement should be drafted with reference services in mind.

2861. The Authority also considered that the term "haulage services" was a subset of reference services as were other types of services, such as "ancillary services". In many instances, the Authority considered that clauses referring to "haulage services" were actually intended to cover all types of reference services. In such cases, the Authority considered it clearer to substitute the term "reference services" in place of the term "haulage services".

2862. The Authority also considered that the phrase "Template Haulage Contract" was problematic, since it covered more than merely haulages services, as explained above, and since the term "service agreement" was used within access arrangement. The Authority preferred the phrase "template service agreement" as a more accurate and consistent title for the instrument.

2863. Accordingly, the Authority required that

- "pipeline service" be replaced with "reference service" throughout (subject to unintended consequences);
- "haulage service" be replaced with "reference service, where appropriate;
- "template haulage contract" be renamed "template service agreement";
- references to "haulage contracts" be replaced with references to "service agreements"; and
- references to "haulage contracts" in other access arrangement documents be amended as appropriate.

2864. In its response to the Draft Decision, ATCO stated that it accepted these required amendments.

2865. ATCO has retained the term "pipeline services" in the following parts of the template service agreement:

- The recitals section;
- Clauses 13.2 and 13.3 relating to the translation of access arrangement amendments into contractual amendments;
- Clause 23.1 in the definitions of many terms;
- Schedules 1 to 5 in the specific terms and conditions associated with reference services A1, A2, B1, B2, B3.

2866. ATCO has retained the term "haulage services" in the following definitions:

- "Non-Reference Service";

- "Relevant Tax";
- "Tariff Component".

2867. ATCO has retained the term "template haulage contract" in its definition of the term "retrospective error notice".

2868. ATCO has retained the term "haulage contract" in various clauses and footnotes of the contract.

2869. No submissions were received on these terminology matters.

2870. The Authority does not completely accept ATCO's implementation of the requirement to substitute "reference services" for the term "pipeline services". The Authority considers it reasonable to retain "pipeline services" in the recitals section, since this is an accurate statement of fact. The Authority has already required the deletion of clauses 13.2 and 13.3, so these instances of the term will not appear in the final version of the document.

2871. The Authority has reviewed clause 23.1 (the dictionary) of the revised proposed template service agreement and considers that, with several exceptions, all of the references to pipeline service should be replaced with the term "reference service". The exceptions to this position are as follows:

- "Capacity". The Authority accepts that capacity is an engineering concept and there is no need to cloud its meaning in this context by making legal distinctions between pipeline and reference services.
- "Covered Pipeline Service Provider". The term contains the words pipeline service, but it has a more specific meaning.
- "Non-Reference Service". This term is best understood by reference to the overarching class of services, pipeline services.
- "Pipeline Service". It is appropriate to define the term, since it is used in other parts of the document.

2872. The Authority has considered the use of the words "pipeline services" in the schedules to the template service agreement. Firstly, the Authority notes that the manner in which "pipelines services" has been used here shows an appreciation on the part of the original drafters of the fact that the ultimate definition of services to be provided is a contractual, rather than statutory matter. The Authority previously pointed out at paragraph 2492 that the parties should be focussed on contracting for pipeline services suitable for their circumstances. Whether the resulting services could still be regarded as reference services should be of secondary importance. However, the Authority also noted that its task was to approve a template service agreement that provides for a notional user seeking access to reference services.

2873. It would be formally consistent with the Authority's view that it should provide for the notional user seeking access to reference services if the Authority required the replacement of "pipeline services" in the schedules with the term "reference services". However, the Authority notes that this would necessitate consequential amendments (for instance to clause 1(c) of each schedule), which it has not previously identified or consulted on.

2874. Furthermore, the Authority recognises a tension between its view that the parties should focus on negotiating suitable pipeline services and ensuring that the template

service agreement is drafted in such a manner as to ignore the set of pipeline services beyond reference services. Noting this tension and the lack of consultation on consequential amendments to the schedules, the Authority accepts ATCO's decision to retain "pipeline services" throughout the schedules.

2875. The Authority does not accept any of the instances where "haulage service" has been retained in favour of "reference service". In the case of the definition of "non-reference service" the Authority would have accepted this usage, but it finds the definition itself to be incorrect and it requires it to be replaced. The definition of a non-reference service should be a pipeline service that is not a reference service. In the other instances, the term "reference service" better reflects the appropriate scope of the definition.

2876. The Authority does not accept the use of the term "template haulage contract" in the definition of retrospective error notice and requires that it be replaced with the term "template service agreement".

2877. The Authority does not accept any of the instances where "haulage contract" has been retained in favour of "service agreement" and requires that the former term be replaced with the latter.

Required Amendment 33

Clause 23.1 of the revised proposed template service agreement should be amended as follows:

All definitions containing the term "Pipeline Service(s)" should be amended to substitute the term "Reference Service(s)" in place of "Pipeline Service(s)", excepting the following definitions:

- "Capacity"
- "Covered Pipeline Service Provider"
- "Non-Reference Service"
- "Pipeline Service"

"Non-Reference Service" means a Pipeline Service that is not a Reference Service~~Haulage Service or an Ancillary Service~~

"Retrospective Error Notice" has the same meaning as given in clause 10.4(a) of the Template ~~Haulage Contract~~Service Agreement

The revised proposed template service agreement should be amended to replace references to "haulage contract" with the phrase "Service Agreement(s)"

Default for breach of terms

2878. Having considered proposed clause 15.1(c) in greater detail, due to ATCO's proposal to expand it (see paragraphs 2755 to 2757), the Authority identified two further problems with the clause.

2879. The first problem is that the clause refers in a non-specific manner to "obligations connected with, arising out of or in relation to the Access Arrangement". The Authority considers that framing the user's obligations as deriving from the access arrangement will invite confusion.

2880. The service agreement is a bilateral contract and its terms can incorporate, by reference, matters dealt with in the access arrangement. For instance, the template service agreement explicitly incorporates the reference services defined by the access arrangement. Another example is that clause 5.5 provides that the user can request the connection of new delivery points, but makes this subject to the application procedure defined in the access arrangement. To be clear, the Authority does not take issue with provisions that take procedures, definitions, pre-conditions or restrictions set out in the access arrangement and incorporate these, by reference, into the service agreement.

2881. The Authority's objection to the reference to the access arrangement in clause 15.1(c) is that it implies that a party's rights or obligations can flow directly from the access arrangement, in much the same manner as the law or a contract create enforceable rights or obligations. This is clearly not the case, since any obligations (or rights) of the parties in that case would derive from the service agreement, not the access arrangement. The Authority wishes to avoid wording that confuses this point.

2882. Other examples of clauses where the Authority has identified an inappropriate general reference to rights or obligations under the access arrangement are:

- Clause 6.11(f);
- Clause 15.6;
- Clause 18.1(a);
- Clause 18.1(g);
- Clause 18.2(a); and
- Clause 19.3(j).

2883. The second problem with clause 15.1(c) is that it makes any breach of the contract a default, irrespective of materiality. Given that default gives rise to important powers and remedies for the other party, this breadth appears excessive.

2884. The Authority notes that the regulated terms and conditions for the Victorian distributors SP Ausnet and Multinet contain default provisions that impose a materiality threshold on general breaches before these can give rise to termination rights.[1119] In the case of Envestra's regulated terms and conditions, materiality isn't required, but before a breach can give rise to a right to terminate the relevant provisions impose a 14 day grace period, following notice of the breach, for the relevant party to correct the situation.[1120]

2885. Given that ATCO has put forward a relatively short five day grace period for any default to be corrected, the Authority considers that breaches to be considered default should be limited to those likely to cause material loss to the service provider. Accordingly, the Authority requires clause 15.1(c) to be amended to revert to its

[1119] See clause 12.2(a)(3) of the regulated terms and conditions for SP Ausnet or Multinet, April 2013.

[1120] See clause 28.2 of the regulated terms and conditions for Envestra, 2013 – 2017.

previous wording (prior to the Draft Decision), adding at the end of the clause the words: “where such failure would cause material detriment to <Service Provider>”.

Required Amendment 34

Clause 15.1(c) of the revised proposed template service agreement must be amended as follows:

(c) if the Party otherwise fails to perform or observe any one or more of its obligations ~~connected with, arising out of or in relation to~~ under ~~the Access Arrangement or~~ this Service Agreement, including any obligation implied by the operation of Law, where such failure would cause material detriment to <Service Provider>;

Clauses that imply that general rights or obligations can arise directly from the access arrangement should be amended to remove this implication. This includes the following clauses:

- Clause 6.11(f);
- Clause 15.6;
- Clause 18.1(a);
- Clause 18.2(a); and
- Clause 19.3(j).

Unclear references to “Annexure”

2886. In its submission dated 12 May 2015, Kleenheat wrote that Annexure C appeared to be missing from the template service agreement.

2887. There is no Annexure C within the template service agreement, however, there is an Annexure C to the access arrangement. The Authority accepts that the definition of “Reference Tariff Variation Mechanism” in the Dictionary refers to annexures in the Access Arrangement without specifying this explicitly. This will cause problems in the correct interpretation of the document, since the rules for interpretation include the instruction at 23.2(c)(ii) to interpret a reference to an annexure as a reference to an annexure of the service agreement.

2888. The Authority has determined that the definition of “Reference Tariff Variation Mechanism” in the Dictionary should be amended to make clear that it refers to Annexures B and C of the access arrangement.

Required Amendment 35

Clause 23.1 of the revised proposed template service agreement should be amended as follows:

"Reference Tariff Variation Mechanism" has the meaning given to that term in the National Gas Rules and for the purposes of this Access Arrangement means the mechanism for varying a Haulage Tariff set out in Annexure B of the Access Arrangement and the mechanism for varying the Reference Tariffs relating to the Ancillary Services set out in Annexure C of the Access Arrangement.

"Reasonable endeavours" or "best endeavours"

2889. In its response to the Draft Decision, ATCO proposed amendments to comply with recent Australian case law that ATCO had the opportunity to consider since its initial proposal, relating to "reasonable" and "best" endeavours. These amendments related both to clauses in the template haulage contract [template service agreement], as well as other parts of the access arrangement.

2890. ATCO claimed that the current position under Australian case law is that there is no substantive difference between the terms 'best endeavours', 'reasonable endeavours' and 'all reasonable endeavours'.

2891. ATCO provided a synopsis of this case law and then explained that, having reviewed the template service agreement and the access arrangement, it had found that the terms "best endeavours" and "reasonable endeavours" were both used. ATCO pointed out that the NGR contains references to both "best endeavours" and "reasonable endeavours".

2892. ATCO concluded that a single term should be used throughout the document and it settled on the term "reasonable endeavours".

2893. ATCO considered whether to define "reasonable endeavours" in the Dictionary, however, it concluded that there was sufficient guidance from case law and industry practice.

2894. The Authority agrees that consistency in the use of terms is desirable and it accepts ATCO's assessment that the terms "best endeavours" and "reasonable endeavours" have the same substantive meaning in this context. Accordingly, the Authority accepts ATCO's substitution of "reasonable endeavours" in favour of "best endeavours" or "best efforts", throughout both the template service agreement and the rest of the access arrangement.

Appendices

Appendix 1 Summary of Required Amendments

Required Amendment 1
The proposed revised access arrangement values for total revenue (nominal) must reflect the values in Table 8.

Required Amendment 2
The GDS demand forecast for the fourth access arrangement period must reflect Table 15 of this Final Decision.

Required Amendment 3
Forecast operating expenditure must be amended to reflect Table 37 of this Final Decision.

Required Amendment 4
The opening capital base for 1 July 2014 in the proposed revised access arrangement must be amended to reflect the values in Table 48 of this Final Decision.

Required Amendment 5
The value of conforming capital expenditure for 2014 to 2019 access arrangement period must be amended to reflect the values shown in Table 68 of this Final Decision.

Required Amendment 6
The projected capital base in the proposed access arrangement must be amended to reflect the values in Table 72 of this Final Decision.

Required Amendment 7
The Authority requires that the rate of return be consistent with the estimates set out in Table 94 of the Final Decision. The rate of return for 2014-15 is 5.97 per cent and for 2015 is 6.02 per cent.

The Authority requires an annual adjustment to be applied to the debt risk premium to be incorporated in each subsequent tariff update during the fourth access arrangement period. The first annual update will apply for the tariff variation for the 2016 calendar year, and should be determined based on the automatic formula set out in Appendix 8 of the Final Decision. The resulting annual adjustment to the rate of return should be incorporated in the Annual Tariff Variation.

The Authority requires that ATCO nominate, as soon as practicable after the release of this Final Decision, the averaging period for each annual update applying in 2016, 2017, 2018 and 2019. The averaging periods for each year must be a nominated 20 trading days in the window 1 July to 31 October in the year prior to the relevant tariff variation, which will allow estimation of the updated DRP for inclusion in the relevant annual tariff variation. The nominated 20 trading day averaging period for each of the four years do not need to be identical periods, only that they occur in the period 1 July to 31 October in each relevant year, and are nominated prior. The nominated averaging periods will remain confidential.

For each annual update for 2016, 2017, 2018 and 2019, the Authority will estimate the updated rate of return following the relevant annual averaging period and then notify ATCO of the outcomes as soon as practicable. Following that notice, ATCO is required to respond on any issues as soon as practicable, in order to allow the updated estimate to be finalised prior to submission by ATCO of its proposed annual tariff variation within the required timeframe.

Required Amendment 8
A gamma of 0.4 must be adopted.

Required Amendment 9
For the calculation of the nominal Opening Capital Base for the GDS for the Next Access Arrangement Period, for the purposes of rule 77(2)(d) of the NGR, depreciation over the

Current Access Arrangement Period is to be calculated in accordance with the current cost accounting depreciation method, consistent with the Australian Energy Regulator's Post Tax Revenue Model method – where first, the real opening capital base in any year is divided by the remaining asset life to calculate the real depreciation for the regulatory year, second, indexation is applied to the real depreciation to convert it to nominal terms, and third, the nominal depreciation is adjusted for the resulting double count of inflation by subtracting the value ascribed to inflation from the opening regulatory asset base for that regulatory year, and is to be the sum of:

Consistent with the above, clause 9 (Depreciation) must be amended to ensure that it is consistent with the current cost accounting approach. In particular, clause 9.1 (b) and (c) of the proposed revised access arrangement must be replaced with:

(b) indexing and adjustment for inflation should be calculated consistent with the rate of inflation as measured by the CPI All Groups, Weighted Average of Eight Capital Cities as at 31 December of each regulatory period.

Required Amendment 10
The estimated cost of income tax must be calculated as per Table 106.

The TAB must be revised as per Table 107, to implement the following:

- Exclude capital contributions from the calculation.
- Exclude commercial meters from the calculation.
- Exclude user specific charges revenue from the calculation.

The cost of debt risk margin and nominal risk free margin must be updated for the calculation of debt servicing costs.

Required Amendment 11
The value of return on working capital for the fourth access arrangement period must reflect the values shown in Table 110 of this Final Decision

Required Amendment 12
The value of tariff revenues to be allocated for the calculation of haulage tariffs for the fourth access arrangement period must be amended to reflect Table 114 of this Final Decision.

Required Amendment 13
The calculation of the B3 standing charge, in addition to all haulage tariff price paths, must be calculated as per Table 122 of this Final Decision.

Annexure A of the proposed revised access arrangement must be amended as per the requirements of paragraph 2271.

Required Amendment 14
The proposed revised access arrangement should remove references to revenue yield in Annexure A, and remove clause 2 and clause 3.1 (e) and update all the formulas in Annexure B of the Access Arrangement to reflect the following:

The proposed revised access arrangement must reflect the haulage tariff variation formulas as presented in paragraph 2350.

To exclude cost pass-throughs for regulatory costs (clause 3.1(e)) of Annexure B)

Clause 3.1(c) in Annexure B of the proposed revised access arrangement should be reworded as follows:

"Conforming Capital Expenditure or Conforming Operating Expenditure as a direct result of a Change in Law or Tax Change."

Clause 3.1(d) in Annexure B of the proposed revised access arrangement should reworded as follows:

"ATCO Gas Australia incurs Conforming Capital Expenditure or Conforming Operating Expenditure as a direct result of any Law that imposes a fee or Tax on greenhouse gas emissions or concentrations; and for avoidance of doubt, this expenditure includes only direct capital or direct operating expenditure associated with preparation for, compliance with the Laws which implement, and the participation in, the Emissions Trading Scheme; and liability only for direct capital or direct operating expenditure transferred to ATCO Gas Australia from another entity as a direct result of acting in accordance with the Emissions Trading Scheme."

The proposed revised access arrangement is required to include the following clause 3.1(e):

"ATCO Gas Australia incurs Conforming Capital Expenditure or Conforming Operating Expenditure as a result of addressing an "Intermediate" security of supply risk following an assessment in accordance with the required steps prescribed in Table C4 of AS 4645 for an 'intermediate' ranked risk. This expenditure can only be passed through for the following areas of the network identified by ATCO in its Response to the Draft Decision: Northern Network, Peel, Hillary's, Canning Vale, Fremantle and Lathlain."

Clause 3.2 in Annexure B of the proposed revised access arrangement should be reworded as follows: "If a Cost Pass Through Event occurs, ATCO Gas Australia must notify the ERA of the Cost Pass Through Event, and may vary one or more Haulage Tariffs to recover only direct Conforming Operating Expenditure and depreciation of and return on direct Conforming Capital Expenditure incurred or forecast to be incurred by ATCO Gas Australia (or on ATCO Gas Australia's behalf) as a direct result of the Cost Pass Through Event, provided that these costs have not already been recovered by ATCO Gas Australia.

The above amendments must take into account the deletion of clause 2, which will result in clause 3 being renumbered as clause 2 in Annexure B of the proposed revised access arrangement.

Required Amendment 15
Annexure C of the proposed revised access arrangement must be amended to reflect the ancillary service tariff prices in Table 126.

Required Amendment 16
The proposed revised access arrangement must be amended to reflect paragraphs 2384 and 2387.

Required Amendment 17
Fixed Principles 11.2(a), 11.3, 11.4 and 11.5 must be removed from the proposed revised access arrangement.

A new Fixed Principle 11.3 to be added to the proposed revised access arrangement as follows:

11.3 The following principle expires at the end of the next access arrangement:

(i) The inclusion of additional conforming expenditure associated with a Cost Pass-Through Event for the period 1 November 2018 to 31 December 2019. The expenditure must meet the requirements of clause 2 of Annexure B of this current access arrangement;

(ii) In compliance with clause 11.3(i), AGA must provide a report to the ERA on the cost pass-through, and that report shall contain the following information:

The ERA will consider ATCO Gas Australia's application for Cost Pass-Through Events during this period in its review of the next access arrangement. ERA may require ATCO Gas Australia to provide further substantiation of the amounts and the nature of the costs that ATCO Gas Australia proposes to be passed through by the varied Reference Tariffs

and requiring ATCO Gas Australia to provide that further substantiation by a date specified in the ERA's request. The ERA will advise if it approves or does not approve the cost pass-throughs detailed in ATCO Gas Australia's report and provide reasons for its decision. ATCO Gas Australia may account for the timing difference between incurring Conforming Operating Expenditure and the start date for the tariff variation, through a time value of money adjustment.

Required Amendment 18

Clause 1 of the revised proposed template service agreement should be amended as follows:

(a) Other than this clause 1 and clauses ~~15,~~ 16, ~~17,~~ 18, 19, 20, 21, 22 and 23 this Service Agreement has no force or effect until…

…

(iii) <User> demonstrates, to <Service Provider>'s reasonable satisfaction, that:

(A) <User> is able to comply with the Approved System Pressure Protection Plan;

(B) <User>'s prudential and financial standing meets the minimum prudential and financial requirements specified by <Service Provider>, acting reasonably;

(C) ~~<User> is able to comply with the Approved System Pressure Protection<User>'s prudential and financial standing meets the minimum prudential and financial requirements specified by <Service Provider>~~ <User> has obtained the insurances required under clause 16.3;

Required Amendment 19

Clause 13.5(a) of the revised proposed template service agreement should be amended as follows:

If the Access Arrangement terminates or expires or is revised under the Access Laws ~~and <User> does not agree to continue this Service Agreement on the basis of the Service Agreement being varied to incorporate the changes set out in the <Service Provider>'s Change Notice~~, <User> may terminate this Service Agreement by giving 20 Business Days' written notice to <Service Provider>, without further liability for either Party (except as regards to rights and obligations (if any) that have already accrued prior to termination and are (expressly or by implication) to survive termination).

Required Amendment 20

Clauses 13.2, 13.3 and 13.4 of the revised proposed template service agreement should be deleted.

Clause 22.3 of the revised proposed template service agreement should be deleted and a new clause 22.3 inserted as follows:

22.3 Amendment

(a) Subject to the remainder of this clause 22.3, this Service Agreement may only be amended or supplemented in writing, executed by the parties in the same manner as the parties executed this Agreement.

(b) It is the intention of the <Service Provider> and <User> that the terms and conditions of this Service Agreement reflect so far as possible the Reference Service Terms and Conditions.

(c) It is therefore agreed that if there is any change to the Reference Service Terms and Conditions then the terms and conditions of this Service Agreement will, subject to any agreement in writing between the parties, and excluding clauses that state that they are not subject to this clause 22.3, be automatically amended (without the requirement for the parties to execute any form of documentation) such that they are the same as the Reference Service Terms and Conditions.

(d) In this clause 22.3 the Reference Service Terms and Conditions means the terms and conditions upon which the Service Provider will provide Reference Services as set out in the Access Arrangement (including the Template Service Agreement).

Required Amendment 21
Clause 13.7 of the revised proposed template service agreement should be deleted.

Required Amendment 22
Clause 6.2 of the revised proposed service agreement should be deleted.

Clause 23.1 of the revised proposed service agreement should be amended as follows:

"Gas Quality Specification":

has the meaning given to that term in Annexure A ~~means the gas quality specifications prescribed by the Gas Standards Regulations~~.

Required Amendment 23
Clause 6.5 of the revised proposed template service agreement should be renumbered as clause 6.4 and amended as follows:

(a) Subject to clauses 6.4(b), <User> hereby:

(i) releases <Service Provider> from any claim <User> has or may have against <Service Provider> as a result of any gas delivered by any person into the ATCO GDS being ~~in respect of any~~ Off-specification Gas ~~delivered by any person into the ATCO GDS~~;

(ii) indemnifies <Service Provider> against all loss, damage, cost or expense suffered or incurred by <Service Provider> as a result of any gas delivered, or attempted to be delivered, by <User> or a Related Shipper of <User> into the ATCO GDS being ~~in relation to or connection with any delivery or attempted delivery of~~ Off-specification Gas ~~into the ATCO GDS by <User> or a Related Shipper of <User>~~; and

(iii) indemnifies <Service Provider> against any loss, damage, cost or expense suffered or incurred by <Service Provider> in relation to or connection with any claim brought by any person against <Service Provider> as a result of any gas delivered, or attempted to be delivered, by <User> or a Related Shipper of <User> into the ATCO GDS being ~~in respect of any delivery or attempted delivery of~~ Off-specification Gas ~~into the ATCO GDS by <User> or a Related Shipper of <User>~~.

(b) Clause 6.4 (a) does not apply to the extent that ~~in respect of any~~ Off-specification Gas was delivered or sought to be delivered into the ATCO GDS as a result of <Service Provider>'s negligence or default; or

(c) Any amount <User> is obliged to indemnify <Service Provider> under clause 6.4 (a)(ii) or (iii) will be reduced in proportion to the extent that <Service Provider>'s negligence or default caused or contributed to the loss, damage, cost or expense to be indemnified by <User>.

Required Amendment 24
Clauses 6.5(c) and 6.9(d) of the revised proposed template service agreement should be deleted.

Required Amendment 25
Clause 8.1 of the revised proposed template service agreement should be amended as follows:

<Service Provider> will, in its operation and maintenance of the ATCO GDS, use reasonable endeavours to minimise the magnitude and duration of any Curtailment of Gas deliveries to <User>~~Service Agreement~~ subject to <Service Provider>'s rights under clauses 15.5(b), 16.1 and 16.2(i)

Required Amendment 26

Clause 10.3 of the revised proposed template service agreement should be amended as follows:

(b) If <User> does not give <Service Provider> a Payment Dispute Notice in respect of a Payment Claim within the period specified in clause 10.3(a)(i), then, clause 10.2 will apply and, if the User wishes to dispute the Payment Claim, it must do so in accordance with clause 10.4. ~~<User> will be deemed to have agreed to the amounts payable set out in the Payment Claim~~.

Clause 10.4(d) of the revised proposed template service agreement should be deleted.

Clause 19.1 of the revised proposed template service agreement should be amended as follows:

(a) Subject to clauses 10.3, 10.4, 19.1(b) and 19.1(c), any dispute arising between the Parties out of or in connection with this Service Agreement must be resolved in accordance with clauses 19.2 and 19.3.

(c) Where a Party seeks the correction of a payment error after payment, pursuant to clause 10.4, the ~~A~~ Party may only give a notice under clause 19.2(a) to initiate dispute resolution processes under this Service Agreement ~~in relation to a disputed or erroneous Payment Claim~~ where:

(i) there is any single line item or multiple line items and the single line item or multiple line items total less than $5,000 in any rolling 3 month period; or

(ii) if a single line item or multiple line items total equal to or greater than $5,000 at any time.

Required Amendment 27
Clause 11.1 of the revised proposed template service agreement should be amended as follows.

(a) (i) the transfer of title to Gas by or on behalf of <User> to the <Service Provider> at a Receipt Point"

Required Amendment 28
Clause 14.8 of the revised proposed template service agreement should be amended as follows:

<Service Provider> may assign its rights or ~~transfer~~ novate its obligations under this Service Agreement, with <User>'s prior written consent, and such consent must not be unreasonably withheld ~~on giving reasonable written notice to <User>~~.

Required Amendment 29
Revised proposed clauses 3(b) and (3(c) of the template service agreement should be deleted and clause 3(a) should be reformatted accordingly.

Revised proposed clause 7.1(a) of the revised proposed template service agreement should be amended as follows:

(a) At ~~at~~ all times, <User> must ensure that ~~caused to be injected into the ATCO GDS must be provided by <User> ensuring that <User>~~ it has good title to any gas it causes to be injected into the ATCO GDS, free and clear of all liens, encumbrances and claims of a nature inconsistent with <Service Provider>'s operation of the ATCO GDS;

(b) Title to Gas:

~~(i) at all times caused to be injected into the ATCO GDS must be provided by <User> ensuring that <User> has good title, free and clear of all liens, encumbrances and claims of a nature inconsistent with <Service Provider>'s operation of the ATCO GDS;~~

(~~ii~~) delivered into the ATCO GDS at a Receipt Point passes to <Service Provider> at the Receipt Point; and

(iii) delivered out of the ATCO GDS to <User> at a Delivery Point passes to <User> at the Delivery Point, subject to any defect to which the title was subject when it passed to <Service Provider> under clause 7.1(a)(i).

Clause 16.2 should be amended as follows:

(b) The Parties acknowledge that any amount determined under clause ~~1.1(a)(1)(C)(v)~~ 16.2(a)(v) is based on a forward estimate of the ~~ReferenceServices~~ Reference Services to be provided under this Service Agreement. If, in <Service Provider>'s reasonable opinion, the amount of the bank guarantee required under clause ~~1.1(a)(1)(C)(v)~~ 16.2(a)(v) has increased since the date of <Service Provider>'s most recent notice under that clause ~~1.1(a)(1)(C)(v)~~ 16.2(a)(v), <Service Provider> may, not more frequently than monthly, give <User> a further notice under clause ~~1.1(a)(1)(C)(v)~~ 16.2(a)(v) specifying a revised amount required to be the subject of a bank guarantee under this Service Agreement, and <User> must provide an additional or replacement guarantee such that this revised amount is guaranteed.

Clause 16.3 of the revised template service agreement should be amended as follows:

(e) <Service Provider> must

(i) obtain and maintain insurance throughout the term against whatever risks a person carrying on a business of managing and operating a gas delivery network, substantially similar to the ATCO GDS, would prudently insure, with reputable insurers.

(ii) give User a certificate of currency for the insurance, whenever reasonably requested.

(iii) promptly notify <User> if <Service Provider> fails to obtain or maintain any insurance required under this Service Agreement.

Clause 18.1 of the revised proposed template service agreement should be deleted and a new clause 18.1 inserted as follows:

18.1 <User> representation and warranties

<User>, by entering into this Service Agreement, represents and warrants to <Service Provider> that:

(a) it has in full force and effect all material authorisations, licences, permits, consents, certificates, authorities and approvals necessary under all Laws to enter into this Service Agreement, to observe its obligations under this Service Agreement, and to allow those obligations to be enforced;

(b) this Service Agreement and any transaction under it do not contravene <User>'s constituent documents or any Law or any of its obligations or undertakings by which it or any of its assets are bound, or cause to be exceeded any limitation on its, or its directors', powers;

(c) its obligations to make payments under this Service Agreement rank at least equally with all unsecured and unsubordinated indebtedness of <User>, except debts mandatorily preferred by Law. The parties acknowledge and agree that, without limiting this clause in any way, except for debts mandatorily preferred by Law, no debt owed by <User> to <Service Provider> at any time under this Service Agreement, is, or is to be taken to be, subordinated in any way to any other debt owed by <User> at any time to any person, unless <Service Provider> otherwise expressly agrees or declares that it be so subordinated. Nothing in this Service Agreement is, or is to be taken to be, such an agreement or declaration by <Service Provider> to subordinate a debt owed by <User> to <Service Provider>;

(d) neither <User> nor any of its Related Bodies Corporate is in breach of a Law affecting any of them or their respective assets, or any obligation or undertaking by which they or

any of their assets are bound, which breach will, or might reasonably be expected to, materially affect <User>'s ability to perform its obligations under this Service Agreement;

(e) there is no undisclosed action or proceeding, either pending or threatened, affecting <User> or any of its Related Bodies Corporate or any of their respective assets before a court, referee, governmental agency, commission, arbitrator or other tribunal which will, or might reasonably be expected to, materially affect <User>'s ability to perform its obligations under this Service Agreement;

(f) it is not an agent or trustee (except if and to the extent that it is disclosed as such in the Application that led to this Service Agreement) in relation to this Service Agreement or the Gas to be delivered or received under this Service Agreement;

(g) <User> has good legal and beneficial title to all Gas delivered into the ATCO GDS at a Receipt Point by, for or on account of <User> or a Related Shipper of <User>, free and clear of mortgages, charges and other encumbrances;

(h) it is and will at all times be a "user" for the purposes of the Retail Market Scheme and will at all times comply with the Retail Market Scheme; and

(i) it shall use reasonable endeavours to ensure the compliance of any pipeline operator and any Shipper or Swing Service Provider who delivers Gas to the ATCO GDS on <User>'s behalf, with the Retail Market Scheme and any contract applying in respect of the relevant Interconnection Arrangements, to the extent necessary to permit the Parties to perform their respective obligations under this Service Agreement.

Revised proposed clause 18.2 should be amended as follows.

(d) there is no undisclosed ~~pending or threatened~~ action or proceeding, either pending or threatened, affecting <Service Provider> before a court, referee, governmental agency, commission, arbitrator or other tribunal which will, or might reasonably be expected to, materially affect its ability to perform its obligations under this Service Agreement.

Clause 18.4 should be amended as follows:

(c) Except as specifically set out in this Service Agreement ~~clause 18~~, each Party acknowledges that in entering into this Service Agreement it has not relied on any representations or warranties about its subject matter.

The Dictionary at clause 23.1 of the template service agreement should be amended as follows:

Shipper: has the meaning given to that term in the Retail Market Rules.

Required Amendment 30

Heading 21 of the revised proposed template service agreement should be amended as follows:

21~~. INTELLECTUAL PROPERTY,~~ CONFIDENTIALITY AND INFORMATION EXCHANGE

Clause 21.1 of the revised proposed template service agreement should be deleted.

Required Amendment 31

Clause 4 of Schedule 4 and Schedule 5 of the revised proposed template service agreement should be amended as follows:

(b) <Service Provider> must use reasonable endeavours to read the Meter at intervals of ~~no less than 88 days and~~ no more than 105 days.

(c) Where <Service Provider> provides consumption data based on estimates, it must individually identify each data item that has been estimated.

Required Amendment 32

Clause 23.1 of the revised proposed template service agreement should be amended as follows:

Terms that do not appear in the revised proposed template service agreement other than in clause 23.1, should be deleted from clause 23.1

Wherever a term, other than a term regarded as a proper noun in common usage, is capitalised in the template service agreement but not defined in clause 23.1, the capitalisation should be removed so that the term is no longer regarded as a defined term.

References to "Template Haulage Agreement" shall be replaced with "Template Service Agreement"

References to "Haulage Contract" shall be replaced with references to Service Agreement, unless there is clear intention to employ the more limited scope of the term "Haulage Contract".

Required Amendment 33
Clause 23.1 of the revised proposed template service agreement should be amended as follows:

All definitions containing the term “Pipeline Service(s)” should be amended to substitute the term “Reference Service(s)” in place of “Pipeline Service(s)”, excepting the following definitions:

- “Capacity”
- “Covered Pipeline Service Provider”
- “Non-Reference Service”
- “Pipeline Service”

“Non-Reference Service” means a Pipeline Service that is not a Reference Service~~Haulage Service or an Ancillary Service~~

“Retrospective Error Notice” has the same meaning as given in clause 10.4(a) of the Template ~~Haulage Contract~~Service Agreement

The revised proposed template service agreement should be amended to replace references to “haulage contract” with the phrase “Service Agreement(s)”

Required Amendment 34
Clause 15.1(c) of the revised proposed template service agreement must be amended as follows:

(c) if the Party otherwise fails to perform or observe any one or more of its obligations ~~connected with, arising out of or in relation to~~ under ~~the Access Arrangement or~~ this Service Agreement, including any obligation implied by the operation of Law, where such failure would cause material detriment to <Service Provider>;

Clauses that imply that general rights or obligations can arise directly from the access arrangement should be amended to remove this implication. This includes the following clauses:

- Clause 6.11(f);
- Clause 15.6;
- Clause 18.1(a);
- Clause 18.2(a); and
- Clause 19.3(j).

Required Amendment 35

Clause 23.1 of the revised proposed template service agreement should be amended as follows:

“Reference Tariff Variation Mechanism” has the meaning given to that term in the National Gas Rules and for the purposes of this Access Arrangement means the mechanism for varying a Haulage Tariff set out in Annexure B of the Access Arrangement and the mechanism for varying the Reference Tariffs relating to the Ancillary Services set out in Annexure C of the Access Arrangement.

Appendix 2 Abbreviations

Abbreviation	For
AA3	Third Access Arrangement Period (1 January 2010 to 30 June 2014)
AA4	Fourth Access Arrangement Period (1 July 2014 to 31 December 2019)
AA5	Fifth Access Arrangement Period
ABS	Australian Bureau of Statistics
ACIL	Acil Allen
ACT	Australian Competition Tribunal
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
AGS	Australian Government Solicitor
ALARP	As Low As Reasonably Practicable
Alinta	Alinta Energy
AMP	Asset Management Plan
APIA	Australian Pipeline Industry
APT	Arbitrage Pricing Theory
ARORO	Allowed Rate of Return Objective
ATCO	ATCO Gas Australia Pty Ltd
ATO	Australian Taxation Office
AUC	Alberta Utilities Commission
AUD	Australian Dollars
BBSW	Bank Bill Swap Rate
BBSY	Bank Bill Bid Rate
BHM	Brailsford, Handley and Maheswaran
CAM	Cost Allocation Methodology
CAPM	Capital Asset Pricing Model
CCA	Current Cost Accounting

CCIWA	The Chamber of Commerce and Industry WA
CEG	Competition Economics Group
CGS	Commonwealth Government Securities
CMA	Conservative Minus Aggressive investment
CME	The Chamber of Minerals and Energy of Western Australia
CoD	Cost of Debt
Compendium	Compendium of Gas Customer Licence Obligations
Core	Core Energy Group Pty Ltd
CPI	Consumer Price Index
CPUC	California Public Utilities Commission
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DBP	DBNGP (WA) Transmission Pty Ltd
DCF	Discounted Cash Flow
DDM	Dividend Discount Model
DDO	Dividend Drop Off
Deloitte	Deloitte Access Economics
DGM	Dividend Growth Model
DPCR5	Fifth Distribution Price Control Review
DRP	Debt Risk Premium
EA	Enterprise Agreement
EBIT	Earnings Before Interest and Tax
ECS	Economics Consulting Services
EDD	Effective Degree Day
EGWWS	Electricity, Gas, Water and Waste Sector
EMCa	Energy Market Consulting associates
ENA	Energy Networks Association
ERA	Economic Regulation Authority
ERP	Equity Risk Premium

ESAA	Energy Supply Association of Australia
FFM	Fama French Three Factor Model
FRC	Full Retail Contestability
FSA	Formal Safety Assessments
FTE	Full Time Equivalents
GBP	Great British Pound
GDS	Mid-West and South-West Gas Distribution System
GGT	Goldfields Gas Transmission
GIS	Geographical Information Systems
GJ	Gigajoule
GPAC	Gas Powered Air Conditioning
GSP	Gross State Product
GST	Goods and Services Tax
HCA	Historical Cost Accounting
HDD	Heating Degree Day
HDF	Hastings Diversified Fund
HHV	Higher Heating Value
HIA	Housing Industry Association
HIFG	Western Australian Housing Industry Forecasting Group
HML	High Minus Low
HWS	Hot Water System
Incenta	Incenta Economic Consulting
IPART	Independent Pricing and Regulatory Tribunal
IPD	Implicit Price Deflators
IRS	Interest Rate Swaps
IT	Information Technology
ITAA	Income Tax Assessment Act
ITAA36	Income Tax Assessment Act 1936

ITAA97	Income Tax Assessment Act 1997
I-Tek	ATCO I-Tek Australia
ITSA	IT Service Agreement
Kleenheat	Wesfarmers Kleenheat Gas Pty Ltd
KPI	Key Performance Indicator
LAD	Least Absolute Deviations
LPG	Liquefied Petroleum Gas
LRMC	Long Run Marginal Cost
MM	Maximum Likelihood Robust Methodology
MRP	Market Risk Premium
NDV	Network Data Visualisation
NERA	NERA Economic Consulting
NFC	Non-Financial Corporates
NGL	National Gas Law
NGL(WA)	National Gas Access (WA) Act 2009
NGO	National Gas Objective
NGR	National Gas Rules
NPV	Net Present Value
NSP	Network Service Provider
OEB	Ontario Energy Board
Ofgem	Office of Gas and Electricity Markets
OLS	Ordinary Least Squares
PPE	Property Plant and Equipment
PTRM	Post Tax Revenue Model
PWC	PricewaterhouseCoopers
QCA	Queensland Competition Authority
RAB	Regulatory Asset Base
RBA	Reserve Bank of Australia

REMCo	Retail Energy Market Company
RIIO	Revenue = Incentives + Innovation + Outputs
RORE	Return on Regulated Equity
RPM	Risk Premium Model
RPP	Revenue and Pricing Principles
Rules	Retail Market Rules
SAIFI	System Average Interruption Frequency Index
SFG	SFG Consulting
SMB	Small Minus Big
SS	Spread of Swap
TAB	Tax Asset Base
THC	Template Haulage Contract
The Code	*National Third Party Access Code for Natural Gas Pipeline Systems*
TR	Taxation Ruling
UAFG	Unaccounted for Gas
UDIA	Urban Development Institute of Australia (Western Australia)
UPSC	Utah Public Service Commission
USD	United States Dollars
VIX	Volatility Index
WALGA	Western Australian Local Government Association
WA Local Regulations	*National Gas Access (WA) (Local Provisions) Regulations 2009*
WACC	Weighted Average Cost of Capital
WAGN	WA Gas Networks Pty Ltd
WIPRO	WIPRO Ltd
WPI	Wage Price Index

Appendix 3 Which factors are priced – an application of the Fama French 3-factor model in Australia?

Introduction

1. Australian regulators including the Economic Regulation Authority (ERA) have not used the Fama French three-factor model (FFM) or any multi factor model to estimate a return on equity in their regulatory decisions. This decision is mainly based on considerations that there is no strong theoretical basis to support the inclusion of the additional risk factors, being a size factor (SMB) and a value factor (HML), in a rate of return on equity. This is because the FFM is dependent on empirical justification - that is, the systematic observance of the FFM risk premia. In addition, since the FFM risk premia are not systematically observed in the Australian market, there is no reasonable basis for the FFM to be applied in Australia. For example, analysis from Australia, which is the relevant market for funds in the Australian regulatory decisions, shows that observed empirical evidence is not consistent with the FFM, with conflicting, variable FFM risk premia and inconsistent FFM factor coefficients. Australian regulators also note that while the FFM has achieved a degree of support in academic circles, there has also been scepticism due to concerns about 'data mining',1121 that is, the reporting of results of strong correlations between variables, without the benefit of a priori theory justifying the inclusion of those variables.

2. Even though in the US market where the FFM was developed, analysis shows conflicting evidence that does not support the FFM for each time period analysed. As an illustration, a study from Kothari, Shanken, and Sloan study[1122] in 2005 concluded that the FFM's statistical tests were of too low power. These authors are of the view that the economic magnitude of firm size is quite small and that the book-to-market premia could be a result of survivorship bias.[1123]

3. In addition, FFM has not been widely used by financial analysts and business practitioners in Australia in valuation and capital budgeting. A practical reason for this is that values of the 'theta factor' (i.e. the input factors) are not commercially available in Australia. In regulatory decisions, Australian regulators considered that while the FFM continues to be considered in finance textbooks, it is used as an illustration of the potential limitations of the Sharpe-Lintner CAPM, and not because it is widely applied in business. The summary below from a leading corporate finance book[1124] written by practitioners confirms the fact that FFM is not a well-accepted model:

1121 Data mining can lead to spurious correlation between variables. Data mining is the process in which the researcher will keep adding explanatory variables to a model, or adjusting the form of the model, until a statistically significant relationship is found. This process can generate spurious relationship between variables because one is bound, sooner or later, to find a variable that is associated with another, maybe for no other reason than accident (Melberg, H, 2000, "From spurious correlation to misleading association", the University of Oslo).

1122 Kothari, S., Shanken, R., Sloan, R. (1995), "Another look at the Cross-section of expected returns", *Journal of Finance,* December 1995.

1123 Survivorship bias is the tendency for failed companies to be excluded from performance studies because they no longer exist. It often causes the results of studies to skew higher because only companies which were successful enough to survive until the end of the period are included. This is a type of selection bias.

1124 Koller, T.; Goedhart, M.; Wessels, D. *Valuation: Measuring and Managing the Value of Companies*, (University Edition), John Wiley & Sons, 4th Edition, 2005, p. 324.

> "The bottom line? It takes a better theory to kill an existing theory, and we have yet to see a better theory. Therefore, we continue to use the CAPM while keeping a watchful eye on new research in the area."

4. Recent developments on the issue have attracted attention from regulated businesses and regulators. Professor Fama, one of the three recipients, was awarded a Nobel Prize in Economics in 2013 for his contribution on empirical studies on asset pricing. In addition, there are recent empirical academic papers to conclude that the FFM model works better than the Sharpe-Lintner CAPM in the Australian context.

5. This study represents a replication of the Fama and French (1993) study using Australian data drawn from a very recent period, from 2009 to 2014. Key differences among Australian applications of the FFM are drawn into this study. The key rationale for this study to be conducted is to consider how robust the estimated coefficients for FFM risk premia are under various scenarios and approaches to portfolio formation adopted in previous empirical studies in Australia and overseas.

The Fama French three-factor model

6. In their various empirical studies, Fama and French (1992, 1993, and 1996) concluded that the cross-sectional variation in returns is not well explained by beta alone. This finding is inconsistent with the conclusion from the capital asset pricing (CAPM) model developed by Sharpe and Lintner in 1964 and 1965, which proposes beta as the sole explanatory factor of asset returns. The central prediction of the model is that the market portfolio of invested wealth is mean-variance efficient in the sense of Markowitz (1959). The efficiency of the market portfolio implies that (i) expected returns on securities are a positive linear function of their market beta (the slope in the regression of a security's return on the market's return), and (ii) market beta is sufficient to describe the cross-section of expected returns.

7. The Fama-French three-factor is argued to identify three sources of un-diversifiable risk which are able to explain the average returns:

- The excess return to the market portfolio (the market risk premium, MRP);
- The value or growth risk premium, high minus low (**HML**) – the premium earned by high minus low book value shares. In this asset pricing model, high-value firms have a high ratio between book value of equity and market value of equity whereas the opposite is true for low-value firms (also known as growth shares);
- The size risk premium, small minus big (**SMB**) – the premium earned by small minus big shares. Small (big) firms have small (big) total capitalisation (i.e. equity at market value).

$$E(R_e) = R_F + \left(E\left(R_M\right) - R_F\right) \times \beta_m + SMB \times s + HML \times h$$

Where

$E(R_e)$ is the return on equity;

$\left(E\left(R_M\right) - R_F\right)$ is the market risk premium (**MRP**); and

$\beta_m; h; s$ are coefficients for the MRP; the mimicking size portfolio and the mimicking book-to-market portfolios.

8. The FFM states that small firms and firms with high book-to-market ratios require additional returns to compensate investors for the additional risks. Accordingly, large firms and firms with a low book-to-market ratio have less risk and therefore investors require a lower rate of return. In their 1992 paper, Fama and French argued that two easily measured variables, size (ME) and book-to-market equity (BE/ME), provide a simple and powerful characterisation of the cross-section of average stock returns for the 1963-1990 period.

9. As a result, the following expectations are derived from the FFM:

- *First*, the estimated coefficient of alpha (a constant) should be statistically insignificant from all formed portfolios.
- *Second*, the three estimated coefficients on the MRP; SMB; and HML carry a positive sign. This means that MRP; SMB; and HML are positively correlated with a return on equity.
- *Third*, these three estimated coefficients should be statistically significant.

Applications of the Fama French three-factor model: Australian empirical studies

10. There have been various attempts to apply the Fama French three-factor model in Australia using Australian data. It is noted that the results from these studies are mixed. Table 127 shows that the ranges of the HML risk premia, from 14.6 per cent to 6 per cent, and of SMB risk premia, from 17.2 per cent to -9 per cent, can be considered too large to confirm the presence of the risk factors when using the FFM in Australia.

11. The FFM predicts that the HML and SMB coefficients estimated from the models should be significantly different from zero. On this prediction, findings from Australian studies indicate that many estimates are not statistically significant. In addition, the FFM also predicts that the intercept from the regression, which is the proportion of the observed return that is not explained by the FFM, should not be significantly different from zero. While there are some studies where the FFM performs well, such as Ghargori, Chan and Faff (24 out of 27 portfolios have intercepts that are not statistically significant from zero), there are studies where the FFM performs poorly, such as Ghargori, Lee and Veeraghavan (only 2 out of 12 portfolios have intercepts that are not statistically significant from zero).

Table 127 Applications of the Fama-French three-factor model in Australia

Authors	Years	Risk premia		FFM's parameter analysis		
		HML (%)	SMB (%)	Intercept not significant	HML coefficients significant	SMB coefficients significant
Fama & French, 1998[1125]	1975-1995	12.3	N/A	N/A	N/A	N/A
Halliwell et al., 1999[1126]	1980-1991	14.6	6.0	23 of 25	6 of 25	18 of 25
Faff, 2001[1127]	1991-1999	14.0	-9.0	20 of 24	7 of 24	11 of 24
Faff, 2004[1128]	1996-1999	6.0	-6.5	19 of 24	14 of 24	18 of 24
Gaunt, 2004[1129]	1993-2001	8.5	10.0	19 of 25	21 of 25	13 of 28
Ghargori, Chan & Faff, 2007[1130]	1996-2004	10.4	17.2	24 of 27	20 of 27	14 of 27
O'Brien et al., 2008[1131]	1982-2006	9.4	4.3	14 of 25	22 of 25	16 of 25
Kassimatis, 2008[1132]	1993-2005	12.6	11.5	11 of 25	20 of 25	11 of 25
Ghargori, Lee & Veeraghavan, 2009[1133]	1993-2005	N/A	N/A	2 of 12	10 of 12	5 of 12
Brailsford; Gaunt & O'Brien, 2012[1134]	1982-2006	9.1	-2.6	24 of 25	15 of 25	22 of 25
Brailsford; Gaunt & O'Brien, 2012[1135]	1982-2006	12	N/A	Varies depending on the approach of portfolio formation		

Source: Economic Regulation Authority, Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline, 14 March 2014, Table 30 and recently updated.

1125 Lajbcygier P. And S. M. Wheatley, *An evaluation of some alternative models for pricing Australian stocks*, Working Paper, Monash University, 2009.

1126 J. Halliwell, R. Heaney and J. Sawicki, 'Size and book to market effects in Australian share markets: a time series analysis', *Accounting Research Journal*, 1999, vol. 12, pp. 122–137.

1127 R. Faff, 'An examination of the Fama and French three-factor model using commercially available factors', *Australian Journal of Management*, 2001, vol. 26, pp. 1–17.

1128 R. Faff, 'A simple test of the Fama and French model using daily data: Australian evidence', *Applied Financial Economics*, 2004, vol. 14, pp. 83–92.

1129 Gaunt, 'Fama–French model: Australian evidence', *Accounting and Finance*, 2004.

1130 P. Gharghori, H. Chan and R. Faff, 'Are the Fama–French factors proxying default risk?', *Australian Journal of Management*, December 2007, vol. 32(2), pp. 223–249.

1131 O'Brien, Brailsford, and Gaunt, 'Market factors in Australia', Australasian Finance and Banking Conference, 2008.

1132 K. Kassimatis, 'Size, book to market and momentum effects in the Australian stock market', *Australian Journal of Management*, June 2008, vol. 33(1), pp. 145–168.

1133 P. Gharghori, R. Lee and M. Veeraraghavan, 'Anomalies and stock returns: Australian evidence', *Accounting and Finance*, 2009, vol. 49, pp. 555–576.

1134 Brailsford, T., Gaunt, C., and O'Brien, M. (2012), 'Size and book-to-market factors in Australia", *Australian Journal of Management*, 2012, vol. 37, pp. 261-81.

1135 Brailsford, T., Gaunt, C., and O'Brien, M. (2012), 'The investment value of the value premium", *Pacific-Basin Finance Journal*, 2012, vol. 20, pp. 416-37.

12. A significant and fundamental issue in the applications of the FFM in Australia is to adopt different approaches to portfolio formation. It is argued that different methods of portfolio formation lead to different conclusions. In addition, there is no strong theory to guide the method of portfolio formation given the inherent empirical nature of this type of study. As a result, studies have tended to follow previous work to determine the way in which stocks are allocated into different portfolios.

Various approaches to portfolio formation

13. Table 128 below presents different approaches adopted in Australian studies to form portfolios. For convenience, approaches of portfolio formation in three initial studies conducted by Fama and French are also included.

Table 128 Various approaches to portfolio formations

Study	Approach
Fama French 1992	In June of each year, all NYSE stocks are sorted by size (ME) to determine the NYSE decile breakpoints for ME. NYSE, AMEX, and NASDAQ stocks are then allocated to 10 size portfolios based on the NYSE breakpoints. Size breakpoints are determined by sorting NYSE stocks by market capitalization. BM breakpoints are determined by sorting NYSE stocks by BM. These breakpoints are then applied to all stocks from NYSE, AMEX and Nasdaq.
Fama French 1993	Six portfolios to mimic the underlying risk factors in returns related to size and book-to-market equity. Stocks are allocated into three book-to market equity groups based on the breakpoints for the bottom 30% (Low), middle 40% Medium) and top 30% (High) of the ranked values of ***BE/ME*** for NYSE stocks. For size factor, the entire market is allocated into only 2 groups (Big and Small) based on the market cap. Stocks are allocated in to five size quintiles and five book-to-market quintiles. 25 portfolios are constructed from the intersections of the size and BE/ME quintiles.
Fama French 2006	As in Fama French 1993.
Halliwell et al., 1999	Companies are formed into 25 portfolios. These portfolios are formed by first dividing companies into 5 groups based on their size. The companies are then independently sorted into five groups based on their *BIM* ratio.
Faff 2001 & 2004	Four of the Australian equity 'style' indexes produced by the Frank Russell Company using ASX data including the style indexes chosen are: (a) the ASX/Russell Value 100 Index; (b) the ASX/Russell Growth 100 Index; (c) the ASX/Russell Small Value Index; and (d) the ASX/Russell Small Growth Index are used. The industry portfolio data represent the 24 Australian Stock Exchange (ASX) indexes.
Gaunt 2004	For size factor, based on market cap, stocks are broken into five (quintile) size groups with an equal number of stocks in each group. Independently, the sample is ranked by BM. BM is calculated as shareholder equity divided For value factor, stocks are broken into five groups with an equal number of stocks in each group with quintile 1 being the smallest book to market (glamour) stocks and quintile 5 being the largest (value) stocks.
Ghargori, Chan & Faff, 2007	Firms are sorted into two size groups (Small and Big) and three book to- market groups (High, Medium and Low) using a 30–40–30 split. Six portfolios are formed from the intersection of the two size and three book-to-market groups. Firms are then allocated into three groups according to a 33%:33%:33% partition and 27 portfolios are formed from the intersection of the three size, three book-to-market, and three DP groups.
O'Brien et al., 2008	For size factor, each firm is ranked at the end of each December by their book-to-market ratio and assigned to one of five book-to-market portfolios, where each portfolio contains an equal number of stocks. Independently, each firm is ranked by market capitalisation again at the end of each December, and assigned to one of five size portfolios, where each portfolio contains an equal number of stocks.

Study	Approach
Kassimatis 2008	The 25 portfolios are the intersection of each BM quintile portfolio with each of the size quintile portfolios For the market portfolio, rather than using the All Ordinaries Accumulation Index which includes only the largest 250 companies of the Australian market, a value weighted portfolio of all the stocks in the sample is used.
Ghargori, Lee & Veeraghavan, 2009	The Fama–French factors are constructed by dual sorting on size and tri-sorting on book-to-market. Sextiles are chosen - the sorting on the test portfolios is at least twice as fine as the sorting used to construct the Fama–French factors.
Brailsford; Gaunt & O'Brien 2012a	The 200 largest firms by market capitalization are ranked at the end of each December by their book-to-market ratio and assigned to one of five book-to-market portfolios, where each portfolio contains an equal number of stocks. These breakpoints are then stored and used to assign all other listed firms into five portfolios. Independently, each firm is ranked by market capitalization again at the end of each December, and assigned to one of five size portfolios. The largest firms that make up 75% of total market capitalization are assigned to portfolio 1 (large). The next set of firms that make up the next 15%; 5%; 3% and the rest of total market capitalization are assigned to portfolios 2; 3; 4; and 5 respectively.
Brailsford; Gaunt & O'Brien 2013b	All firms on the ASX are ranked by market capitalization (largest to smallest) and the first n number of firms that make up 90% of total market capitalization are assigned to the big portfolio. All other firms are assigned to the small portfolio. Independently, the top 200 firms by market capitalization are ranked by their book-to-market ratios. The first 30% of firms with the lowest book-to-market ratios are assigned to the low portfolio. The next 40% of firms based on book-to-market ratio are assigned to the neutral portfolio and finally the 30% of firms with the highest book-to-market are assigned to the high portfolio. These book-to-market breakpoints are recorded and used to assign all other firms outside the top 200 into the three book-to-market portfolios. This leads to all stocks being assigned to one of two size portfolios and one of three book-to-market portfolios, giving a total of six portfolios.

Source: Compiled from various papers

14. In applying the Fama French 3 factors model in different countries/ periods of time, various empirical studies have adopted different proxies and different approaches to portfolios formation. Differences in adopting proxies (for the risk free rate and the market) are not considered. A key focus is on different approaches to portfolio formation as discussed in the 2012 paper by Brailsford; Gaunt & O'Brien. Each of these 5 portfolios formations is summarised as below.

Table 129 Proposed approaches to portfolio formations adopted in this study

Approach	Explanation
1	All stocks are ranked by size and sorted in five portfolios with each portfolio containing the same number of stocks. Stocks by book-to-market ratios (lowest to highest) are ranked and quintile portfolios of equal numbers of stocks are formed.
2	Each firm (largest to smallest) by market capitalization is ranked and then assigned to one of five size portfolios. The largest size portfolio contains the first n number of stocks that make up 75% of total market capitalization. The second portfolio contains the next n number of stocks that make up the next 15% of total market capitalization. The next 3 portfolios contain the next 5%; 3%; and 2% of total market capitalization. These market capitalization breakpoints are argued to parallel the findings of Fama and French (2006). For value factor, portfolios are constructed using book-to-market breakpoints determined on the basis of sorts on the top 200 stocks and subsequently applied to the full sample of stocks.
3	For a size factor, each stock is first ranked by market capitalization (largest to smallest). The largest size portfolio contains the largest 50 stocks. The second size portfolio contains the next 150 stocks (i.e. stocks 51-200). The third and fourth size portfolio contains the next 100 and stocks. The fifth size portfolio contains all other listed stocks. For a value factor, breakpoints for book-to-market value are determined on the basis of the top 200 stocks and then applied to the full sample of stocks.
4	For a size factor, the approach is similar to Approach 3. However, for a value factor, this approach adopts an allocation in which stocks are allocated into quintile portfolios where each portfolio contains the same number of stocks.
5	Method 5 is the same portfolio construction approach as Method 4 but on a reduced sample of stocks. Specifically, stocks with a price of less than $0.20 are excluded from the sample.

Source: Brailsford; Gaunt & O'Brien, 2012b.

Data, mimicking portfolios returns, and various scenarios

Data

15. As a standard Australian regulatory control period is 5 years, estimates of parameters in the calculation of a rate of return are generally conducted every 5 years. As such, daily data of stock and market returns for the 5 year period from 1 July 2009 to 31 May 2014 are adopted.

Estimating returns for the size factor and the value factor in mimicking portfolios

16. Fama and French (1992) used the market value of a stock at time t-1 to determine size at time t. This means that a firm's size is determined based on its market value of a previous year. In this study, a market cap for a firm (or a stock) on a day is determined based on the number of stocks outstanding in the market on the day and the closing price of a stock. As such, stocks with market caps which are lower than the average of the market cap for the entire market are allocated into a small-sized portfolio (Small - S). In addition, stocks with market caps which are higher than the average of the market cap for the entire market are allocated into a big-sized portfolio (Big - B).

17. A book-to-market (B/M) ratio for each stock is estimated based on a ratio between; (i) a book value of an equity; and (ii) its market value. A book value of equity is collected from a firm's financial statements for a previous year, year t-1. All stocks are ranked based on their B/M ratio. Thirty per cent of all stocks with lowest B/M ratios will be allocated in the low B/M ratio (Low - L); 40 per cent of all stocks with next B/M ratios will be allocated in the medium B/M ratio; and 30 per cent of all stocks with highest B/M ratios will be allocated in the high B/M ratio (High - H).

18. Fama and French (1993) clearly indicated that the intersection between the two size portfolios and the three B/M ratio portfolios will form the following 6 portfolios in which the returns on the SMB and HML mimicking portfolios in each period can be calculated:

- SH: a portfolio including stocks with *small size* and *high B/M ratio*.
- SM: a portfolio including stocks with *small size* and *medium B/M ratio*.
- SL: a portfolio including stocks with *small size* and *low B/M ratio*.
- BH: a portfolio including stocks with *big size* and *high B/M ratio*.
- BM: a portfolio including stocks with *big size* and *medium B/M ratio*.
- BL: a portfolio including stocks with *big size* and *low B/M ratio*.

19. For a size factor (SMB factor), SMB is estimated as an excess of a daily average return from stocks with small size (SH, SM, SL) and stocks with big size (BH, BM, BL):

$$SMB = \frac{SH + SM + SL}{3} + \frac{BH + BM + BL}{3}$$

20. For a value factor (a HML factor), HML is estimated as an excess of a daily average return from stocks with high B/M ratio (SH, BH) and stocks with low B/M ratio (SL, BL):

$$HML = \frac{SH + BH}{2} + \frac{SL + BL}{2}$$

Econometric approach

21. The approach proposed by Fama and Macbeth (1973) - the two-stage cross-sectional regression technique, followed by Brailsford; Gaunt & O'Brien (2012b), is adopted. In the first stage, coefficients for the market risk premium, SMB and HML are estimated using the time series regression.

$$R_{p,t} - R_{f,t} = \alpha_p + \beta\left(R_{m,t} - R_{f,t}\right) + s \times SMB_t + h \times HML_t$$

Where

$R_{p,t} - R_{f,t}$ is the excess return over the risk free rate;

α_p is the slope for the mimicking portfolio;

s is the estimated coefficient for the size factor; and

h is the estimated coefficient for the value factor.

22. In the second stage, a single cross-sectional regression of mean excess returns on the factor coefficients from the first stage, are estimated.

$$\overline{R}_{p,t} - \overline{R}_{\mathrm{f},t} = \lambda_p + \lambda_\beta \beta + \lambda_s s + \lambda_h h$$

Where

$\overline{R}_{p,t} - \overline{R}_{\mathrm{f},t}$ represents the mean excess returns on the factors coefficient;

λ_p is the slope of the regression;

λ_β represents the estimated coefficients on beta;

β , s , h represent for beta, size and value factors; and

λ_s , λ_h represent the estimated coefficients in the second stage regression on the size and value factors.

23. Fama and Macbeth argued that if a factor is priced then the estimated coefficient in the second stage regression will be statistically significant.

A various scenario approach

24. Three different scenarios are developed to consider how robust the estimates from the model are in the Australian context. It is noted that by using three different scenarios, it is not expected to produce the same or similar findings in terms of the magnitude of the estimated coefficients. Rather it is expected that all three expectations from the Fama French three-factor model are met in the Australian context including estimated coefficients of alphas are not statistically significantly and those of SMB and HML are positive and statistically significant. Each of these three scenarios is as follows.

Scenario 1:

25. Daily data for all listed firms in Australia as at 31 December each year (except for 2014 which is at 31 May 2014) during the period of 5 years, from 1 June 2009 to 31 May 2014. In this scenario, six sub samples are formed for 2009 (7 months) and 2014 (5 months) and the full 12 months for each year within the period from 2010 to 2013.

Scenario 2:

26. Daily data for all listed firms in Australia as at 31 May 2014. In this scenario, a number of listed firms in a sample in each year during the 5 year period from 1 June 2009 to 31 May 2014 remains the same.

Scenario 3:

27. This scenario is similar to Scenario 2. The only difference is that the number of shares traded (not the number of shares outstanding in Scenario 2) in the market on the day is used to calculate the market capitalisation of the firm.

Empirical results

28. A summary of the findings from this study under three different scenarios and five approaches to portfolio formation is presented in Table 130 below. A full result of the study can be found in Appendix 3 (Tables).

Table 130 The results

Scenario	Approach to portfolio formation	FFM's parameter analysis		
		Intercept not significant	HML coefficients significant	SMB coefficients significant
Scenario 1	1	25	16	25
	2	25	15	25
	3	25	18	25
	4	25	17	25
	5	25	22	25
Scenario 2	1	14	21	25
	2	11	22	25
	3	13	22	25
	4	14	21	25
	5	25	19	25
Scenario 3	1	10	17	16
	2	12	16	15
	3	9	15	13
	4	11	16	12
	5	24	18	16

Source: Economic Regulation Authority's analysis.

29. Key findings from this empirical study can be summarised as below.

- *First*, the findings from this study indicate that while the size factor (SMB) may be priced well in the Australian context, the value factor (HML) provides a very mixed result.
- *Second*, all estimated coefficients on beta (a single factor under the CAPM) are statistically significant and they carry "correct" sign as expected across all five portfolio formations and under all three different scenarios.
- *Third*, the risk premium for the two additional factors, the SMB and the HML, vary significantly across portfolios depending on the way portfolios are formed and the scenarios being considered.

- *Fourth*, ignoring the use of different proxies, adopting different approaches to portfolio formulation will result in different findings of the model both in terms of expected sign for the estimated coefficients and statistically significant estimated coefficients.
- *Fifth*, under the three scenarios considered, the estimated coefficients for both SMB and HML factors vary significantly. Some of the coefficients from various portfolios carry a different sign as expected and/or the estimated coefficients are not statistically significant.

30. The second stage, a single cross-sectional regression of mean excess returns on the factor coefficients from the first stage, is then conducted. The results for this stage using Australian data under Scenario 1 are presented in Table 131 below.

Table 131 The results of the second stage for Scenario 1

Method	λ_0	λ_β	λ_s	λ_h	Adj.R^2
Method 1	0.0067 (0.2199)	-0.0034 (0.5043)	0.0014 (0.0000)***	-0.0019 (0.0000)***	88.63%
Method 2	0.0116 (0.0288)**	-0.0085 (0.0641)*	0.0016 (0.0000)***	-0.0019 (0.0000)***	94.21%
Method 3	0.0098 (0.0485)**	-0.0067 (0.1215)	0.0015 (0.0001)***	-0.0020 (0.0000)***	93.71%
Method 4	0.0086 (0.0300)**	-0.0052 (0.1351)	0.0013 (0.0004)***	-0.0018 (0.0000)***	92.34%
Method 5	-0.0029 (0.4775)	0.0042 (0.2504)	0.0004 (0.1401)	-0.0021 (0.0000)***	92.60%

Source: Economic Regulation Authority's analysis.

31. The findings from this second stage regression indicate that the coefficients on HML are all statistically significant at 1 per cent level of significance. However, these coefficients are all negative which is not an expectation from the Fama French three-factor model and findings from the recent Australian study by Brailsford; Gaunt & O'Brien (2012b). In addition, the findings are mixed for estimated coefficients on the market risk premium and SMB and alphas. To a certain extent, the findings from this study are similar to the study by Core et al. (2008) for the US. In this US study, the authors concluded that the coefficients on the market risk premium and SMB to be insignificant but the intercept and the coefficient on HML to be positive and significant.

Conclusions

32. This empirical study aims to apply the Fama French three-factor model in the Australian context using the most recent data for the period of 5 years from July 2009 to May 2015. The findings from this study under various scenarios and various approaches to portfolio formations are mixed. Fundamental expectations from the Fama French three-factor model in terms of the insignificance of the estimated coefficients on alphas, the significance and positivity of the coefficients on the market risk premium; the SMB and the HML are not met in this study. As such, a claim from a recent study in Australia that for the first time, Fama French three-factor model

produces a consistent outcome is simply exaggerated. It can be argued that this recent and new finding is an outcome of another "data mining" exercise, which is a common criticism of the Fama French three-factor model.

33. The contributions of this study can be summarised as below.

34. First, the study utilises the most recent data for the 5 year period from 1999 to 2014. The 5-years is generally a standard regulatory period in Australia. The data ends on 31 May 2014.

35. Second, it was argued that using daily data may better reflect the dynamics of the Australian equity market. No Australian empirical studies on the issue have adopted daily data. This study used daily data of all Australian listed stocks.

36. Third, one of the fundamental differences between the Australian empirical studies on the FFM is the method used to form various mimicking portfolios used in the FFM. This study applies the various different ways of portfolio formulation, as well as some new methods obtained from other empirical studies on the applications of the FFM in other countries – to the same dataset – in order to consider whether or not the findings are robust.

37. Fourth, various scenarios have been evaluated to check the robustness of the estimates using Australian data.

38. Fifth, this study provides further evidence to the debate on the adoption of an appropriate model to estimate the return on equity for future regulatory decisions in Australia. It is argued that the use of Australian data provides a further response to the accusation of data mining. If the FFM is itself robust, replication of similar results in different markets is suggestive of a more pervasive asset pricing effect than might be the case if the results were only observed in the USA.

Appendix 3 tables

Scenario 1 - Method 1

α	Growth	2	3	4	Value
Big	0.0005 0.7032	-0.0003 0.7849	0.0004 0.7375	-0.0003 0.7889	0.0002 0.8887
2	0.0004 0.7901	-0.0001 0.9671	0.0005 0.6819	-0.0001 0.9360	0.0005 0.7103
3	-0.0001 0.9566	-0.0003 0.8102	0.0000 0.9946	-0.0003 0.8318	0.0003 0.8111
4	-0.0009 0.5644	-0.0008 0.5588	-0.0001 0.9457	-0.0012 0.3867	-0.0002 0.9105
Small	0.0012 0.4300	0.0012 0.2991	0.0012 0.3532	0.0006 0.6030	0.0007 0.6163

β	G	2	3	4	V
B	1.0706 (0.0000)***	1.1121 (0.0000)***	1.0509 (0.0000)***	1.0916 (0.0000)***	1.065 (0.0000)***
2	1.0500 (0.0000)***	1.0448 (0.0000)***	1.0311 (0.0000)***	1.0362 (0.0000)***	1.0738 (0.0000)***
3	1.0599 (0.0000)***	1.0198 (0.0000)***	1.0030 (0.0000)***	1.0320 (0.0000)***	1.0420 (0.0000)***
4	1.0645 (0.0000)***	1.0708 (0.0000)***	1.0073 (0.0000)***	1.0657 (0.0000)***	1.0593 (0.0000)***
S	0.9931 (0.0000)***	1.0691 (0.0000)***	1.0486 (0.0000)***	1.0715 (0.0000)***	1.0544 (0.0000)***

s_i	G	2	3	4	V
B	1.2635 (0.0000)***	1.1521 (0.0000)***	1.1286 (0.0000)***	1.3477 (0.0000)***	1.4947 (0.0000)***
2	1.6396 (0.0000)***	1.2973 (0.0000)***	1.3678 (0.0000)***	1.4725 (0.0000)***	1.6735 (0.0000)***
3	2.0049 (0.0000)***	1.5981 (0.0000)***	1.6335 (0.0000)***	1.7146 (0.0000)***	1.8499 (0.0000)***
4	2.5874 (0.0000)***	2.148 (0.0000)***	1.9286 (0.0000)***	2.2289 (0.0000)***	2.4757 (0.0000)***
S	2.7612 (0.0000)***	2.2127 (0.0000)***	2.1941 (0.0000)***	2.6511 (0.0000)***	2.7721 (0.0000)***

h_i	G	2	3	4	V
B	-1.4652 (0.0000)***	-1.2063 (0.0000)***	-0.5093 (0.0586)*	-0.0658 0.8121	0.3614 0.1843
2	-1.1673 (0.0002)***	-1.0672 (0.0000)***	-0.2417 0.3880	0.0533 0.8556	0.6220 (0.0383)**
3	-1.2292 (0.0000)***	-1.1163 (0.0002)***	-0.4266 0.1395	0.1360 0.6395	0.4031 0.1826
4	-1.4722 (0.0000)***	-0.9409 (0.0011)***	-0.0646 0.8235	0.0794 0.7860	0.7547 (0.0126)**
S	-2.6357 (0.0000)***	-1.5269 (0.0000)***	-1.2654 (0.0000)***	0.2009 0.4350	1.1003 (0.0000)***

R^2	G	2	3	4	V
B	52.74%	58.87%	50.98%	54.88%	58.17%
2	52.40%	52.06%	53.99%	53.51%	59.00%
3	55.80%	51.78%	54.42%	57.63%	59.09%
4	62.20%	62.58%	59.96%	65.54%	71.39%
S	65.53%	69.19%	69.01%	81.47%	80.89%

Scenario 1 - Method 2

α	Growth	2	3	4	Value
Big	0.0005 0.6826	-0.0003 0.8101	-0.0001 0.9428	-0.0008 0.5701	-0.0002 0.8761
2	0.0002 0.8539	-0.0009 0.4407	-0.0003 0.7910	-0.0005 0.6574	0.0003 0.8332
3	0.0005 0.7108	-0.0003 0.8145	0.0003 0.7959	0.0000 0.9844	0.0008 0.5811
4	0.0005 0.7092	0.0000 0.9726	-0.0001 0.9623	-0.0005 0.7061	0.0002 0.8839
Small	0.0001 0.9291	0.0002 0.8698	0.0002 0.8845	0.0001 0.9142	0.0002 0.8966

β	G	2	3	4	V
B	1.0118 (0.0000)***	1.0945 (0.0000)***	1.0654 (0.0000)***	1.083 (0.0000)***	1.0332 (0.0000)***
2	1.0677 (0.0000)***	1.1142 (0.0000)***	1.082 (0.0000)***	1.0985 (0.0000)***	1.0753 (0.0000)***
3	1.0526 (0.0000)***	1.1195 (0.0000)***	1.053 (0.0000)***	1.1022 (0.0000)***	1.0757 (0.0000)***
4	1.0422 (0.0000)***	1.0485 (0.0000)***	1.0438 (0.0000)***	1.0624 (0.0000)***	1.0492 (0.0000)***
S	1.06 (0.0000)***	1.0458 (0.0000)***	1.0413 (0.0000)***	1.0479 (0.0000)***	1.0468 (0.0000)***

s_i	G	2	3	4	V
B	1.7165 (0.0000)***	1.3616 (0.0000)***	1.5337 (0.0000)***	1.7628 (0.0000)***	2.0717 (0.0000)***
2	1.7607 (0.0000)***	1.2406 (0.0000)***	1.5429 (0.0000)***	1.5001 (0.0000)***	1.8548 (0.0000)***
3	1.6603 (0.0000)***	1.18 (0.0000)***	1.3202 (0.0000)***	1.4202 (0.0000)***	1.7464 (0.0000)***
4	1.5975 (0.0000)***	1.222 (0.0000)***	1.3408 (0.0000)***	1.3906 (0.0000)***	1.6218 (0.0000)***
S	2.2658 (0.0000)***	2.1825 (0.0000)***	2.2419 (0.0000)***	2.2752 (0.0000)***	2.2713 (0.0000)***

h_i	G	2	3	4	V
B	-2.2930 (0.0000)***	-1.1371 (0.0000)***	-0.2635 0.3145	0.5310 (0.0487)**	0.5400 (0.0783)*
2	-2.3271 (0.0000)***	-1.3783 (0.0000)***	-0.1779 0.4805	0.7017 (0.0069)***	1.0296 (0.0008)***
3	-2.1594 (0.0000)***	-1.1436 (0.0000)***	-0.2913 0.2961	0.6113 (0.0217)**	0.9538 (0.0018)***
4	-1.3521 (0.0000)***	-0.6835 (0.0124)**	-0.4152 0.1507	0.0307 0.9143	0.3143 0.3035
S	-0.7022 (0.0166)**	-0.3371 0.2155	-0.2298 0.4017	-0.1883 0.4940	0.0314 0.9118

R^2	G	2	3	4	V
B	57.00%	60.70%	58.91%	65.29%	65.14%
2	60.56%	60.32%	63.96%	64.05%	62.45%
3	55.53%	56.53%	52.55%	61.40%	60.47%
4	53.31%	51.84%	50.96%	53.90%	54.88%
S	64.12%	66.77%	67.23%	68.02%	66.99%

Scenario 1 - Method 3

α	Growth	2	3	4	Value
Big	0.0004 0.7585	-0.0004 0.7556	-0.0003 0.8076	-0.0009 0.4904	-0.0003 0.8346
2	0.0000 0.9814	-0.0009 0.4827	0.0000 0.9854	-0.0002 0.8899	0.0007 0.5686
3	0.0003 0.8158	-0.0002 0.8827	-0.0001 0.9309	-0.0004 0.7842	0.0003 0.8504
4	0.0002 0.9014	-0.0002 0.8911	-0.0004 0.7867	-0.0005 0.7046	0.0004 0.8104
Small	0.0003 0.8296	0.0001 0.9581	0.0001 0.9299	0.0000 0.9691	-0.0001 0.9206

β	G	2	3	4	V
B	1.0641 (0.0000)***	1.0829 (0.0000)***	1.0586 (0.0000)***	1.0997 (0.0000)***	1.0357 (0.0000)***
2	1.0954 (0.0000)***	1.1314 (0.0000)***	1.0922 (0.0000)***	1.0962 (0.0000)***	1.0708 (0.0000)***
3	1.0785 (0.0000)***	1.0918 (0.0000)***	1.0671 (0.0000)***	1.0997 (0.0000)***	1.0273 (0.0000)***
4	1.0362 (0.0000)***	1.0515 (0.0000)***	1.0317 (0.0000)***	1.0331 (0.0000)***	1.0364 (0.0000)***
S	1.0604 (0.0000)***	1.0391 (0.0000)***	1.0299 (0.0000)***	1.0535 (0.0000)***	1.0591 (0.0000)***

s_i	G	2	3	4	V
B	1.8274 (0.0000)***	1.3516 (0.0000)***	1.5890 (0.0000)***	1.8062 (0.0000)***	2.1351 (0.0000)***
2	1.7000 (0.0000)***	1.1975 (0.0000)***	1.3570 (0.0000)***	1.2625 (0.0000)***	1.5543 (0.0000)***
3	1.7278 (0.0000)***	1.3051 (0.0000)***	1.4564 (0.0000)***	1.4944 (0.0000)***	1.8319 (0.0000)***
4	1.7120 (0.0000)***	1.3029 (0.0000)***	1.4493 (0.0000)***	1.4776 (0.0000)***	1.7365 (0.0000)***
S	2.2918 (0.0000)***	2.1857 (0.0000)***	2.2372 (0.0000)***	2.2996 (0.0000)***	2.3327 (0.0000)***

h_i	G	2	3	4	V
B	-2.375 (0.0000)***	-1.2098 (0.0000)***	-0.2747 0.3034	0.6091 (0.0313)**	0.6677 (0.0306)**
2	-1.9746 (0.0000)***	-1.2882 (0.0000)***	-0.178 0.4665	0.5147 (0.0388)**	0.8463 (0.0026)***
3	-2.0273 (0.0000)***	-1.0104 (0.0002)***	-0.4127 0.1660	0.5548 (0.0623)*	0.7442 (0.0188)**
4	-1.4028 (0.0000)***	-0.5598 (0.0361)**	-0.219 0.4429	0.2232 0.4406	0.5936 (0.0573)*
S	-0.8182 (0.0054)***	-0.4646 (0.09)*	-0.5049 (0.0667)*	-0.3358 0.2186	-0.0826 0.7696

R^2	G	2	3	4	V
B	61.59%	58.47%	58.67%	64.82%	66.38%
2	65.65%	61.50%	63.44%	61.37%	60.84%
3	55.56%	53.96%	51.13%	56.18%	58.89%
4	57.03%	54.85%	54.01%	55.47%	57.02%
S	63.90%	65.99%	66.07%	68.49%	68.46%

Scenario 1 - Method 4

α	G	2	3	4	V
B	0.0002 0.8821	-0.0006 0.6267	0.0005 0.7090	-0.0011 0.4395	-0.0001 0.9250
2	0.0004 0.7775	-0.0004 0.7517	-0.0001 0.9658	-0.0004 0.7680	0.0009 0.4917
3	0.0003 0.8699	-0.0004 0.7601	0.0005 0.6920	-0.0006 0.6726	0.0003 0.8468
4	0.0001 0.9362	-0.0004 0.7660	0.0002 0.8985	-0.0005 0.7265	0.0004 0.7620
S	0.0002 0.8971	0.0001 0.9090	0.0002 0.8963	0.0000 0.9796	-0.0002 0.8846

β	G	2	3	4	V
B	0.9447 (0.0000)***	1.0717 (0.0000)***	1.0014 (0.0000)***	1.0727 (0.0000)***	1.0179 (0.0000)***
2	1.0672 (0.0000)***	1.0994 (0.0000)***	1.0760 (0.0000)***	1.0660 (0.0000)***	1.0840 (0.0000)***
3	1.0045 (0.0000)***	1.0984 (0.0000)***	1.0228 (0.0000)***	1.0737 (0.0000)***	1.0151 (0.0000)***
4	1.0272 (0.0000)***	1.0350 (0.0000)***	1.0050 (0.0000)***	1.0400 (0.0000)***	1.0607 (0.0000)***
S	1.0586 (0.0000)***	1.0459 (0.0000)***	1.0296 (0.0000)***	1.0502 (0.0000)***	1.0565 (0.0000)***

s_i	G	2	3	4	V
B	1.8563 (0.0000)***	1.3095 (0.0000)***	1.3500 (0.0000)***	1.8422 (0.0000)***	2.0749 (0.0000)***
2	1.3895 (0.0000)***	1.1637 (0.0000)***	1.1409 (0.0000)***	1.3865 (0.0000)***	1.5595 (0.0000)***
3	1.7552 (0.0000)***	1.2937 (0.0000)***	1.3292 (0.0000)***	1.6125 (0.0000)***	1.8139 (0.0000)***
4	1.6918 (0.0000)***	1.2868 (0.0000)***	1.3298 (0.0000)***	1.5428 (0.0000)***	1.7887 (0.0000)***
S	2.3844 (0.0000)***	2.2354 (0.0000)***	2.1826 (0.0000)***	2.2432 (0.0000)***	2.3191 (0.0000)***

h_i	G	2	3	4	V
B	-2.9796 (0.0000)***	-1.9507 (0.0000)***	-0.5769 (0.0331)**	0.1723 0.5560	0.8505 (0.0052)***
2	-1.9477 (0.0000)***	-1.5663 (0.0000)***	-0.8608 (0.0038)***	0.1888 0.4771	1.0800 (0.0000)***
3	-2.1468 (0.0000)***	-1.7534 (0.0000)***	-0.4359 0.1339	0.16 0.5991	0.8749 (0.0052)***
4	-1.4647 (0.0000)***	-1.2427 (0.0000)***	-0.3331 0.2365	0.3533 0.2262	0.9208 (0.0022)***
S	-0.7937 (0.0065)***	-0.5500 (0.0526)*	-0.4985 (0.0675)*	-0.3216 0.2361	-0.0504 0.8594

R^2	G	2	3	4	V
B	46.74%	58.86%	52.23%	61.23%	67.27%
2	54.41%	59.90%	54.05%	57.82%	63.02%
3	45.31%	53.83%	49.73%	54.70%	60.52%
4	50.36%	52.20%	51.62%	55.92%	62.48%
S	65.52%	64.84%	66.26%	67.98%	67.88%

Scenario 1 - Method 5

α	Growth	2	3	4	Value
Large	-0.0021 0.1358	-0.0011 0.3179	-0.0006 0.5591	-0.0015 0.1211	-0.0019 0.1126
2	-0.0012 0.2892	-0.0005 0.6532	-0.0002 0.8649	-0.0007 0.5400	-0.0006 0.5763
3	-0.0017 0.1603	-0.0009 0.4385	-0.0005 0.6709	-0.0013 0.2267	-0.0015 0.2224
4	-0.0019 0.1031	-0.0011 0.3132	-0.0009 0.3739	-0.0015 0.1397	-0.0017 0.1347
Small	-0.0004 0.7854	-0.0006 0.5844	0.0002 0.8858	-0.0010 0.4736	-0.0010 0.4697

β	Growth	2	3	4	Value
Large	1.0725 (0.0000)***	1.1316 (0.0000)***	1.0910 (0.0000)***	1.0916 (0.0000)***	1.1163 (0.0000)***
2	1.1521 (0.0000)***	1.1704 (0.0000)***	1.1383 (0.0000)***	1.1466 (0.0000)***	1.1568 (0.0000)***
3	1.1661 (0.0000)***	1.1713 (0.0000)***	1.1282 (0.0000)***	1.1313 (0.0000)***	1.1235 (0.0000)***
4	1.1655 (0.0000)***	1.1518 (0.0000)***	1.1510 (0.0000)***	1.1560 (0.0000)***	1.1658 (0.0000)***
Small	1.1480 (0.0000)***	1.1050 (0.0000)***	1.0675 (0.0000)***	1.0559 (0.0000)***	1.1171 (0.0000)***

s_i	Growth	2	3	4	Value
Large	2.0383 (0.0000)***	1.2574 (0.0000)***	1.1402 (0.0000)***	1.1231 (0.0000)***	1.5181 (0.0000)***
2	1.0925 (0.0000)***	0.9374 (0.0000)***	0.9698 (0.0000)***	1.1487 (0.0000)***	1.1121 (0.0000)***
3	1.7652 (0.0000)***	1.5629 (0.0000)***	1.5473 (0.0000)***	1.4697 (0.0000)***	1.6180 (0.0000)***
4	2.1738 (0.0000)***	2.0007 (0.0000)***	1.9669 (0.0000)***	1.9565 (0.0000)***	1.9936 (0.0000)***
Small	2.8883 (0.0000)***	1.8220 (0.0000)***	1.9329 (0.0000)***	2.4636 (0.0000)***	2.2386 (0.0000)***

h_i	Growth	2	3	4	Value
Large	-3.5620 (0.0000)***	-2.2577 (0.0000)***	-1.3241 (0.0000)***	-1.0743 (0.0000)***	0.1756 0.3044
2	-2.3342 (0.0000)***	-1.7627 (0.0000)***	-1.1875 (0.0000)***	-1.0503 (0.0000)***	-0.4244 (0.0202)**
3	-2.8297 (0.0000)***	-1.8205 (0.0000)***	-1.1374 (0.0000)***	-1.1723 (0.0000)***	-0.3293 0.1020
4	-2.2925 (0.0000)***	-1.6738 (0.0000)***	-1.3927 (0.0000)***	-1.3685 (0.0000)***	-0.9166 (0.0000)***
Small	-3.0301 (0.0000)***	-2.3569 (0.0000)***	-1.3386 (0.0000)***	-1.4189 (0.0000)***	0.2071 0.3866

R^2	Growth	2	3	4	Value
Large	85.01%	71.50%	70.31%	69.45%	58.86%
2	69.57%	68.72%	64.31%	62.75%	61.03%
3	70.40%	66.41%	65.07%	63.72%	57.81%
4	71.38%	69.23%	70.09%	70.52%	66.23%
Small	80.52%	72.52%	64.99%	63.75%	54.45%

Scenario 2 - Method 1

α	Growth	2	3	4	Value
Big	-0.0007 0.4231	-0.0011 0.2110	-0.0023 (0.0112)**	-0.0032 (0.0006)***	0.0000 0.9813
2	-0.0017 0.1290	-0.0017 0.1058	-0.0032 (0.0018)***	-0.0041 (0.0002)***	-0.0006 0.6014
3	-0.0019 (0.0828)*	-0.0018 0.1153	-0.0030 (0.0100)**	-0.0032 (0.0083)***	-0.0006 0.6039
4	-0.0028 (0.0149)**	-0.0029 (0.0037)***	-0.0043 (0.0000)***	-0.0052 (0.0000)***	-0.0014 0.1865
Small	0.0008 0.4807	0.0006 0.4766	-0.0001 0.9158	-0.0009 0.3645	-0.0004 0.6957

β	Growth	2	3	4	Value
Big	1.0250 (0.0000)***	1.0876 (0.0000)***	1.0840 (0.0000)***	1.0588 (0.0000)***	1.0392 (0.0000)***
2	0.9903 (0.0000)***	1.0604 (0.0000)***	1.0626 (0.0000)***	1.0413 (0.0000)***	1.0099 (0.0000)***
3	0.9721 (0.0000)***	0.9730 (0.0000)***	0.9831 (0.0000)***	0.9585 (0.0000)***	0.9585 (0.0000)***
4	1.0035 (0.0000)***	1.0652 (0.0000)***	1.0512 (0.0000)***	1.0275 (0.0000)***	1.0272 (0.0000)***
Small	0.9782 (0.0000)***	1.0447 (0.0000)***	1.0438 (0.0000)***	1.0207 (0.0000)***	0.9842 (0.0000)***

s_i	Growth	2	3	4	Value
Big	1.6321 (0.0000)***	1.3084 (0.0000)***	1.3860 (0.0000)***	1.3652 (0.0000)***	1.3546 (0.0000)***
2	2.0427 (0.0000)***	1.7315 (0.0000)***	1.9071 (0.0000)***	1.8941 (0.0000)***	1.8822 (0.0000)***
3	2.3858 (0.0000)***	1.9675 (0.0000)***	2.1571 (0.0000)***	2.0650 (0.0000)***	2.3136 (0.0000)***
4	2.7589 (0.0000)***	2.3329 (0.0000)***	2.4198 (0.0000)***	2.4541 (0.0000)***	2.5889 (0.0000)***
Small	3.2284 (0.0000)***	2.6773 (0.0000)***	2.7164 (0.0000)***	2.8102 (0.0000)***	2.8750 (0.0000)***

h_i	Growth	2	3	4	Value
Big	-2.2094 (0.0000)***	-0.9749 (0.0000)***	-0.5720 (0.0018)***	-0.2037 0.2758	0.1933 0.2853
2	-2.2209 (0.0000)***	-1.3523 (0.0000)***	-1.1411 (0.0000)***	-0.6959 (0.0019)***	-0.3864 (0.0800)*
3	-2.5327 (0.0000)***	-1.4489 (0.0000)***	-1.3656 (0.0000)***	-0.8311 (0.0010)***	-0.7013 (0.0061)***
4	-2.5579 (0.0000)***	-1.3939 (0.0000)***	-0.8361 (0.0001)***	-0.4604 (0.0404)**	-0.3124 0.1519
Small	-3.0182 (0.0000)***	-1.4670 (0.0000)***	-0.9180 (0.0000)***	-0.4502 (0.0295)**	0.1880 0.3660

R^2	Growth	2	3	4	Value
Big	72.12%	68.91%	70.57%	68.58%	67.82%
2	62.80%	63.71%	66.87%	63.14%	59.80%
3	63.24%	57.24%	60.56%	53.88%	54.88%
4	64.59%	67.01%	69.44%	68.31%	68.62%
Small	68.02%	72.47%	74.29%	73.01%	75.44%

Scenario 2 - Method 2

α	Growth	2	3	4	Value
Big	-0.0001 0.9494	-0.0016 (0.0829)*	-0.0021 (0.0198)**	-0.0038 (0.0000)***	-0.0009 0.3632
2	-0.0002 0.8787	-0.0015 0.1012	-0.0019 (0.0365)**	-0.0031 (0.0004)***	-0.0008 0.3752
3	-0.0005 0.6883	-0.0016 0.1172	-0.0020 (0.0469)**	-0.0033 (0.0007)***	-0.0009 0.3361
4	-0.0017 0.2098	-0.0019 (0.0941)*	-0.0020 (0.0523)*	-0.0028 (0.0073)***	-0.0013 0.1961
Small	-0.0015 0.1631	-0.0020 (0.0404)**	-0.0018 (0.0812)*	-0.0019 (0.0647)*	-0.0025 (0.0386)**

β	Growth	2	3	4	Value
Big	0.9454 (0.0000)***	1.0737 (0.0000)***	1.0894 (0.0000)***	1.0193 (0.0000)***	0.9930 (0.0000)***
2	0.9673 (0.0000)***	1.0728 (0.0000)***	1.0879 (0.0000)***	1.0014 (0.0000)***	0.9967 (0.0000)***
3	0.9820 (0.0000)***	1.0890 (0.0000)***	1.1277 (0.0000)***	1.0503 (0.0000)***	1.0212 (0.0000)***
4	1.0125 (0.0000)***	1.0691 (0.0000)***	1.0848 (0.0000)***	1.0633 (0.0000)***	1.0285 (0.0000)***
Small	1.0025 (0.0000)***	1.0174 (0.0000)***	0.9923 (0.0000)***	0.9630 (0.0000)***	1.0041 (0.0000)***

s_i	Growth	2	3	4	Value
Big	2.3249 (0.0000)***	1.7489 (0.0000)***	1.6963 (0.0000)***	1.6244 (0.0000)***	1.9039 (0.0000)***
2	2.2046 (0.0000)***	1.6258 (0.0000)***	1.5989 (0.0000)***	1.4095 (0.0000)***	1.8521 (0.0000)***
3	2.1269 (0.0000)***	1.5676 (0.0000)***	1.5943 (0.0000)***	1.5016 (0.0000)***	1.8606 (0.0000)***
4	2.2935 (0.0000)***	1.8539 (0.0000)***	1.9027 (0.0000)***	1.8622 (0.0000)***	2.0172 (0.0000)***
Small	2.6435 (0.0000)***	2.4636 (0.0000)***	2.2453 (0.0000)***	2.2465 (0.0000)***	2.5981 (0.0000)***

h_i	Growth	2	3	4	Value
Big	-3.4821 (0.0000)***	-2.0804 (0.0000)***	-1.1193 (0.0000)***	-0.4430 (0.0132)**	0.4033 (0.0406)**
2	-3.2534 (0.0000)***	-1.8700 (0.0000)***	-0.9997 (0.0000)***	-0.4336 (0.0011)***	0.4104 (0.0376)**
3	-2.8471 (0.0000)***	-1.4275 (0.0000)***	-0.7885 (0.0002)***	-0.2678 0.1787	0.2961 0.1479
4	-1.7710 (0.0000)***	-0.9487 (0.0000)***	-0.8241 (0.0002)***	-0.7627 (0.0004)***	-0.5795 (0.0044)***
Small	-3.1246 (0.0000)***	-2.5913 (0.0000)***	-1.4611 (0.0000)***	-0.7566 (0.0004)***	-0.4053 0.1005

R^2	Growth	2	3	4	Value
Big	67.57%	73.32%	71.49%	70.78%	69.48%
2	68.17%	72.85%	71.36%	70.15%	68.99%
3	62.92%	66.44%	66.64%	66.31%	67.29%
4	55.84%	59.69%	63.43%	63.21%	65.26%
Small	70.38%	71.12%	64.31%	63.43%	65.33%

Scenario 2 - Method 3

α	Growth	2	3	4	Value
Big	-0.0001 0.9209	-0.0017 (0.0607)*	-0.0022 (0.0129)**	-0.0038 (0.0000)***	-0.0010 0.3067
2	-0.0003 0.7416	-0.0014 0.1162	-0.0017 (0.0635)*	-0.0029 (0.0013)***	-0.0008 0.3843
3	-0.0004 0.7572	-0.0016 0.1176	-0.0023 (0.0240)**	-0.0034 (0.0007)***	-0.0009 0.3576
4	-0.0013 0.2631	-0.0022 (0.0325)**	-0.0024 (0.0200)**	-0.0039 (0.0001)***	-0.0014 0.1844
Small	-0.0016 0.1204	-0.0016 0.1242	-0.0016 0.1273	-0.0018 (0.0880)*	-0.0019 (0.0746)*

β	Growth	2	3	4	Value
Big	0.9467 (0.0000)***	1.0729 (0.0000)***	1.0873 (0.0000)***	1.0177 (0.0000)***	0.9906 (0.0000)***
2	1.0034 (0.0000)***	1.0880 (0.0000)***	1.1023 (0.0000)***	1.0472 (0.0000)***	1.0156 (0.0000)***
3	0.9876 (0.0000)***	1.0851 (0.0000)***	1.1199 (0.0000)***	1.0555 (0.0000)***	1.0156 (0.0000)***
4	0.9738 (0.0000)***	1.0684 (0.0000)***	1.0684 (0.0000)***	1.0439 (0.0000)***	1.0082 (0.0000)***
Small	0.9984 (0.0000)***	0.9940 (0.0000)***	0.9909 (0.0000)***	0.9918 (0.0000)***	0.9981 (0.0000)***

s_i	Growth	2	3	4	Value
Big	2.3126 (0.0000)***	1.7427 (0.0000)***	1.6700 (0.0000)***	1.6030 (0.0000)***	1.8873 (0.0000)***
2	1.9399 (0.0000)***	1.4400 (0.0000)***	1.3989 (0.0000)***	1.3473 (0.0000)***	1.7091 (0.0000)***
3	2.1543 (0.0000)***	1.6779 (0.0000)***	1.7305 (0.0000)***	1.6225 (0.0000)***	1.9260 (0.0000)***
4	2.0820 (0.0000)***	1.8254 (0.0000)***	1.7413 (0.0000)***	1.8361 (0.0000)***	1.9963 (0.0000)***
Small	2.6720 (0.0000)***	2.6312 (0.0000)***	2.6555 (0.0000)***	2.6582 (0.0000)***	2.6204 (0.0000)***

h_i	Growth	2	3	4	Value
Big	-3.4841 (0.0000)***	-2.0886 (0.0000)***	-1.0768 (0.0000)***	-0.3953 (0.0263)**	0.4265 (0.0303)**
2	-2.6408 (0.0000)***	-1.4426 (0.0000)***	-0.7226 (0.0001)***	-0.2831 0.1179	0.3698 (0.0581)*
3	-3.0336 (0.0000)***	-1.8005 (0.0000)***	-1.0535 (0.0000)***	-0.4762 (0.0214)**	0.2530 0.2364
4	-2.3417 (0.0000)***	-1.8630 (0.0000)***	-1.3025 (0.0000)***	-0.9891 (0.0000)***	-0.1755 0.4125
Small	-1.5649 (0.0000)***	-1.2825 (0.0000)***	-1.2378 (0.0000)***	-1.1847 (0.0000)***	-1.0002 (0.0000)***

R^2	Growth	2	3	4	Value
Big	67.97%	73.93%	71.72%	70.78%	69.48%
2	68.56%	71.32%	70.09%	69.40%	68.20%
3	65.02%	67.29%	67.16%	65.42%	65.69%
4	61.78%	66.63%	64.58%	66.32%	63.53%
Small	65.49%	66.52%	66.04%	66.47%	65.63%

Scenario 2 - Method 4

α	Growth	2	3	4	Value
Big	-0.0007 0.5241	-0.0011 0.2343	-0.0028 (0.0021)***	-0.0046 (0.0000)***	0.0005 0.6342
2	-0.0007 0.4559	-0.0010 0.2947	-0.0024 (0.0102)**	-0.0036 (0.0003)***	0.0004 0.6859
3	-0.0008 0.4926	-0.0012 0.2476	-0.0028 (0.0053)***	-0.0042 (0.0001)***	0.0003 0.7578
4	-0.0017 0.1324	-0.0017 (0.0946)*	-0.0032 (0.0013)***	-0.0045 (0.0000)***	-0.0005 0.6238
Small	-0.0017 0.1053	-0.0016 0.1238	-0.0016 0.1222	-0.0018 (0.0885)*	-0.0018 (0.0903)*

β	Growth	2	3	4	Value
Big	0.9621 (0.0000)***	1.0759 (0.0000)***	1.0614 (0.0000)***	1.0195 (0.0000)***	0.9859 (0.0000)***
2	1.0154 (0.0000)***	1.0853 (0.0000)***	1.0737 (0.0000)***	1.0437 (0.0000)***	1.0251 (0.0000)***
3	1.0023 (0.0000)***	1.0926 (0.0000)***	1.0826 (0.0000)***	1.0526 (0.0000)***	1.0186 (0.0000)***
4	0.9809 (0.0000)***	1.0716 (0.0000)***	1.0693 (0.0000)***	1.0426 (0.0000)***	1.0011 (0.0000)***
Small	0.9990 (0.0000)***	0.9929 (0.0000)***	0.9944 (0.0000)***	0.9922 (0.0000)***	0.9950 (0.0000)***

s_i	Growth	2	3	4	Value
Big	2.3996 (0.0000)***	1.6827 (0.0000)***	1.7422 (0.0000)***	1.7370 (0.0000)***	1.8490 (0.0000)***
2	2.0039 (0.0000)***	1.4264 (0.0000)***	1.5270 (0.0000)***	1.5086 (0.0000)***	1.5676 (0.0000)***
3	2.2416 (0.0000)***	1.6646 (0.0000)***	1.7818 (0.0000)***	1.7602 (0.0000)***	1.8395 (0.0000)***
4	2.1642 (0.0000)***	1.7547 (0.0000)***	1.9041 (0.0000)***	1.9258 (0.0000)***	1.9374 (0.0000)***
Small	2.7111 (0.0000)***	2.5721 (0.0000)***	2.5810 (0.0000)***	2.6407 (0.0000)***	2.7353 (0.0000)***

h_i	Growth	2	3	4	Value
Big	-3.7443 (0.0000)***	-1.5199 (0.0000)***	-0.6801 (0.0003)***	0.0680 0.7380	0.6585 (0.0009)***
2	-2.9009 (0.0000)***	-1.0778 (0.0000)***	-0.5504 (0.0037)***	0.0433 0.8283	0.5110 (0.0086)***
3	-3.3052 (0.0000)***	-1.4051 (0.0000)***	-0.6969 (0.0009)***	-0.1059 0.6338	0.4085 (0.0678)*
4	-2.6184 (0.0000)***	-1.5195 (0.0000)***	-1.1342 (0.0000)***	-0.6294 (0.0050)***	-0.2386 0.2770
Small	-1.6110 (0.0000)***	-1.2495 (0.0000)***	-1.1694 (0.0000)***	-1.0943 (0.0000)***	-1.1261 (0.0000)***

R^2	Growth	2	3	4	Value
Big	73.29%	69.67%	70.46%	67.48%	69.80%
2	72.45%	68.10%	69.45%	66.78%	67.88%
3	69.56%	64.84%	66.91%	63.86%	63.25%
4	64.70%	65.85%	67.94%	63.51%	60.70%
Small	65.94%	66.50%	66.08%	65.53%	65.93%

Scenario 2 - Method 5

α	Growth	2	3	4	Value
Large	-0.0003 0.7002	0.0007 0.3256	0.0007 0.3334	-0.0004 0.6261	0.0001 0.9416
2	0.0000 0.9522	0.0009 0.2664	0.0009 0.2837	0.0002 0.8150	0.0005 0.5329
3	-0.0003 0.7598	0.0004 0.6061	0.0005 0.5098	-0.0003 0.7417	-0.0001 0.9081
4	-0.0001 0.9109	0.0003 0.6360	0.0003 0.6998	0.0000 0.9620	0.0000 0.9967
Small	-0.0001 0.9492	0.0009 0.2105	0.0013 0.1084	0.0008 0.3485	0.0012 0.2566

β	Growth	2	3	4	Value
Large	1.0037 (0.0000)***	1.1154 (0.0000)***	1.0414 (0.0000)***	1.0732 (0.0000)***	1.0263 (0.0000)***
2	1.0862 (0.0000)***	1.1041 (0.0000)***	1.0750 (0.0000)***	1.0874 (0.0000)***	1.0543 (0.0000)***
3	1.1098 (0.0000)***	1.1511 (0.0000)***	1.0941 (0.0000)***	1.1161 (0.0000)***	1.1000 (0.0000)***
4	1.0376 (0.0000)***	1.1025 (0.0000)***	1.0736 (0.0000)***	1.1011 (0.0000)***	1.0817 (0.0000)***
Small	1.0073 (0.0000)***	1.0992 (0.0000)***	1.0181 (0.0000)***	1.0625 (0.0000)***	1.0650 (0.0000)***

s_i	Growth	2	3	4	Value
Large	0.8911 (0.0000)***	1.0208 (0.0000)***	0.7451 (0.0000)***	0.7879 (0.0000)***	0.7629 (0.0000)***
2	0.6397 (0.0000)***	0.6359 (0.0000)***	0.4853 (0.0007)***	0.6329 (0.0000)***	0.5172 (0.0002)***
3	1.3598 (0.0000)***	1.5003 (0.0000)***	1.2951 (0.0000)***	1.2135 (0.0000)***	1.3934 (0.0000)***
4	1.5865 (0.0000)***	1.7746 (0.0000)***	1.6492 (0.0000)***	1.7832 (0.0000)***	1.6843 (0.0000)***
Small	1.4591 (0.0000)***	1.5820 (0.0000)***	1.1776 (0.0000)***	1.3215 (0.0000)***	1.4395 (0.0000)***

h_i	Growth	2	3	4	Value
Large	-1.9584 (0.0000)***	-0.5038 (0.0004)***	0.3036 (0.0309)**	0.2466 0.1043	1.6171 (0.0000)***
2	-0.8642 (0.0000)***	-0.0129 0.9371	0.5399 (0.0014)***	0.3145 (0.0574)*	1.0586 (0.0000)***
3	-1.1535 (0.0000)***	-0.3176 (0.0638)*	0.1962 0.2254	0.2478 0.1585	1.0488 (0.0000)***
4	-0.5280 (0.0024)***	-0.0243 0.8718	0.1403 0.3459	0.2718 (0.0816)*	0.5566 (0.0002)***
Small	-2.4091 (0.0000)***	-0.4558 (0.0037)***	0.5510 (0.0010)***	0.6025 (0.0012)***	2.5868 (0.0000)***

R^2	Growth	2	3	4	Value
Large	80.50%	81.50%	75.30%	74.46%	69.11%
2	76.06%	72.70%	67.69%	70.84%	66.30%
3	76.66%	77.52%	74.31%	71.76%	67.28%
4	75.60%	80.30%	78.70%	78.49%	80.85%
Small	82.16%	80.11%	68.16%	66.78%	57.11%

Scenario 3 - Method 1

α	Growth	2	3	4	Value
Big	0.0019 (0.0816)*	0.0014 0.1894	0.0017 0.1071	0.0013 0.2167	0.0014 0.1831
2	0.0019 (0.0999)*	0.0021 (0.0543)*	0.0024 (0.034)**	0.002 (0.0764)*	0.0023 (0.0549)*
3	0.0021 (0.084)*	0.0021 (0.0726)*	0.0023 (0.0479)**	0.002 (0.0863)*	0.0022 (0.0739)*
4	0.0016 0.1639	0.0017 0.1141	0.0019 (0.0914)*	0.0016 0.1600	0.0017 0.1497
Small	0.0024 (0.0413)**	0.0022 (0.0464)**	0.0023 (0.0427)**	0.0018 0.1029	0.0019 0.1118

β	G	2	3	4	V
B	1.078 (0.0000)***	1.0422 (0.0000)***	1.0281 (0.0000)***	1.0303 (0.0000)***	1.0262 (0.0000)***
2	1.0132 (0.0000)***	1.023 (0.0000)***	0.9961 (0.0000)***	1.003 (0.0000)***	1.0046 (0.0000)***
3	0.9946 (0.0000)***	1.0046 (0.0000)***	0.9787 (0.0000)***	0.9718 (0.0000)***	0.9827 (0.0000)***
4	0.9792 (0.0000)***	1.0137 (0.0000)***	0.9851 (0.0000)***	0.9926 (0.0000)***	0.9971 (0.0000)***
S	0.9781 (0.0000)***	1.0577 (0.0000)***	1.0531 (0.0000)***	1.0548 (0.0000)***	1.0609 (0.0000)***

si	G	2	3	4	V
B	0.6386 (0.0004)***	-0.2061 0.2405	-0.0425 0.8106	0.0261 0.8797	-0.0164 0.9261
2	0.7341 (0.0002)***	0.0114 0.9495	0.1135 0.5405	0.2155 0.2384	0.1832 0.3397
3	0.9751 (0.0000)***	0.249 0.1836	0.349 (0.0713)*	0.4249 (0.0283)**	0.4536 (0.0225)**
4	1.2001 (0.0000)***	0.5717 (0.0016)***	0.6395 (0.0006)***	0.724 (0.0001)***	0.8343 (0.0000)***
S	1.6156 (0.0000)***	1.3915 (0.0000)***	1.5808 (0.0000)***	1.7267 (0.0000)***	1.8801 (0.0000)***

hi	G	2	3	4	V
B	-1.1894 (0.0000)***	-0.3581 0.1026	0.1373 0.5377	0.3049 0.1584	0.6847 (0.0021)***
2	-1.2852 (0.0000)***	0.2237 0.3172	0.5753 (0.0134)**	0.8419 (0.0003)***	1.1122 (0.0000)***
3	-1.0836 (0.0000)***	0.2909 0.2118	0.7759 (0.0014)***	1.0803 (0.0000)***	1.3531 (0.0000)***
4	-1.2134 (0.0000)***	0.1146 0.6085	0.68 (0.0033)***	0.9923 (0.0000)***	1.2911 (0.0000)***
S	-1.5991 (0.0000)***	-0.795 (0.0007)***	-0.1642 0.4855	0.0488 0.8358	0.4166 (0.0904)*

R2	G	2	3	4	V
B	60.02%	63.21%	54.93%	53.62%	50.55%
2	52.31%	51.72%	45.50%	45.28%	43.95%
3	44.25%	44.88%	41.20%	42.52%	44.58%
4	44.67%	45.39%	440%	47.96%	50.73%
S	44.35%	46.23%	48.33%	51.72%	55.58%

Scenario 3 - Method 2

α	Growth	2	3	4	Value
Big	0.0019 0.1026	0.0015 0.1426	0.0018 (0.0803)*	0.0019 (0.0682)*	0.0016 0.1452
2	0.0019 0.1026	0.0016 0.1298	0.0018 (0.0826)*	0.0021 (0.0466)**	0.0016 0.1307
3	0.0021 (0.0979)*	0.0019 (0.0938)*	0.0021 (0.0514)*	0.0022 (0.0417)**	0.0018 0.1045
4	0.0018 0.1335	0.0011 0.3394	0.0015 0.1880	0.0017 0.1467	0.0016 0.1704
Small	0.0019 (0.0868)*	0.002 (0.0673)*	0.002 (0.0744)*	0.002 (0.0727)*	0.0019 (0.0846)*

β	G	2	3	4	V
B	1.0267 (0.0000)***	1.0353 (0.0000)***	1.0006 (0.0000)***	1.0129 (0.0000)***	1.0084 (0.0000)***
2	1.0194 (0.0000)***	1.0416 (0.0000)***	1.0032 (0.0000)***	1.02 (0.0000)***	1.0063 (0.0000)***
3	1.0426 (0.0000)***	1.063 (0.0000)***	1.0229 (0.0000)***	1.0527 (0.0000)***	1.0275 (0.0000)***
4	1.0643 (0.0000)***	1.0269 (0.0000)***	1.0121 (0.0000)***	1.022 (0.0000)***	1.0176 (0.0000)***
S	0.9821 (0.0000)***	0.9917 (0.0000)***	0.9893 (0.0000)***	0.9883 (0.0000)***	0.9935 (0.0000)***

si	G	2	3	4	V
B	1.4857 (0.0000)***	-0.0449 0.7936	0.1203 0.4839	0.3532 (0.0476)**	0.5377 (0.0022)***
2	1.492 (0.0000)***	-0.0611 0.7226	0.15 0.3968	0.3607 (0.0464)**	0.5397 (0.0024)***
3	1.4482 (0.0000)***	-0.1208 0.5086	0.0742 0.6876	0.2982 0.1072	0.5145 (0.0045)***
4	1.2947 (0.0000)***	-0.2388 0.2237	-0.0912 0.6391	0.1168 0.5409	0.4031 (0.0316)**
S	0.7336 (0.0001)***	0.7653 (0.0000)***	0.7653 (0.0000)***	0.7606 (0.0000)***	0.7643 (0.0000)***

hi	G	2	3	4	V
B	-2.9601 (0.0000)***	-0.4912 (0.0225)**	0.126 0.5588	0.7098 (0.0017)***	1.5929 (0.0000)***
2	-2.9612 (0.0000)***	-0.4299 (0.0463)**	0.1224 0.5819	0.8225 (0.0004)***	1.6458 (0.0000)***
3	-2.8021 (0.0000)***	-0.1845 0.4185	0.317 0.1717	1.007 (0.0000)***	1.6466 (0.0000)***
4	-2.404 (0.0000)***	-0.8054 (0.0011)***	-0.1848 0.4476	0.3668 0.1263	1.3299 (0.0000)***
S	0.0082 0.9711	0.1794 0.4279	0.1811 0.4220	0.1907 0.3993	0.2614 0.2530

R2	Growth	2	3	4	Value
Big	63.92%	62.65%	52.58%	48.02%	55.27%
2	63.80%	62.40%	51.03%	47.96%	55.30%
3	60.09%	58.91%	49.60%	48.71%	54.70%
4	59.85%	62.83%	53.17%	46.81%	48.05%
Small	41.92%	42.74%	42.74%	42.55%	42.43%

Scenario 3 - Method 3

α	Growth	2	3	4	Value
Big	0.0018 0.1184	0.0014 0.1755	0.0017 (0.0936)*	0.0019 (0.067)*	0.0019 (0.0817)*
2	0.0019 (0.097)*	0.0015 0.1432	0.0018 (0.0827)*	0.0019 (0.0668)*	0.0017 0.1126
3	0.002 (0.0976)*	0.0014 0.2903	0.0017 0.1936	0.0019 0.1179	0.0016 0.1794
4	0.0021 (0.0756)*	0.0022 (0.0476)**	0.0023 (0.0371)**	0.0024 (0.0303)**	0.0021 (0.069)*
Small	0.0019 (0.0971)*	0.002 (0.072)*	0.0019 (0.081)*	0.0019 (0.0841)*	0.0018 0.1038

β	G	2	3	4	V
B	1.0344 (0.0000)***	1.0444 (0.0000)***	1.0128 (0.0000)***	1.0231 (0.0000)***	1.0698 (0.0000)***
2	1.0573 (0.0000)***	1.0562 (0.0000)***	1.0301 (0.0000)***	1.054 (0.0000)***	1.0299 (0.0000)***
3	1.0581 (0.0000)***	1.0093 (0.0000)***	0.9943 (0.0000)***	0.9993 (0.0000)***	1.0092 (0.0000)***
4	1.0151 (0.0000)***	1.026 (0.0000)***	0.9908 (0.0000)***	1.0091 (0.0000)***	1.0118 (0.0000)***
S	0.9637 (0.0000)***	0.9905 (0.0000)***	0.9841 (0.0000)***	0.9853 (0.0000)***	0.9903 (0.0000)***

si	G	2	3	4	V
B	1.4731 (0.0000)***	-0.0525 0.7557	0.1243 0.4702	0.3467 (0.0485)**	0.6469 (0.0007)***
2	1.0111 (0.0000)***	-0.2305 0.1811	-0.0773 0.6544	0.1016 0.5540	0.3744 (0.0305)**
3	1.2017 (0.0000)***	-0.2372 0.2636	-0.1068 0.6192	0.0768 0.7073	0.3942 (0.0441)**
4	0.924 (0.0000)***	-0.0501 0.7874	-0.0088 0.9620	0.1639 0.3812	0.3851 (0.0385)**
S	0.975 (0.0000)***	1.0047 (0.0000)***	1.0488 (0.0000)***	1.0401 (0.0000)***	1.0095 (0.0000)***

hi	G	2	3	4	V
B	-2.9325 (0.0000)***	-0.4768 (0.0241)**	0.1283 0.5530	0.7238 (0.0012)***	1.5061 (0.0000)***
2	-1.8619 (0.0000)***	-0.1444 0.5013	0.3036 0.1614	0.748 (0.0006)***	1.4 (0.0000)***
3	-2.5047 (0.0000)***	-1.0741 (0.0001)***	-0.6444 (0.0173)**	0.089 0.7284	1.1119 (0.0000)***
4	-1.6981 (0.0000)***	0.1893 0.4140	0.3458 0.1322	0.6774 (0.0041)***	1.3773 (0.0000)***
S	-0.1716 0.4495	0.1237 0.5787	0.2125 0.3401	0.2398 0.2830	0.4615 (0.042)**

R2	G	2	3	4	V
B	64.43%	63.83%	53.28%	49.42%	54.50%
2	59.59%	62.88%	55.33%	52.76%	530%
3	60.50%	61.53%	52.96%	44.66%	43.74%
4	53.67%	51.49%	48.51%	45.36%	48.49%
S	40.71%	43.75%	44.34%	44.42%	45.37%

Scenario 3 - Method 4

α	Growth	2	3	4	Value
Big	0.0019 0.1025	0.0017 0.1055	0.0022 (0.0428)**	0.0014 0.1853	0.0017 0.1280
2	0.0019 (0.0857)*	0.0018 (0.0935)*	0.002 (0.0607)*	0.0016 0.1315	0.0018 0.1034
3	0.0021 (0.0905)*	0.0016 0.1787	0.0021 (0.0872)*	0.0015 0.2375	0.0017 0.2077
4	0.0022 (0.0717)*	0.0022 (0.0455)**	0.0025 (0.0281)**	0.0021 (0.0656)*	0.0024 (0.0461)**
Small	0.0019 (0.0962)*	0.0019 (0.0711)*	0.0019 (0.0767)*	0.0018 (0.0941)*	0.0018 0.1008

β	G	2	3	4	V
B	1.029 (0.0000)***	1.0536 (0.0000)***	1.0231 (0.0000)***	1.0207 (0.0000)***	1.0226 (0.0000)***
2	1.0535 (0.0000)***	1.0676 (0.0000)***	1.0268 (0.0000)***	1.0434 (0.0000)***	1.046 (0.0000)***
3	1.0589 (0.0000)***	1.029 (0.0000)***	0.9935 (0.0000)***	1.0084 (0.0000)***	1.0076 (0.0000)***
4	1.0138 (0.0000)***	1.0294 (0.0000)***	1.0008 (0.0000)***	1.0131 (0.0000)***	1.0139 (0.0000)***
S	0.9604 (0.0000)***	0.9924 (0.0000)***	0.9899 (0.0000)***	0.9829 (0.0000)***	0.9883 (0.0000)***

si	G	2	3	4	V
B	1.3618 (0.0000)***	0.0789 0.6448	0.3102 (0.0875)*	0.4533 (0.0094)***	0.4609 (0.0117)**
2	0.9621 (0.0000)***	-0.0749 0.6661	0.1132 0.5144	0.2251 0.1941	0.1817 0.3042
3	1.1265 (0.0000)***	-0.0663 0.7407	0.0896 0.6581	0.2203 0.2809	0.218 0.3204
4	0.8993 (0.0000)***	0.0323 0.8594	0.1505 0.4205	0.2416 0.1963	0.2422 0.2162
S	0.9574 (0.0000)***	0.964 (0.0000)***	1.0047 (0.0000)***	1.052 (0.0000)***	1.1069 (0.0000)***

hi	G	2	3	4	V
B	-2.7147 (0.0000)***	-0.3311 0.1219	0.6674 (0.0037)***	1.1081 (0.0000)***	1.7832 (0.0000)***
2	-1.775 (0.0000)***	-0.0627 0.7723	0.6224 (0.0045)***	0.9407 (0.0000)***	1.5122 (0.0000)***
3	-2.3477 (0.0000)***	-0.7837 (0.0019)***	0.1181 0.6418	0.4579 (0.0736)*	0.9094 (0.001)***
4	-1.6072 (0.0000)***	0.1337 0.5565	0.6044 (0.0101)**	0.996 (0.0000)***	1.3805 (0.0000)***
S	-0.1704 0.4533	0.1109 0.6141	0.2737 0.2214	0.3188 0.1554	0.353 0.1205

R2	G	2	3	4	V
B	63.48%	59.91%	47.78%	50.76%	55.22%
2	59.27%	59.64%	50.91%	50.75%	52.47%
3	59.81%	58.73%	44.36%	40.91%	37.16%
4	52.96%	51.84%	45.29%	45.25%	45.26%
S	40.47%	44.28%	44.49%	44.73%	45.14%

Scenario 3 - Method 5

α	Growth	2	3	4	Value
Big	0.0009 0.3174	0.0013 0.1459	0.001 0.2506	0.001 0.2370	0.0007 0.3599
2	0.0014 0.1510	0.0017 (0.0841)*	0.0015 0.1083	0.0012 0.1845	0.0012 0.1883
3	0.0008 0.4408	0.001 0.3427	0.0009 0.4012	0.0009 0.3966	0.0006 0.5871
4	0.0012 0.2091	0.0015 0.1218	0.0013 0.1771	0.0014 0.1603	0.0013 0.1811
Small	0.0004 0.6633	0.0011 0.2441	0.0008 0.3686	0.001 0.2808	0.0008 0.4035

β	G	2	3	4	V
B	0.9194 (0.0000)***	1.0436 (0.0000)***	1.0408 (0.0000)***	0.9466 (0.0000)***	0.9883 (0.0000)***
2	0.9232 (0.0000)***	0.9852 (0.0000)***	0.9603 (0.0000)***	0.9395 (0.0000)***	0.9505 (0.0000)***
3	0.9444 (0.0000)***	1.0329 (0.0000)***	1.0345 (0.0000)***	0.937 (0.0000)***	1.0238 (0.0000)***
4	1.0028 (0.0000)***	1.0527 (0.0000)***	1.0566 (0.0000)***	0.9977 (0.0000)***	1.0142 (0.0000)***
S	0.8526 (0.0000)***	0.951 (0.0000)***	0.9304 (0.0000)***	0.881 (0.0000)***	0.9396 (0.0000)***

si	G	2	3	4	V
B	-0.1053 0.5312	-0.112 0.5071	0.0933 0.5713	-0.2155 0.2032	-0.0007 0.9963
2	-0.5349 (0.0034)***	-0.6081 (0.001)***	-0.419 (0.018)**	-0.5447 (0.0018)***	-0.4683 (0.0054)***
3	-0.1864 0.3378	-0.2576 0.1977	-0.0242 0.9084	-0.402 (0.0406)**	-0.0952 0.6365
4	0.4853 (0.0108)**	0.4801 (0.01)***	0.6262 (0.0006)***	0.4203 (0.0299)**	0.5221 (0.0071)***
S	0.6747 (0.0001)***	0.5815 (0.0009)***	0.6983 (0.0000)***	0.4326 (0.0171)**	0.6291 (0.0004)***

hi	G	2	3	4	V
B	-2.1464 (0.0000)***	-0.6545 (0.0000)***	-0.2742 (0.082)*	0.1458 0.3675	1.5089 (0.0000)***
2	-0.8966 (0.0000)***	-0.124 0.4676	0.0585 0.7223	0.3036 (0.0613)*	0.8495 (0.0000)***
3	-1.8615 (0.0000)***	-1.1085 (0.0000)***	-0.9427 (0.0000)***	-0.6181 (0.0008)***	0.117 0.5323
4	-1.3838 (0.0000)***	-0.6715 (0.0001)***	-0.6675 (0.0001)***	-0.3136 (0.0838)*	0.2337 0.1930
S	-1.8655 (0.0000)***	-0.6453 (0.0001)***	-0.1259 0.4107	-0.0124 0.9418	1.1268 (0.0000)***

R2	G	2	3	4	V
B	76.77%	69.96%	66.43%	61.38%	62.65%
2	67.97%	65.34%	62.94%	63.10%	62.11%
3	70.57%	66.67%	60.81%	61.60%	55.57%
4	64.92%	61.51%	61.60%	54.37%	50.27%
S	67.67%	58.77%	55.12%	48.37%	46.57%

Appendix 4 The bond yield approach extended sample

1. The following tables set out the bonds utilised in the enhanced benchmark sample.

No.	Bond	Country of Domicile	Country of Risk	S&P Credit Rating	Years to maturity	Currency	Spread to Swap with Cross Currency Conversion (7 Day Average in bp)	Amount (A$)	Redemption
1	New Terminal Financing Co Pty Ltd	AU	AU	BBB	2.0	AUD	166.22	100,000,000	AT MATURITY
2	AusNet Electricity Services Pty Ltd	AU	AU	BBB+ /*+	2.2	USD	161.89	100,000,000	AT MATURITY
3	Coca-Cola Amatil Ltd	AU	AU	BBB+	2.4	AUD	58.78	250,000,000	AT MATURITY
4	SGSP Australia Assets Pty Ltd	AU	AU	BBB+	2.5	AUD	100.73	400,000,000	AT MATURITY
5	United Energy Distribution Pty Ltd	AU	AU	BBB	2.6	AUD	136.97	265,000,000	AT MATURITY
6	DBNGP Finance Co Pty Ltd	AU	AU	BBB-	2.6	AUD	180.52	275,000,000	CALLABLE
7	Powercor Australia LLC	AU	AU	BBB+	2.6	AUD	105.35	200,000,000	AT MATURITY
8	CitiPower I Pty Ltd	AU	AU	BBB+	2.9	AUD	99.02	300,000,000	CALLABLE
9	CitiPower I Pty Ltd	AU	AU	BBB+	2.9	AUD	101.21	275,000,000	CALLABLE
10	Crown Group Finance Ltd	AU	AU	BBB	2.9	AUD	114.32	300,000,000	AT MATURITY
11	Leighton Finance USA Pty Ltd	AU	AU	BBB-	2.9	USD	246.58	145,000,000	AT MATURITY
12	Holcim Finance Australia Pty Ltd	AU	CH	BBB	2.9	AUD	116.28	250,000,000	AT MATURITY
13	Premier Finance Trust Australia	AU	AU	BBB-	3.0	AUD	157.32	190,000,000	AT MATURITY
14	Coca-Cola Amatil Ltd	AU	AU	BBB+	3.4	AUD	21.42	100,000,000	AT MATURITY
15	Asciano Finance Ltd	AU	AU	BBB-	3.6	USD	136.82	750,000,000	AT MATURITY
16	Asciano Finance Ltd	AU	AU	BBB-	3.6	USD	136.70	750,000,000	AT MATURITY
17	Jemena Ltd	AU	AU	BBB+	3.6	USD	140.65	150,000,000	AT MATURITY
18	Jemena Ltd	AU	AU	BBB+	3.6	USD	172.28	150,000,000	AT MATURITY
19	Brambles Finance PLC	GB	AU	BBB+	3.6	EUR	107.88	500,000,000	AT MATURITY
20	DBNGP Finance Co Pty Ltd	AU	AU	BBB-	3.6	AUD	216.42	325,000,000	CALLABLE
21	Sydney Airport Finance Co Pty Ltd	AU	AU	BBB	3.8	AUD	114.48	100,000,000	AT MATURITY
22	Coca-Cola Amatil Ltd	AU	AU	BBB+	4.0	AUD	43.99	200,000,000	AT MATURITY
23	Origin Energy Finance Ltd	AU	AU	BBB	4.1	USD	135.36	800,000,000	AT MATURITY
24	Origin Energy Finance Ltd	AU	AU	BBB	4.1	USD	136.98	800,000,000	AT MATURITY
25	Leighton Finance Ltd	AU	AU	BBB-	4.1	USD	288.75	79,000,000	AT MATURITY
26	Adani Abbot Point Terminal Pty Ltd	AU	AU	BBB-	4.1	AUD	246.26	500,000,000	AT MATURITY
27	Caltex Australia Ltd	AU	AU	BBB+	4.2	AUD	108.86	150,000,000	AT MATURITY
28	Incitec Pivot Ltd	AU	AU	BBB	4.5	AUD	162.07	200,000,000	AT MATURITY
29	Woodside Finance Ltd	AU	AU	BBB+	4.5	USD	121.96	600,000,000	AT MATURITY
30	Woodside Finance Ltd	AU	AU	BBB+	4.5	USD	120.74	600,000,000	AT MATURITY
31	CitiPower I Pty Ltd	AU	AU	BBB+	4.6	AUD	139.80	150,000,000	CALLABLE
32	Holcim Finance Australia Pty Ltd	AU	CH	BBB	4.6	AUD	122.29	200,000,000	AT MATURITY
33	Amcor Ltd/Australia	AU	AU	BBB	4.6	EUR	108.41	550,000,000	AT MATURITY
34	Brisbane Airport Corp Pty Ltd	AU	AU	BBB	4.8	AUD	99.56	200,000,000	AT MATURITY
35	Premier Finance Trust Australia	AU	AU	BBB-	5.0	AUD	158.29	190,000,000	AT MATURITY
36	Origin Energy Finance Ltd	AU	AU	BBB	5.1	EUR	142.42	500,000,000	AT MATURITY
37	DBNGP Finance Co Pty Ltd	AU	AU	BBB-	5.1	AUD	156.59	300,000,000	CALLABLE
38	Coca-Cola Amatil Ltd	AU	AU	BBB+	5.2	AUD	56.20	150,000,000	AT MATURITY
39	Incitec Pivot Finance LLC	US	AU	BBB	5.3	USD	188.72	800,000,000	AT MATURITY
40	Incitec Pivot Finance LLC	US	AU	BBB	5.3	USD	188.72	800,000,000	AT MATURITY
41	Barrick PD Australia Finance Pty Ltd	AU	CA	BBB	5.4	USD	112.54	400,000,000	AT MATURITY
42	SGSP Australia Assets Pty Ltd	AU	AU	BBB+	5.5	AUD	156.61	150,000,000	AT MATURITY
43	Brambles USA Inc	US	AU	BBB+	5.6	USD	128.61	500,000,000	AT MATURITY
44	Brambles USA Inc	US	AU	BBB+	5.6	USD	124.68	500,000,000	AT MATURITY
45	Adani Abbot Point Terminal Pty Ltd	AU	AU	BBB-	5.7	AUD	265.10	100,000,000	AT MATURITY
46	Coca-Cola Amatil Ltd	AU	AU	BBB+	5.7	AUD	61.18	205,000,000	AT MATURITY
47	Leighton Finance USA Pty Ltd	AU	AU	BBB-	5.9	USD	309.43	115,000,000	AT MATURITY
48	APT Pipelines Ltd	AU	AU	BBB	5.9	AUD	142.76	300,000,000	AT MATURITY
49	Perth Airport Pty Ltd	AU	AU	BBB	5.9	AUD	104.44	150,000,000	AT MATURITY
50	QPH Finance Co Pty Ltd	AU	AU	BBB	5.9	AUD	114.38	300,000,000	AT MATURITY

No.	Bond	Country of Domicile	Country of Risk	S&P Credit Rating	Years to maturity	Currency	Spread to Swap with Cross Currency Conversion (7 Day Average in bp)	Amount (A$)	Redemption
51	Asciano Finance Ltd	AU	AU	BBB-	6.0	USD	175.51	600,000,000	AT MATURITY
52	Asciano Finance Ltd	AU	AU	BBB-	6.0	USD	174.59	600,000,000	AT MATURITY
53	Brisbane Airport Corp Pty Ltd	AU	AU	BBB	6.1	AUD	103.85	350,000,000	AT MATURITY
54	Origin Energy Finance Ltd	AU	AU	BBB	6.1	EUR	154.53	750,000,000	AT MATURITY
55	Aurizon Network Pty Ltd	AU	AU	BBB+	6.1	AUD	119.93	525,000,000	AT MATURITY
56	Coca-Cola Amatil Ltd	AU	AU	BBB+	6.2	AUD	68.68	100,000,000	AT MATURITY
57	SGSP Australia Assets Pty Ltd	AU	AU	BBB+	6.4	GBP	168.96	250,000,000	AT MATURITY
58	Sydney Airport Finance Co Pty Ltd	AU	AU	BBB	6.5	USD	126.04	500,000,000	AT MATURITY
59	Sydney Airport Finance Co Pty Ltd	AU	AU	BBB	6.5	USD	126.02	500,000,000	AT MATURITY
60	SGSP Australia Assets Pty Ltd	AU	AU	BBB+	6.5	AUD	120.34	350,000,000	AT MATURITY
61	Perth Airport Pty Ltd	AU	AU	BBB	6.5	AUD	108.13	400,000,000	AT MATURITY
62	Woodside Finance Ltd	AU	AU	BBB+	6.7	USD	121.31	700,000,000	CALLABLE
63	Woodside Finance Ltd	AU	AU	BBB+	6.7	USD	121.20	700,000,000	CALLABLE
64	Coca-Cola Amatil Ltd	AU	AU	BBB+	6.7	AUD	77.36	100,000,000	AT MATURITY
65	QPH Finance Co Pty Ltd	AU	AU	BBB	6.8	AUD	121.74	200,000,000	AT MATURITY
66	Coca-Cola Amatil NZ Ltd	AU	AU	BBB+	6.9	AUD	86.29	45,000,000	AT MATURITY
67	Coca-Cola Amatil Ltd	AU	AU	BBB+	6.9	AUD	79.92	100,000,000	AT MATURITY
68	Powercor Australia LLC	AU	AU	BBB+	6.9	AUD	122.28	300,000,000	AT MATURITY
69	Coca-Cola Amatil Ltd	AU	AU	BBB+	7.1	AUD	87.48	30,000,000	AT MATURITY
70	Origin Energy Finance Ltd	AU	AU	BBB	7.1	EUR	165.14	800,000,000	AT MATURITY
71	Origin Energy Finance Ltd	AU	AU	BBB	7.1	EUR	165.35	800,000,000	AT MATURITY
72	Origin Energy Finance Ltd	AU	AU	BBB	7.1	USD	164.77	500,000,000	AT MATURITY
73	Origin Energy Finance Ltd	AU	AU	BBB	7.1	USD	165.13	500,000,000	AT MATURITY
74	Newcrest Finance Pty Ltd	AU	AU	BBB-	7.2	USD	291.43	750,000,000	AT MATURITY
75	Newcrest Finance Pty Ltd	AU	AU	BBB-	7.2	USD	291.10	750,000,000	AT MATURITY
76	Sydney Airport Finance Co Pty Ltd	AU	AU	BBB	7.2	AUD	128.83	200,000,000	AT MATURITY
77	Powercor Australia LLC	AU	AU	BBB+	7.4	AUD	117.87	630,000,000	AT MATURITY
78	SGSP Australia Assets Pty Ltd	AU	AU	BBB+	7.8	EUR	146.45	500,000,000	AT MATURITY
79	Coca-Cola Amatil Ltd	AU	AU	BBB+	7.8	AUD	85.28	30,000,000	AT MATURITY
80	Newcrest Finance Pty Ltd	AU	AU	BBB-	8.1	USD	317.15	750,000,000	AT MATURITY
81	Newcrest Finance Pty Ltd	AU	AU	BBB-	8.1	USD	318.79	750,000,000	AT MATURITY
82	APT Pipelines Ltd	AU	AU	BBB	8.1	USD	179.76	750,000,000	AT MATURITY
83	APT Pipelines Ltd	AU	AU	BBB	8.1	USD	179.70	750,000,000	AT MATURITY
84	Sydney Airport Finance Co Pty Ltd	AU	AU	BBB	8.1	AUD	121.61	750,000,000	AT MATURITY
85	Leighton Finance USA Pty Ltd	AU	AU	BBB-	8.2	USD	318.25	500,000,000	AT MATURITY
86	Leighton Finance USA Pty Ltd	AU	AU	BBB-	8.2	USD	318.58	500,000,000	AT MATURITY
87	Sydney Airport Finance Co Pty Ltd	AU	AU	BBB	8.5	USD	148.58	825,000,000	AT MATURITY
88	Sydney Airport Finance Co Pty Ltd	AU	AU	BBB	8.5	USD	148.78	825,000,000	AT MATURITY
89	Amcor Ltd/Australia	AU	AU	BBB	8.5	EUR	143.53	300,000,000	AT MATURITY
90	Origin Energy Finance Ltd	AU	AU	BBB	8.6	EUR	201.81	150,000,000	AT MATURITY
91	Asciano Finance Ltd	AU	AU	BBB-	8.6	USD	213.40	250,000,000	AT MATURITY
92	Asciano Finance Ltd	AU	AU	BBB-	8.6	USD	213.50	250,000,000	AT MATURITY
93	SGSP Australia Assets Pty Ltd	AU	AU	BBB+	8.6	USD	177.71	500,000,000	AT MATURITY
94	Asciano Finance Ltd	AU	AU	BBB-	9.0	GBP	221.71	300,000,000	AT MATURITY
95	Sydney Airport Finance Co Pty Ltd	AU	AU	BBB	9.6	EUR	143.64	700,000,000	AT MATURITY
96	Brambles Finance Ltd	AU	AU	BBB+	9.8	EUR	147.84	500,000,000	CALLABLE
97	APT Pipelines Ltd	AU	AU	BBB	10.2	GBP	186.79	350,000,000	AT MATURITY
98	Caltex Australia Ltd	AU	AU	BBB-	23.0	AUD	450.00	550,000,000	CALLABLE
99	Barrick PD Australia Finance Pty Ltd	AU	CA	BBB	25.1	USD	275.84	834,000,000	AT MATURITY
100	Newcrest Finance Pty Ltd	AU	AU	BBB-	27.2	USD	387.41	500,000,000	AT MATURITY
101	Newcrest Finance Pty Ltd	AU	AU	BBB-	27.2	USD	387.17	500,000,000	AT MATURITY
102	Santos Finance Ltd	AU	AU	BBB	56.0	EUR	361.21	1,000,000,000	CALLABLE

Appendix 5 Converting Foreign Currency Yields into Australian Dollar Equivalents

1. The Authority's process for converting foreign currency yields into Australian dollar equivalents is detailed here. This provides for replicability and transparency of the Authority's approach.

2. Bloomberg LP have recently developed functionality that allows for the conversion of foreign currency bond yields into hedged Australian dollar equivalents for historical dates. The solution requires a Bloomberg users' account to be enabled to access the 'Swaps Toolkit (beta)'. Once enabled a user can interface with Bloomberg's Swap Manager through Microsoft Excel. A sample of bonds with their associated fields can then be loaded into Excel where historical yields and spreads for each bond can be converted into hedged Australian dollar equivalents by accessing Bloomberg's swap manager function.

3. The facility can convert the yields on the following instruments:

   - fixed rate instruments which receive a fixed coupon payment;
   - a floating rate instrument for which the coupon payments consist of a spread (quoted margin) over an index such as the bank bill swap rate in Australia or London Interbank Offered Rate (Libor) in foreign markets; or
   - a variable instrument which receives a coupon for that can vary due factors additional to the index.

Asset Swap Spreads

4. The starting point is to acquire the 'mid' asset swap spread for instrument in the sample. This is calculated as the average of the bid and ask asset swap spreads (ASW spreads) returned from Bloomberg's asset swap calculator.

5. The ASW spread is the spread between the instruments yield and the relevant point on the swap curve (index) for the currency of each instrument in question. This is calculated using a 'par/par breakeven asset swap spread' formula which solves for an ASW spread such that the present value of the bonds cash flows on the fixed side of the swap equals the present value of cash flows based on the index plus ASW spread (at each future payment date).

6. The swap has two legs; a floating leg in which the ASW spread plus index is received; and a fixed side which pays the floating leg in exchange for the fixed payment. If the payments made on the fixed side are in a currency other than Australian dollars (due to the instrument being issued in a foreign currency) the currency of the instrument in question is input into the swap calculation making it a 'cross currency' swap so that the floating payments received are converted into Australian dollars. The costs of swapping from this currency to Australian dollars are determined using Bloomberg's default cross currency basis curves.

7. The ASW spread is calculated assuming a quarterly payment frequency and is adjusted to account for differences between the frequencies of payments on the fixed and floating side of the swap.

8. The Australian dollar ASW mid spread is then effectively converted to a yield to maturity using the Bloomberg swap manager.

Bloomberg Swap Manager

9. The swap manager is a facility used for calculating various aspects of a swap such as premiums, notional principal and spreads. For the purposes of converting the mid Australian dollar ASW spread into an effective yield to maturity, the swap is treated as a 'fixed float swap' where a fixed payment (which effectively represents the yield to maturity) is received in exchange for a floating payment (discussed above) made.

10. The main input is the 'mid' Australian dollar ASW spread which is treated as the spread component of the floating payment made. The output is a fixed coupon payment fully hedged in Australian dollars.[1136] This fixed coupon payment can effectively be treated as the yield to maturity for two reasons. Firstly, it uses the Australian swap curve as the index to which the calculated hedged Australian dollar spread is added. It therefore reflects Australian interest rates for the date the calculation is made. Secondly, it is calculated on the assumption that the premium on the fixed leg of the swap is zero.[1137] In other words it is trading at 'par' per 100 Australian dollars. When the fixed instrument is traded at par the coupon per 100 dollars is effectively equal to the yield to maturity. On the fixed leg the payment frequency is set to semi-annual while on the floating leg the payment frequency is set to quarterly. The reset frequency is also set at quarterly.

11. The priority of pricing sources or 'pricing water fall' used in the conversions to Australian dollar equivalent yields in Excel are shown in Table 132.

Table 132 Pricing Waterfall Set in Bloomberg for AUD Equivalent Yield Conversion

Currency of Issuance	1st Pricing Source	2nd Pricing Source
USD	BVAL	TRAC
EUR	BVAL	BGN
GBP	BVAL	BGN
AUD	BVAL	CBBT

[1136] The 'BPRICE' formula in Excel that calls the Swap Manager must have 'Target' set to 'FixedCoupon' while the 'BView' formula must be set to output the fixed coupon.

[1137] The 'BPRICE' formula in Excel that calls the Swap Manager must have 'Premium' set to zero.

Appendix 6 International Bond Sample

Table 133 Sample of Bonds with Australia as Country of Risk as at 2 April 2015

Ticker	S&P Credit Rating	Industry	Country of Risk	Coupon Type	Issue Date	Maturity Date	Currency	AUD Amount Issued
EJ1181084 Corp	BBB	Utilities	AU	FIXED	11/04/2012	11/04/2017	AUD	265000000
ED9016905 Corp	BBB-	Utilities	AU	FLOATING	20/04/2005	25/04/2017	AUD	275000000
EJ1389117 Corp	BBB+	Utilities	AU	FIXED	27/04/2012	27/04/2017	AUD	200000000
EI5951831 Corp	BBB+	Utilities	AU	FLOATING	12/01/2007	15/07/2017	AUD	300000000
EI5951997 Corp	BBB+	Utilities	AU	FLOATING	12/01/2007	15/07/2017	AUD	275000000
EJ2797904 Corp	BBB	Consumer Discretionary	AU	FIXED	18/07/2012	18/07/2017	AUD	300000000
EI7021435 Corp	BBB-	Industrials	AU	FIXED	21/07/2010	21/07/2017	USD	165126000
EF0695496 Corp	BBB+	Industrials	AU	FLOATING	10/11/2005	10/11/2017	AUD	300000000
EJ5156389 Corp	BBB+	Consumer Staples	AU	FIXED	24/01/2013	6/02/2018	AUD	100000000
EI6300228 Corp	BBB	Industrials	AU	FIXED	7/04/2011	7/04/2018	USD	716400000
CP5029097 Corp	BBB+	Energy	AU	FIXED	14/04/1998	15/04/2018	USD	231285000
EI6460709 Corp	BBB+	Materials	AU	FIXED	20/04/2011	20/04/2018	EUR	677745000
EF3590199 Corp	BBB-	Utilities	AU	FLOATING	26/04/2006	26/04/2018	AUD	325000000
EI6849026 Corp	BBB	Industrials	AU	FIXED	25/05/2011	6/07/2018	AUD	100000000
EJ3377821 Corp	BBB+	Consumer Staples	AU	FIXED	6/09/2012	6/09/2018	AUD	200000000
EJ8660791 Corp	BBB-	Utilities	AU	FIXED	9/10/2013	9/10/2018	USD	847040000
EI1562293 Corp	BBB-	Industrials	AU	FIXED	15/10/2008	15/10/2018	USD	119400600
EJ8818027 Corp	BBB-	Industrials	AU	FIXED	1/11/2013	1/11/2018	AUD	500000000
EI8834174 Corp	BBB+	Energy	AU	FIXED	23/11/2011	23/11/2018	AUD	150000000
EJ7922069 Corp	BBB	Materials	AU	FIXED	21/08/2013	21/02/2019	AUD	200000000
EH7350695 Corp	BBB+	Energy	AU	FIXED	3/03/2009	1/03/2019	USD	940800000
EK0838251 Corp	BBB+	Utilities	AU	FLOATING	27/02/2014	1/04/2019	AUD	150000000
EI6030205 Corp	BBB	Materials	AU	FIXED	16/03/2011	16/04/2019	EUR	777018000
EI6204404 Corp	BBB	Industrials	AU	FIXED	4/04/2011	9/07/2019	AUD	200000000
EJ3879651 Corp	BBB-	Utilities	AU	FIXED	11/10/2012	11/10/2019	EUR	629735000
EJ4265850 Corp	BBB-	Utilities	AU	FIXED	8/11/2012	11/10/2019	AUD	300000000
EJ4333419 Corp	BBB+	Consumer Staples	AU	FIXED	13/11/2012	13/11/2019	AUD	150000000
EK5876389 Corp	BBB	Consumer Discretionary	AU	FIXED	18/11/2014	18/11/2019	AUD	450000000
EK5989620 Corp	BBB-	Materials	AU	FIXED	19/11/2014	19/11/2019	AUD	125000000
EI0704078 Corp	BBB	Materials	AU	FIXED	10/12/2009	10/12/2019	USD	872880000
EI1592092 Corp	BBB+	Industrials	AU	FIXED	31/12/2004	31/12/2019	USD	139192620
EI1608021 Corp	BBB+	Industrials	AU	FLOATING	31/12/2004	31/12/2019	AUD	72000000
EJ5984160 Corp	BBB+	Utilities	AU	FLOATING	25/03/2013	25/03/2020	AUD	150000000
EI2000491 Corp	BBB+	Materials	AU	FIXED	31/03/2010	1/04/2020	USD	545150000
EK2849330 Corp	BBB-	Industrials	AU	FIXED	30/05/2014	29/05/2020	AUD	100000000
EJ6899243 Corp	BBB+	Consumer Staples	AU	FIXED	4/06/2013	4/06/2020	AUD	205000000
EI7021476 Corp	BBB-	Industrials	AU	FIXED	21/07/2010	21/07/2020	USD	130962000
EI3253362 Corp	BBB	Energy	AU	FIXED	22/07/2010	22/07/2020	AUD	300000000

Ticker	S&P Credit Rating	Industry	Country of Risk	Coupon Type	Issue Date	Maturity Date	Currency	AUD Amount Issued
EJ7588209 Corp	BBB	Industrials	AU	FIXED	23/07/2013	23/07/2020	AUD	150000000
EJ7646361 Corp	BBB	Industrials	AU	FIXED	29/07/2013	29/07/2020	AUD	300000000
EI4098048 Corp	BBB	Industrials	AU	FIXED	23/09/2010	23/09/2020	USD	632280000
EK5107249 Corp	BBB-	Utilities	AU	FIXED	1/10/2014	1/10/2020	AUD	100000000
EJ8616397 Corp	BBB+	Industrials	AU	FIXED	8/10/2013	8/10/2020	EUR	720135000
EJ8798880 Corp	BBB	Industrials	AU	FIXED	21/10/2013	21/10/2020	AUD	350000000
EJ6371623 Corp	BBB-	Utilities	AU	FIXED	23/04/2013	23/10/2020	EUR	950175000
EJ8893137 Corp	BBB+	Industrials	AU	FIXED	28/10/2013	28/10/2020	AUD	525000000
EJ9225768 Corp	BBB+	Consumer Staples	AU	FIXED	25/11/2013	25/11/2020	AUD	100000000
EI5615311 Corp	BBB+	Utilities	AU	FIXED	11/02/2011	11/02/2021	GBP	399350000
EI4214900 Corp	BBB	Industrials	AU	FIXED	7/10/2010	22/02/2021	USD	508900000
EK1048710 Corp	BBB+	Utilities	AU	FIXED	12/03/2014	12/03/2021	AUD	350000000
EK1306886 Corp	BBB	Industrials	AU	FIXED	25/03/2014	25/03/2021	AUD	400000000
EI6641167 Corp	BBB+	Energy	AU	FIXED	10/05/2011	10/05/2021	USD	645960000
EK2622026 Corp	BBB+	Consumer Staples	AU	FIXED	21/05/2014	21/05/2021	AUD	100000000
EK3554137 Corp	BBB	Industrials	AU	FIXED	7/07/2014	7/07/2021	AUD	200000000
EI7486208 Corp	BBB+	Consumer Staples	AU	FIXED	22/07/2011	22/07/2021	AUD	45000000
EK4152378 Corp	BBB+	Consumer Staples	AU	FIXED	12/08/2014	12/08/2021	AUD	100000000
EI6010694 Corp	BBB+	Utilities	AU	FLOATING	15/08/2007	15/08/2021	AUD	300000000
EI8144731 Corp	BBB+	Consumer Staples	AU	FIXED	27/09/2011	27/09/2021	AUD	30000000
EJ8598074 Corp	BBB-	Utilities	AU	FIXED	4/10/2013	4/10/2021	EUR	1149496000
EI8364461 Corp	BBB-	Utilities	AU	FIXED	14/10/2011	14/10/2021	USD	483550000
EK5737813 Corp	BBB	Utilities	AU	FIXED	5/11/2014	5/11/2021	AUD	600000000
EI8703494 Corp	BBB-	Materials	AU	FIXED	15/11/2011	15/11/2021	USD	736875000
EG0640763 Corp	BBB	Industrials	AU	FLOATING	8/12/2006	20/11/2021	AUD	200000000
EK6279310 Corp	BBB	Industrials	AU	FIXED	8/12/2014	8/12/2021	AUD	250000000
EI6011379 Corp	BBB+	Utilities	AU	FLOATING	15/08/2007	17/01/2022	AUD	630000000
EK8055148 Corp	BBB	Energy	AU	FIXED	20/03/2015	22/03/2022	EUR	974344000
EK3157451 Corp	BBB+	Utilities	AU	FIXED	30/06/2014	30/06/2022	EUR	725780000
EJ2714362 Corp	BBB+	Consumer Staples	AU	FIXED	11/07/2012	11/07/2022	AUD	30000000
EJ3784331 Corp	BBB-	Materials	AU	FIXED	1/10/2012	1/10/2022	USD	723900000
EG0219857 Corp	BBB	Industrials	AU	FLOATING	15/12/2006	11/10/2022	AUD	750000000
EJ3906165 Corp	BBB	Energy	AU	FIXED	11/10/2012	11/10/2022	USD	730725000
EJ4317107 Corp	BBB-	Industrials	AU	FIXED	13/11/2012	13/11/2022	USD	479200000
EJ4068577 Corp	BBB	Industrials	AU	FIXED	23/10/2012	22/03/2023	USD	803715000
EJ5962760 Corp	BBB	Materials	AU	FIXED	22/03/2013	22/03/2023	EUR	373101000
EJ6105286 Corp	BBB-	Utilities	AU	FIXED	5/04/2013	5/04/2023	EUR	187699500
EI6307918 Corp	BBB	Industrials	AU	FIXED	7/04/2011	7/04/2023	USD	238800000
EJ3849779 Corp	BBB+	Utilities	AU	FIXED	9/10/2012	9/04/2023	USD	489950000
EJ8324406 Corp	BBB	Industrials	AU	FIXED	19/09/2013	19/09/2023	GBP	509580000
EK1561159 Corp	BBB	Industrials	AU	FIXED	23/04/2014	23/04/2024	EUR	1040963000

Ticker	S&P Credit Rating	Industry	Country of Risk	Coupon Type	Issue Date	Maturity Date	Currency	AUD Amount Issued
EK3156859 Corp	BBB+	Industrials	AU	FIXED	12/06/2014	12/06/2024	EUR	718810000
EK4655081 Corp	BBB+	Industrials	AU	FIXED	16/09/2014	16/09/2024	EUR	855024000
EK4685294 Corp	BBB+	Industrials	AU	FIXED	18/09/2014	18/09/2024	EUR	718685000
EJ4508010 Corp	BBB	Energy	AU	FIXED	26/11/2012	26/11/2024	GBP	536025000
EK6424791 Corp	BBB	Industrials	AU	FLOATING	16/12/2014	16/12/2024	AUD	200000000
EK7758478 Corp	BBB+	Energy	AU	FIXED	5/03/2015	5/03/2025	USD	1285000000
EK8078215 Corp	BBB	Energy	AU	FIXED	23/03/2015	23/03/2025	USD	1395790000
EK8055387 Corp	BBB	Energy	AU	FIXED	20/03/2015	22/03/2027	EUR	904748000
EK8055262 Corp	BBB	Energy	AU	FIXED	20/03/2015	22/03/2030	GBP	1153920000
EK8078397 Corp	BBB	Energy	AU	FIXED	23/03/2015	23/03/2035	USD	380670000
EJ3049461 Corp	BBB-	Energy	AU	FLOATING	4/09/2012	15/09/2037	AUD	550000000
EI8704930 Corp	BBB-	Materials	AU	FIXED	15/11/2011	15/11/2041	USD	491250000
EI4096521 Corp	BBB-	Energy	AU	VARIABLE	22/09/2010	22/09/2070	EUR	1401130000

Source: Bloomberg and ERA Analysis

Appendix 7 Evaluation of capital expenditure weighting the hybrid trailing average estimate of the DRP

1. By weighting the trailing average to account for new capex, it can be made to ensure that the cost of capital for new capex reflects prevailing rates. This efficiency consideration is a key concern of the Authority, given the requirements of the NGL and NGR.

2. This adds significant complexity. However, the Authority considers that QTC and DBP have demonstrated that a spreadsheet calculation relating to weights could be implemented, at least for the Post Tax Revenue Model (**PTRM**) approach.

3. Weights may be based on the following approaches:

   - actual debt issuance data – this approach would require an ex post true up of the rate of return, once actual debt issuance data became available;
   - actual changes in the debt component of the RAB, consistent with the benchmark gearing – again, this approach would require an ex post true up of the rate of return, once actual debt issuance data became available; or
   - weights based on the (forecast ex ante) debt issuance assumptions in the PTRM – this approach has the advantage of not requiring an ex post true up for the rate of return.[1138]

4. QTC in a submission to the AER proposed that the weighting method should be based on the forecast new capex approved for use in the PTRM for the forthcoming access arrangement:

> QTC considers that a weighted average based on the PTRM debt balances is appropriate to ensure that changes in the debt balance are correctly compensated at the prevailing cost of debt. An example of the proposed approach is provided in Appendix B.[1139]
>
> …This approach is computationally simple and transparent, which should alleviate any concerns around complexity. A simple spreadsheet model can be used to perform the calculations.
>
> The return on debt would be calculated as a simple average of the adjusted rates. This approach is consistent with the use of a single set of weights (eg, 10 per cent for

---

[1138] GGT in its submission on the 4 March 2015 Discussion Paper on estimating the return on debt stated that (Goldfields Gas Transmission, *GGT submission on ERA return on debt discussion paper*, 25 March 2015, p. 5):

> Paragraph 152 of the Discussion Paper advises that the ERA considers that adoption of the weighting implicitly assigned to debt issues in the Australian Energy Regulator's Post Tax Revenue Model (PTRM) would ensure a return on debt which provides appropriate incentives for new capital expenditure.
>
> Use of the PTRM, a model designed initially for use in the electricity sector, is not required under the access regulatory regime of the National Gas Law and the National Gas Rules. However, any properly constructed model for post-tax revenue determination (which is effectively required by rule 87(4)) is likely to incorporate the active debt management policy which is implicit in the PTRM, whereby the gearing is maintained at 60% (the gearing of the benchmark efficient entity).
>
> However, the Authority agrees with GGT when it subsequently states that its post tax revenue model shares relevant features with the AER's PTRM for the purposes of this discussion.

[1139] Queensland Treasury Corporation, *Submission to the Draft Rate of Return Guideline*, 11 October 2013, p. 21.

each annual observation based on a 10-year debt tenor), but still results in the changes in the PTRM debt balance being compensated at the prevailing cost of debt.

Worked example

Consider an example where the PTRM debt balance increases from $100 to $115 over a 1-year period. The service provider is assumed to have been operating under the trailing average approach for at least 10 years, so the underlying interest rates in the trailing average reflect the historical rates over the last 10 years. For the purpose of this example, a series of hypothetical rates have been used to populate the trailing average.

Regardless of how the return on debt is calculated, the final estimate will be applied to the PTRM debt balance to determine the dollar value of the return on debt allowance. As such, the following weights will apply (either explicitly or implicitly) to the interest rates associated with the existing and new debt:

Weight applying to existing debt = $100 ÷ $115 = 0.8696

Weight applying to change in debt = $15 ÷ $115 = 0.1304

Table 4 displays the adjustments to the rates in the trailing average based on QTC's proposed method, which compensates the increase in the debt balance at the prevailing cost of debt (6.25 per cent).[1140]

TABLE 4: ADJUSTED RATES USING THE PREVAILING COST OF DEBT AND CHANGE IN THE PTRM DEBT BALANCE

Observation	Rates before new borrowing (%)	Rate adjustments based on change in PTRM debt balance	Rates after new borrowing (%)
-9	8.00	8.00 x 0.8696 + *6.25* x 0.1304	7.77
-8	8.50	8.50 x 0.8696 + *6.25* x 0.1304	8.21
-7	9.00	9.00 x 0.8696 + *6.25* x 0.1304	8.64
-6	8.00	8.00 x 0.8696 + *6.25* x 0.1304	7.77
-5	6.00	6.00 x 0.8696 + *6.25* x 0.1304	6.03
-4	6.00	6.00 x 0.8696 + *6.25* x 0.1304	6.03
-3	7.00	7.00 x 0.8696 + *6.25* x 0.1304	6.90
-2	8.00	8.00 x 0.8696 + *6.25* x 0.1304	7.77
-1	7.00	7.00 x 0.8696 + *6.25* x 0.1304	6.90
Prevailing	6.25	6.25 x 0.8696 + *6.25* x 0.1304	6.25
Return on debt	**7.38**		**7.23**

5. An advantage of the PTRM approach would be that it allows for prevailing rates to apply to new investments. This occurs because the prevailing rate is adjusted through the weighting, at the time of the access arrangement review, to the extent that the forecast capex adds to the outstanding debt in the PTRM. The result is that the prevailing rate becomes the marginal cost of debt for the new forecast capex.

[1140] Queensland Treasury Corporation, *Submission to the Draft Rate of Return Guideline*, 11 October 2013, p. 28.

Should capex weights be trued up ex post?

6. The question arises as to whether capex weights, if adopted, would be revised ex post, at the next access arrangement review, based on actual approved capital expenditure.

7. This could create incentives to bring forward or over-invest in the event that interest rates were abnormally high, as it would increase the weighting for that year in the following access arrangement. However, offsetting this effect, high interest rates would discourage additional investment, as projects would be less likely to be profitable at the margin.

8. Overall, the Authority considered that it would be sensible to adjust PTRM weights (if adopted) ex post at the next access arrangement review, to allow for actual PTRM outcomes. Such an approach would be consistent with the treatment of capex in the PTRM more broadly, where actual capex outcomes for the past access arrangement are used for the next access arrangement.

9. DBP in its submission on the Authority's 4 March 2015 Discussion Paper on estimating the return on debt considered that there was some confusion as to exactly what was being proposed with regard to ex post true up for capex weights.[1141]

10. Therefore, for the removal of doubt, the Authority reiterates that where such an ex post true up was undertaken at the next access arrangement review, there would be no retrospective adjustment of tariffs and revenue – that would remain based on the forecast capex established at the start of the access arrangement period.

No capex weights for historic trailing average data

11. The Authority considered the application of PTRM capex weights in the forward years. The objective of weighting the trailing average in this way is to ensure that forecast new capex is remunerated by the most timely estimate of the prevailing return on debt.

12. As to the past, DBP submitted:[1142]

> The third and final caveat applies to models without a transition period. The ATCO Hybrid Approach provides for a weighting of ten percent per annum on debt from the past ten years. However, this is not in keeping with the efficiency arguments which underpin the PTRM weighting model. If a regulated service provider did not incur any debt in 2009, when debt risk premia were very high, the apportioning ten percent to that year would over-reward the service provider and provide a windfall gain. The weights, therefore, should bear some resemblance to efficient debt actually incurred, just as the case going forward, rather than an arbitrary figure such as ten percent.
>
> Although public data on actual debt incurred by service providers (including debt instruments such as derivatives) are available on sources such as Bloomberg, the Rules require the ERA to consider the benchmark efficient entity, not the actual firm. Thus, it is not sufficient to look at actual debt as it was incurred and assume this is efficient. Instead, regulators ought to look at the reason for incurring the debt; more specifically, expansion of the RAB and other capital spending. If this is deemed to be efficient capital spending, and the efficient way of issuing debt is a ten-year bond (as regulators agree

[1141] Dampier Bunbury Pipeline, Estimating the Return on Debt: Response to ERA Discussion Paper of 4 March 2015, 25 March 2015, p. 10.

[1142] Dampier Bunbury Pipeline, Estimating the Return on Debt: Response to ERA Discussion Paper of 4 March 2015, 25 March 2015, p. 11.

> that it is) then the PTRM weighting approach, applied to actual capital spending from the past, should be applied. This is because it captures the cost of debt when efficient spending of capital was actually incurred, and thus reflects the cost of debt which the benchmark efficient entity would have on its books today if it undertook the capital spending when regulators deemed it to be efficient. Thus, if the ERA accepts the ATCO Hybrid Approach, it should not accept a weighting of ten percent per annum, but should implement the PTRM model starting with a RAB in 2005, and capturing actual capital spending since that point in time.

13. The Authority notes these points, but does not accept that past estimates of the DRP should be capex weighted, in the event that weights were adopted.

14. First, investment in the past has already been expended, so incentives for that investment through the introduction of capex weights will not have any influence on the timing of that investment.

15. Second, the Authority considers that there would be considerable uncertainty as to the timing of debt raising in the past by the benchmark efficient entity, as it would not have been seeking to replicate any clear financing strategy for the DRP under the previous on the day regime. It could have opportunistically raised debt finance at those times that it considered best lowered its cost of debt, which may have been removed in timing terms from the actual capital expenditure profile. To ascribe capex weights to the past data then runs the risk of over or under compensating the benchmark efficient entity.

16. The Authority considers that the best estimate of the DRP relating to debt raised at unknown points in the past will be the simple, equally weighted annual averages applicable to those periods.

Implementing capex weights as an overlay to the simple trailing average

17. There are two ways to implement an approach for incorporating the PTRM capex weights. The first is that proposed by the QTC, which is outlined above. The second is the method proposed by DBP. Both approaches produce identical outcomes, but the method of calculation is different.

18. The Authority considered the method proposed by DBP.[1143] This method accords with the approach suggested by ATCO's consultant CEG:[1144]

> 123. Calculating a weighted trailing average DRP is not complex to model on a forward-looking basis. Suppose that an initial RAB of a regulated business consists of 10 year debt staggered so as to expire evenly across a 10 year period. That is, the starting position is a simple trailing average. However, let the business have a significant net capital expenditure requirement in a given year such that the RAB will grow. This simply means that the weight of that year in future trailing averages should be higher.
>
> 124. If the business finances the increase in the RAB with debt that is, on average, 10 year maturity but is itself staggered[1145] then a smoothly staggered refinance profile will continue to be maintained in the future.

[1143] Dampier Bunbury Pipeline, *Proposed Revisions DBNGP Access Arrangement: 2016 – 2020 Regulatory Period: Rate of Return: Supporting Submission: 12*, Appendix J (excel file version available on the Authority's website).

[1144] ATCO Gas Australia, *Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 27 November 2014, Appendix 9.2, p. 39.

[1145] For example, the business finances the increase in the RAB with debt ranging from 6 to 14 year debt.

- the DRP on financing (and refinancing) the pre-existing RAB is simply the trailing average 10 year cost of debt over the last 10 years; and
- the cost of debt on each 'vintage' of change in RAB from the pre-existing level is modelled as a transition from the initial staggered debt raising (of, say, 6 to 14 years maturity) at the time of the change in RAB back to a trailing average 10 year cost of debt (the same as the pre-existing RAB). The transition is straightforward to model - as each tranche of the staggered (initial 6-14 year) debt expires and is replaced with 10 year debt. At which point that tranche of change in RAB can simply be treated the same as the pre-existing RAB.

125. The weighted trailing average cost of debt in any year is then simply the average across the cost of debt for the RAB and subsequent changes in RAB, weighted by the associated RAB amount.

19. Under such an approach, the PTRM capex weighting overlay could apply to each of the forward looking estimators from 2015 (t=0) to 2019 (t=4). Each PTRM capex weight could be consistent with the capex forecast to occur in each regulatory year. So for:

- the DRP to apply in calendar year 2015, the PTRM capex weight to apply to the estimate t=0 would be the forecast capex to occur over the period 1 January 2015 to 31 December 2015, as a proportion of the closing value of the RAB at 31 December 2015;[1146]
- for the DRP to apply in calendar year 2016, the PTRM capex weight to apply to the:
- t=1 estimate would be the forecast capex to occur over the period 1 January 2016 to 31 December 2016, as a proportion of the closing value of the RAB at 31 December 2016; and
- t=0 estimate would be the forecast capex to occur over the period 1 January 2015 to 31 December 2015, as a proportion of the closing value of the RAB at 31 December 2015.
- for the DRP to apply in calendar year 2017, the PTRM capex weight to the:
- t=2 estimate would be the forecast capex to occur over the period 1 January 2017 to 31 December 2017, as a proportion of the opening value of the RAB at 31 December 2017.
- t=1 estimate would be the forecast capex to occur over the period 1 January 2016 to 31 December 2016, as a proportion of the closing value of the RAB at 31 December 2016; and
- t=0 estimate would be the forecast capex to occur over the period 1 January 2015 to 31 December 2015, as a proportion of the closing value of the RAB at 31 December 2015.
- for the DRP to apply in calendar year 2018, the PTRM capex weight to the:
- t=3 estimate would be the forecast capex to occur over the period 1 January 2018 to 31 December 2018, as a proportion of the opening value of the RAB at 31 December 2018.

[1146] In what follows, it is assumed that gearing remains at 60 per cent across all periods. Therefore there is equivalence between the proportion of depreciated new capex in the depreciated RAB, as compared to the same proportions that are funded by debt.

- t=2 estimate would be the forecast capex to occur over the period 1 January 2017 to 31 December 2017, as a proportion of the opening value of the RAB at 31 December 2017.
- t=1 estimate would be the forecast capex to occur over the period 1 January 2016 to 31 December 2016, as a proportion of the closing value of the RAB at 31 December 2016; and
- t=0 estimate would be the forecast capex to occur over the period 1 January 2015 to 31 December 2015, as a proportion of the closing value of the RAB at 31 December 2015.
- for the DRP to apply in calendar year 2019, the PTRM capex weight to the:
- t=4 estimate would be the forecast capex to occur over the period 1 January 2019 to 31 December 2019, as a proportion of the opening value of the RAB at 31 December 2019.
- t=3 estimate would be the forecast capex to occur over the period 1 January 2018 to 31 December 2018, as a proportion of the opening value of the RAB at 31 December 2018.
- t=2 estimate would be the forecast capex to occur over the period 1 January 2017 to 31 December 2017, as a proportion of the opening value of the RAB at 31 December 2017.
- t=1 estimate would be the forecast capex to occur over the period 1 January 2016 to 31 December 2016, as a proportion of the closing value of the RAB at 31 December 2016; and
- t=0 estimate would be the forecast capex to occur over the period 1 January 2015 to 31 December 2015, as a proportion of the closing value of the RAB at 31 December 2015.

Calculating capex weights

20. Capex weights work to adjust the simple (equally weighted) trailing average, so as to account for the relative proportion of new capex in the RAB which is less than 10 years old. That ensures the forecast new capex initially faces the prevailing rate. So for example, if capex comprised the same proportion of the depreciated RAB (opening value) in each year, then the weights would be 10 per cent for each year of the trailing average. However, where the new capex proportions of the RAB vary between years, then the weights in the trailing average will diverge from the equal weighting (see paragraph 4 above for the QTC's summary of the effect of capex weights).

21. An equivalent approach to the QTC method for incorporating weights is to transition new capex progressively from an initial on the day annual estimate to a full trailing average over 10 years (see paragraph 1661 for an outline of how transition weights work). This approach, submitted by DBP, is essentially the same transition approach followed by the AER for its full trailing average, but in this instance applied to new forecast capex.[1147] It is equivalent to the QTC's PTRM weights method in outcome,

[1147] For a spreadsheet example of DBP's method, see Dampier Bunbury Pipeline, *Proposed Revisions DBNGP Access Arrangement: 2016 – 2020 Regulatory Period: Rate of Return: Supporting Submission: 12*, Appendix J (excel file version available on the Authority's website)

but works slightly differently in the calculation. The calculation is explained in the following hypothetical example.

22. First, the data required to calculate the capex weights for each of the years 2015-16 to 2019-20 in a typical regulatory period are established (Table 134).

23. An asset life of 60 years is assumed, to allow for depreciation of the new capex. The weight of any new capital expenditure depends on its depreciated proportion of the closing asset value of the RAB.

24. Second, the trailing averages of rates that will be weighted by the old and new capex are established (Table 135). For the sake of this simplified example, it is assumed that an illustrative prevailing (t=0) rate of 6.36 per cent applied over the previous 9 years from t=-9 to t=-1. The prevailing rate then changes from 2016-17 on. The values in this table involve the most complex step of the DBP method to establish and describe.

Table 134 Data for capex weights example

Row		2015-16	2016-17	2017-18	2018-19	2019-20
1	**Opening PTRM RAB**	$10,041.50	$10,651.70	$11,233.30	$11,748.10	$12,311.50
2	**Closing PTRM RAB**	$10,651.70	$11,233.30	$11,748.10	$12,311.50	$12,867.00
3	**Benchmark gearing**	60%	60%	60%	60%	60%
4	**Opening debt portfolio**	$6,024.90	$6,391.00	$6,740.00	$7,048.90	$7,386.90
5	**Closing debt portfolio**	$6,391.00	$6,740.00	$7,048.90	$7,386.90	$7,720.20
6	**Change in debt portfolio**	$366.10	$349.00	$308.90	$338.00	$333.30
7	**Prevailing rate**	6.36%	7.00%	7.75%	8.00%	8.25%
8	**Pre 2015-16 debt weighting**	94.27%	89.39%	85.47%	81.56%	78.04%
9	**2015-16 new debt weighting**	5.73%	5.43%	5.19%	4.96%	4.74%
10	**2016-17 new debt weighting**	0.00%	5.18%	4.95%	4.72%	4.52%
11	**2017-18 new debt weighting**	0.00%	0.00%	4.38%	4.18%	4.00%
12	**2018-19 new debt weighting**	0.00%	0.00%	0.00%	4.58%	4.38%
13	**2019-20 new debt weighting**	0.00%	0.00%	0.00%	0.00%	4.32%
14	**Total debt weighting**	100.00%	100.00%	100.00%	100.00%	100.00%
15	**Capex weighted average rate**	6.36%	6.45%	6.64%	6.85%	7.08%

Source ERA analysis.

Table 135 Transition weighted interest rates for capex weights example

Row	Column	(1) 2006-07 (t=-9)	(2) 2007-08 (t=-8)	(3) 2008-09 (t=-7)	(4) 2009-10 (t=-6)	(5) 2010-11 (t=-5)	(6) 2011-12 (t=-4)	(7) 2012-13 (t=-3)	(8) 2013-14 (t=-2)	(9) 2014-15 (t=-1)	(10) 2015-16 (t=-0)	(11) 2016-17 (t=+1)	(12) 2017-18 (t=+2)	(13) 2018-19 (t=+3)	(14) 2019-20 (t=+4)
1	**Prevailing rate**	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	7.00%	7.75%	8.00%	8.25%
2	**2006-07 (t=-9)**	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
3	**2007-08 (t=-8)**		6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
4	**2008-09 (t=-7)**			6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
5	**2009-10 (t=-6)**				6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
6	**2010-11 (t=-5)**					6.36%	6.36%	6.36%	6.36%	6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
7	**2011-12 (t=-4)**						6.36%	6.36%	6.36%	6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
8	**2012-13 (t=-3)**							6.36%	6.36%	6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
9	**2013-14 (t=-2)**								6.36%	6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
10	**2014-15 (t=-1)**									6.36%	6.36%	6.42%	6.56%	6.73%	6.92%
11	**2015-16 (t=0)**										6.36%	6.42%	6.56%	6.73%	6.92%
12	**2016-17 (t=+1)**											7.00%	7.08%	7.18%	7.30%
13	**2017-18 (t=+2)**												7.75%	7.78%	7.83%
14	**2018-19 (t=+3)**													8.00%	8.03%
15	**2019-20 (t=+4)**														8.25%

Source *ERA analysis.*

25. In Table 135:

- Row 2 gives the 10 year equally weighted rates, comprising the sum of 10 per cent of the rate of each of the 10 prior years in the relevant columns:
  - the equally weighted 10 year sum in 2015-16 is 100 per cent of 6.36 per cent, given that the prior 10 years of rates are all 6.36 per cent;
  - the equally weighted 10 year sum in 2016-17 is 90 per cent of 6.36 per cent and 10 per cent of 7 per cent, giving a weighted sum of 6.42 per cent;
  - the equally weighted 10 year sum in 2017-18 is 80 per cent of 6.36 per cent, 10 per cent of 7 per cent and 10 per cent of 7.75 per cent, giving a weighted sum of 6.56 per cent;
  - and so on;
- Row 3 gives the 9 year weighted sum for 2015-16, and the 10 year equally weighted rates thereafter:
  - the 9 year sum in 2015-16 is 100 per cent of 6.36 per cent, given that the prior 9 years of rates are all 6.36 per cent (for all 9 year estimates, 20 per cent weight is applied to the first year term and 10 per cent to each year term thereafter, following the transition method – see paragraph 1661 above for a discussion of transition weights);
  - the equally weighted 10 year sum in 2016-17 is 90 per cent of 6.36 per cent and 10 per cent of 7 per cent, giving a weighted sum of 6.42 per cent;
  - the equally weighted 10 year sum in 2017-18 is 80 per cent of 6.36 per cent, 10 per cent of 7 per cent and 10 per cent of 7.75 per cent, giving a weighted sum of 6.56 per cent;
  - and so on;
- Row 4 gives the 8 year weighted sum for 2015-16, the 9 year weighted sum for 2016-17 and the 10 year equally weighted rates thereafter:
  - the 8 year sum in 2015-16 is 100 per cent of 6.36 per cent, given that the prior 8 years of rates are all 6.36 per cent (for all 8 year estimates, 30 per cent weight is applied to the first year term and 10 per cent to each year term thereafter, following the transition method);
  - the 9 year sum in 2016-17 is 90 per cent of 6.36 per cent, 10 per cent of 7 per cent, giving a weighted sum of 6.42 per cent;
  - the equally weighted 10 year sum in 2017-18 is 80 per cent of 6.36 per cent, 10 per cent of 7 per cent and 10 per cent of 7.75 per cent, giving a weighted sum of 6.56 per cent;
  - the equally weighted 10 year sum in 2018-19 is 70 per cent of 6.36 per cent, 10 per cent of 7 per cent, 10 per cent of 7.75 per cent and 10 per cent of 8.00 per cent, giving a weighted sum of 6.73 per cent;
  - and so on;
- Row 5 gives the 7 year weighted sum for 2015-16, the 8 year weighted sum for 2016-17, the 9 year weighted sum for 2017-18 and the 10 year equally weighted rates thereafter:

  - the 7 year sum in 2015-16 is 100 per cent of 6.36 per cent, given that the prior 7 years of rates are all 6.36 per cent (for all 7 year estimates, 40 per cent weight is applied to the first year term and 10 per cent to each of the 6 year terms thereafter, following the transition method);
  - the 8 year sum in 2016-17 is 90 per cent of 6.36 per cent, 10 per cent of 7 per cent, giving a weighted sum of 6.42 per cent;
  - the equally weighted 10 year sum in 2017-18 is 80 per cent of 6.36 per cent, 10 per cent of 7 per cent and 10 per cent of 7.75 per cent, giving a weighted sum of 6.56 per cent;
  - the equally weighted 10 year sum in 2018-19 is 70 per cent of 6.36 per cent, 10 per cent of 7 per cent, 10 per cent of 7.75 per cent and 10 per cent of 8.00 per cent, giving a weighted sum of 6.73 per cent;
  - and so on;
- through to;
- Row 11 gives the 1 year weighted sum for 2015-16, the 2 year weighted sum for 2016-17, the 3 year weighted sum for 2017-18, the 4 year weighted sum for 2018-19, and the 5 year weighted sum for 2019-20:
  - the 1 year sum in 2015-16 is 100 per cent of 6.36 per cent (100 per cent weight is applied to the first year);
  - the 2 year sum in 2016-17 is 90 per cent of 6.36 per cent, 10 per cent of 7 per cent, giving a weighted sum of 6.42 per cent (for a 2 year estimate, 90 per cent weight is applied to the first year term and 10 per cent to the second year term, following the transition method);
  - the 3 year sum in 2017-18 is 80 per cent of 6.36 per cent, 10 per cent of 7 per cent and 10 per cent of 7.75 per cent, giving a weighted sum of 6.56 per cent (80 per cent weight is applied to the first year term and 10 per cent to the second and third year terms, following the transition method);
  - and so on;
- through to;
- Row 15 gives the 1 year weighted sum for 2019-20;
  - the 1 year sum in 2019-20 is 100 per cent of 8.25 per cent (100 per cent weight is applied to the first year term, which is the prevailing rate in this case).

26. Third, the contribution of various vintage (illustrative) depreciated capex in the closing asset value in each year is developed (Table 136).

Table 136 Composition of closing asset values (existing capital and new capital in $ million)

Column		(10)	(11)	(12)	(13)	(14)
		2015-16	2016-17	2017-18	2018-19	2019-20
Row		(t=-0)	(t=+1)	(t=+2)	(t=+3)	(t=+4)
1	**2006-07 (t=-9)**	6024.90	6031.00	6042.92	6059.99	6082.69
2	**2007-08 (t=-8)**					
3	**2008-09 (t=-7)**					
4	**2009-10 (t=-6)**					
5	**2010-11 (t=-5)**					
6	**2011-12 (t=-4)**					
7	**2012-13 (t=-3)**					
8	**2013-14 (t=-2)**					
9	**2014-15 (t=-1)**					
10	**2015-16 (t=0)**	366.10	360.00	353.90	347.80	341.69
11	**2016-17 (t=+1)**		349.00	343.18	337.37	331.55
12	**2017-18 (t=+2)**			308.90	303.75	298.60
13	**2018-19 (t=+3)**				338.00	332.37
14	**2019-20 (t=+4)**					333.3
	Total	**6391.00**	**6740.00**	**7048.90**	**7386.90**	**7720.20**

Source ERA analysis.

27. Fourth, capex weights are developed that correspond to the column proportions in Table 137.

Table 137 Capex weights to apply to each year for the trailing average

Column		(10)	(11)	(12)	(13)	(14)
		2015-16	2016-17	2017-18	2018-19	2019-20
Row		(t=-0)	(t=+1)	(t=+2)	(t=+3)	(t=+4)
1	**2006-07 (t=-9)**	94.27%	89.39%	85.47%	81.56%	78.04%
2	**2007-08 (t=-8)**					
3	**2008-09 (t=-7)**					
4	**2009-10 (t=-6)**					
5	**2010-11 (t=-5)**					
6	**2011-12 (t=-4)**					
7	**2012-13 (t=-3)**					
8	**2013-14 (t=-2)**					
9	**2014-15 (t=-1)**					
10	**2015-16 (t=0)**	5.73%	5.43%	5.19%	4.96%	4.74%
11	**2016-17 (t=+1)**		5.18%	4.95%	4.72%	4.52%
12	**2017-18 (t=+2)**			4.38%	4.18%	4.00%
13	**2018-19 (t=+3)**				4.58%	4.38%
14	**2019-20 (t=+4)**					4.32%
	Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source ERA analysis.

28. Finally, the 'sumproduct' of corresponding columns (10 through to 14) in each of Table 137 and Table 134 are calculated to give the capex weighted trailing average to apply in each year (Table 138).

Table 138 Capex weighted trailing average rate in each year

Column	(10)	(11)	(12)	(13)	(14)
	2015-16	2016-17	2017-18	2018-19	2019-20
	(t=-0)	(t=+1)	(t=+2)	(t=+3)	(t=+4)
Capex weighted trailing average rate	**6.36%**	**6.45%**	**6.64%**	**6.85%**	**7.07%**
Simple weighted trailing average rate	6.36%	6.42%	6.56%	6.73%	6.92%
Prevailing rate	6.36%	7.00%	7.75%	8.00%	8.25%

Source ERA analysis.

29. It may be observed that the capex weighted trailing average is below the prevailing rate in most years, in this illustrative example. This occurs because prevailing rates are rising strongly, while the majority of capex was undertaken in years prior to 2015-16, when interest rates were low. However, the capex weighted trailing average is above the simple (equally weighted) trailing average, reflecting the influence of the capex weights in this example, lifting the influence of the later years when rates are higher.

Appendix 8 Automatic updating formulas for the return on debt

1. This appendix sets out the method and automatic formulas for updating the debt risk premium (**DRP**) for each regulatory year. The annual update will contribute to the revised tariff that is published at each annual tariff variation. Annual tariff variations will occur on 1 January 2016, 1 January 2017, 1 January 2018 and 1 January 2019.

2. The Authority has determined that the return on debt will be estimated as the sum of the:

   - risk free rate;
   - spread of the bank bill swap rate over the risk free rate (BBSW spread);
   - DRP; and
   - relevant debt raising and hedging transactions costs.

3. The risk free rate and BBSW spread are estimated with the same term as the regulatory period, that is, 5 years. These two components are estimated once every 5 years at the start of the regulatory period, so do not require annual updating.

4. The DRP is estimated using a 10 year trailing average consisting of a DRP for the current year and a DRP for each of the 9 prior years and so must be updated each year. The DRP for each years is based on:

   - a term to maturity of 10 years;
   - a BBB band credit rating;
   - the Authority's revised bond yield approach; and
   - a corresponding 10 year bank bill swap rate estimation.

5. The revised bond yield approach uses international bonds that have their country of risk identified by Bloomberg as Australia to estimate the cost of debt each year. The DRP represents the risk spread of the cost of debt estimated over the 10 year bank bill swap rate estimation in any given year.

6. The debt raising and hedging transactions costs, like the 5 year risk free rate and swap spread, are estimated only once, at the start of the regulatory period, and so do not require annual updating.

Averaging period

7. The DRP estimates that are to be included the 2016, 2017, 2018 and 2019 tariff variations are based on an averaging period of 20 trading days.[1148] This averaging period must fall within a window at least three months prior to, but no longer than six months before the regulatory period. Therefore, the Authority requires that the nominated averaging period occur in the period 1 July to 31 October in each year. For example, the updated DRP for inclusion in the 1 January 2016 tariff variation will be based on an averaging period that falls within the window 1 July 2015 to 31 October 2015.

[1148] With the trading days based on the eastern states' public holidays.

8. The averaging periods must be nominated in advance. The Authority requires ATCO nominate the averaging periods for 2016 to 2019 as soon as practicable around the time of release of this Final Decision. The Authority does not require that the nominated 20 business day averaging period for each of the four years be identical periods, only that they occur in the period 1 July to 31 October.

Method for estimating the DRP

The simple equally weighted trailing average

9. The estimate of the DRP for each year will be a simple trailing average.

10. The trailing average estimate of the DRP will weight the most recent 10 years of annual DRP estimates, which have been estimated consistent with debt with a 10 year term in the BBB credit rating band.

11. Annually updating the resulting 10 year trailing average will involve adding in the most recent estimate of the DRP and dropping the estimate from 10 years ago. The weights for a simple hybrid trailing average DRP estimate will be 10 per cent each.

12. The automatic formula for the equally weighted trailing average of the DRP to apply in any regulatory year as shown below:

$$TA\ DRP_0 = \frac{\sum_{t=0}^{-9} DRP_t}{10}$$

Where

$TA\ DRP_0$ is the equally weighted trailing average of the DRP to apply in the following year as the annual update of the estimate used in the current year; and

DRP_t is the DRP estimated for each of the 10 regulatory years $t = 0, -1, -2\ldots, -9$.

13. All years are in the same year convention as year *0*. For example, if year *0* is the regulatory year 2016, *t* = *-9* is the calendar year 2007 because 2016 is a calendar year in this Access Arrangement. Similarly, if year *0* is the regulatory year 2017, *t* = *-9* is the calendar year 2008.

14. Using the same logic if year *0* is regulatory year 2014-15, *t* = *-9* is the financial year 2005/2006.

15. For example, the DRP trailing average estimate for the calendar 2016 regulatory year will be:

$$\begin{aligned} TA\,DRP_{2016} = {} & 0.1 \times DRP_{2016} + 0.1 \times DRP_{2015} + 0.1 \times DRP_{2014} \\ & + 0.1 \times DRP_{2013} + 0.1 \times DRP_{2012} + 0.1 \times DRP_{2011} \\ & + 0.1 \times DRP_{2010} + 0.1 \times DRP_{2009} + 0.1 \times DRP_{2008} \\ & + 0.1 \times DRP_{2007} \end{aligned}$$

16. In terms of the notation used by the Australian Energy Regulator (but in the Authority's case applying just to the DRP trailing average), the foregoing TA DRP for the 2016 calendar year may be written as follows:[1149]

$$\begin{aligned} {}_{2015}kd_{2016} = {} & 0.1 \times {}_{2006}R_{2007} + 0.1 \times {}_{2007}R_{2008} + 0.1 \times {}_{2008}R_{2009} \\ & + 0.1 \times {}_{2009}R_{2010} + 0.1 \times {}_{2010}R_{2011} + 0.1 \times {}_{2011}R_{2012} \\ & + 0.1 \times {}_{2012}R_{2013} + 0.1 \times {}_{2013}R_{2014} + 0.1 \times {}_{2014}R_{2015} \\ & + 0.1 \times {}_{2015}R_{2016} \end{aligned}$$

17. Equivalently, where 't=0' specifies the year 2016 in this case:

$$\begin{aligned} {}_{-1}kd_{0} = {} & 0.1 \times {}_{-10}R_{-9} + 0.1 \times {}_{-9}R_{-8} + 0.1 \times {}_{-8}R_{-7} + 0.1 \times {}_{-7}R_{-6} \\ & + 0.1 \times {}_{-6}R_{-5} + 0.1 \times {}_{-5}R_{-4} + 0.1 \times {}_{-4}R_{-3} \\ & + 0.1 \times {}_{-3}R_{-2} + 0.1 \times {}_{-2}R_{-1} + 0.1 \times {}_{-1}R_{0} \end{aligned}$$

Post-March 2015 Estimates of the DRP for inclusion in the trailing average DRP estimate

18. The estimates of the DRP applying to each calendar year will be estimated using the Authority's revised bond yield approach. Resulting estimates of the DRP will be included in the trailing average.

19. The first estimate is that made for the 20 day period ending 2 April 2015, which has been included in the estimate of the DRP for financial year 2014-15 and calendar year 2015 included in this Final Decision.

20. The next estimate that will be made falls in the period July to October 2015, (DRP_{2016}), and will be incorporated in the trailing average DRP to apply in 2016 (that is, TA DRP_{2016}).

[1149] Australian Energy Regulator, *Draft Decision: Jemena Gas Networks (NSW) 2015-20*, November 2014, Attachment 3, p. 3-288.

21. The following automatic formulas will apply, and will remain unchanged for the duration of the AA4 period, and hence will apply for the estimates made for DRP_{2016}, as well as for the estimates DRP_{2017}, DRP_{2018} and DRP_{2019}.[1150]

Techniques to estimate the debt risk premium

22. The Authority's approach to estimating the debt risk premium (DRP) is designed so that a stakeholder can replicate the debt risk premium calculation implemented by the Authority. The process is outlined in sufficient detail such that replicating it should incur minimal research and development costs for stakeholders whilst maintaining transparency and removing discretion in the application. Once the approach has been established in Bloomberg and Excel for the first time the settings and spreadsheet templates do not need to be established again. The estimation process thereafter requires significantly less time and becomes mechanistic. ***The footnotes in this section provide assistance with Bloomberg commands.***

23. The Revised Bond Yield Approach consists of the following six processes.

Determining the Benchmark Sample

Identifying a sample of bonds based on the benchmark sample selection criteria. This will comprise a 'cross section' of bonds.

Collecting Data

Collecting data for those bonds over the averaging period in question, for example 20 trading days). This represents 'time series' data related to each bond.

Converting Yields to Australian Dollar Equivalents

Converting yields for bonds denominated in foreign currencies into Australian dollar (**AUD**) equivalents so that all yields are expressed as an AUD equivalent.

Averaging Yields over the Averaging Period

Calculating an average AUD equivalent bond yield for each bond in the cross section across the averaging period. For example, where a 20 trading day averaging period applies, each bond will have a single 20 day 'average yield' calculated.

Estimating 'Curves'

Estimating three yield curves based on different methodologies and using the average yield for each bond; its remaining term to maturity; and AUD face value.[1151]

1150 As part of the response to the consultation on the proposed changes to the Final Decision, the automatic formulas for the annual update in this section have been amended. However, the Authority has determined not to amend some aspects of the approach used to estimate the 2 April 2015 estimate of the DRP set out in the Final Decision (for example, the constraints on the Nelson-Siegel Svennson curve parameters). Therefore, applying the amended methods set out below to the 20 day period ending 2 April 2015 will not reproduce the exact DRP utilised for 2 April 2015 in this amended Final Decision (see paragraphs 1617 to 1637 in the main body for the 2 April 2015 value of the DRP and the method adopted to estimate it).

1151 The three curves are based on the Gaussian Kernel, the Nelson Siegel and the Nelson Siegel Svennson methodologies. The Gaussian Kernel approach produces a series of point estimates as opposed to a curve. However, each point estimate can be seen as points that compose a curve.

Calculating the DRP

Calculating the DRP by subtracting the average of the 10 year AUD interest rate swap (**IRS**) rate from the 10 year cost of debt estimate, with the latter calculated as the average of the three estimated yield curves at the ten year tenor.

Step 1: Determining the benchmark sample

24. The benchmark sample of bonds should be identified as soon as practicable, but 24 hours after the date identified as the final trading day in the averaging period in order to allow the sample from Bloomberg to 'settle' to its final form.

25. The first step in determining the benchmark sample, or cross section of bonds is to identify the appropriate benchmark credit rating. For Gas Access Arrangements, the Standard & Poors' credit rating for the benchmark firm is outlined in the Economic Regulation Authority's Rate of Return Guidelines and is currently the BBB band.[1152]

26. The Bloomberg search SRCH <GO> facility is used to conduct a search for bonds with a Standard & Poors' issue level (as opposed to issuer) rating that matches the benchmark firm's credit rating, and other criteria set out in Table 139.[1153] This is carried out between 24 and 48 hours after the date that marks the final trading day in the averaging period in order to allow global markets to close. The exception here is where this 24 hour period overlaps a Western Australian non-trading day, in which case this process is carried out on the next Western Australian trading day.[1154]

Table 139 Revised Bond Yield Approach Search Criteria – Bloomberg Search Structure

Criteria	ERA's approach
Country of risk	Australia
S&P Rating	BBB+ to BBB-
Currency	Australian Dollar, United States Dollar, Euro Currency and British Pound
Maturity Date	>= 2 years from now
Maturity Type	Bullet or Callable or Putable but not Perpetual
Security Type	Exclude Inflation Linked Note
Sector/Industry Group	Exclude 'Financials' (based on Bloomberg Industry Classification System Level 1 Sector Name)
Was Called	No

27. A screen shot of how this would look in the Bloomberg SRCH<GO> function is presented in Figure 28. The security status defaults to 'active'. It is important to note that in the top left hand corner of this figure the 'Asset Classes' criteria has been

---

1152 Economic Regulation Authority, Explanatory Statement for the Rate of Return Guidelines: Meeting the Requirements of the National Gas Rules, 16 December 2013, p.44-52. Available from < https://www.erawa.com.au/gas/gas-access/guidelines/rate-of-return-guidelines>

1153 <GO> is the Bloomberg equivalent of hitting the enter key after entering commands in the top left hand corner of the screen to the left of <HELP>. For example, type SRCH and then hit the <GO> key.

1154 Note that the revised bond yield approach is based on Eastern States trading days for consistency with Commonwealth Government Security data used in risk free rate and inflation calculations.

enabled to consolidate duplicate bond issues. The consolidation option is accessed by typing 11 in the top left hand corner to the left of <HELP> and then hitting <GO>. Ensure that *only* the 'Corporate' and 'Consolidate Duplicate Bonds' option is checked before clicking 'Update'. The remaining criteria are entered into the Bloomberg SRCH function as shown in Figure 28 by typing the keywords into the 'Field' column and hitting <GO> after each of the criteria are entered to add new criteria. The criteria in the Bloomberg search panel can be edited by clicking the pencil icon to the right of each criteria. [1155]

Figure 28 Bloomberg 'SRCH' Function Populated with Sample Selection Criteria.

Source: Bloomberg

28. The results of this bond search are exported into Microsoft Excel.[1156] The only information that is collected from the search result output into Excel at this stage is the 'Bloomberg ID' or 'ticker' for each bond.[1157] Each ticker needs to be appended with " Corp" so that formulas used in the next step can recognise them as a corporate bond. This can be carried out using the structure in Microsoft Excel below.[1158]

1155 For the maturity date change the boundary condition to 'years from now' by selecting 'Y'.

1156 Click the 'Results' button and in the resulting screen click 'Actions' and then 'Export to Excel'.

1157 It is important to save a copy of this search for future reference if help is requested from Bloomberg Helpdesk.

1158 It is recommended that formulas presented in these Excel structure tables are copy and pasted from an electronic copy of this document.

Table 140 Appending Bloomberg Bond Tickers for use in Pricing Formulas– Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Pasted value of bond ticker (example)	A2 down	EXXXXXXXX Corp
Bond ticker appended with " Corp"	B2 down	=A2&" Corp"

29. The bond tickers in B2 down should be pasted as values (as opposed to Excel commands) into a separate worksheet for use in subsequent calculations.

Step 2: Collecting Data and Conversion of yields into AUD equivalents

30. Data is collected between 24 and 48 hours after the date that marks the final trading day in the averaging period in order to allow global markets to close. The exception here is if a Western Australian non-trading day falls in this period, in which case this process is carried out on the next Western Australian trading day.[1159]

31. Before data for each of the bond identifiers in the sample (established in the previous section) is retrieved, some 'pricing source defaults' need to be set in the Bloomberg terminal, to ensure that data sources are consistent and of similar quality. This determines the source that formula outlined further below use to draw bond pricing from.

32. Table 141 provides the 'pricing source defaults' for bonds issued in the relevant range of currencies.

Table 141 Pricing Waterfall Set in Bloomberg for Retrieving Bond Price Data

Currency of Issuance	1st Pricing Source	2nd Pricing Source
USD	BVAL	TRAC
EUR	BVAL	BGN
GBP	BVAL	BGN
AUD	BVAL	CBBT

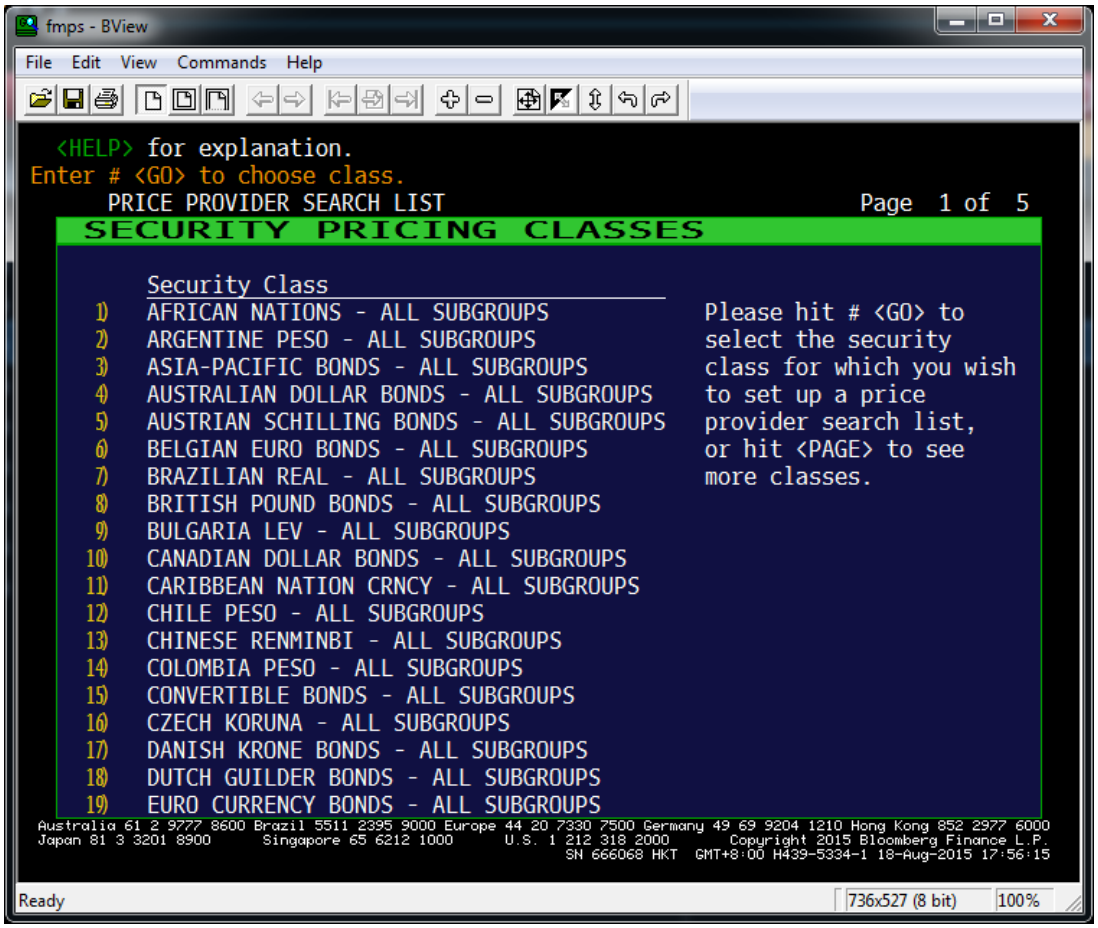
33. To set these as the default sources in the Bloomberg terminal for each currency use FMPS <GO> shown in Figure 29.[1160] Scroll down to reveal 'US Denominated

[1159] Note that the revised bond yield approach is based on Eastern States trading days for consistency with Commonwealth Government Security data used in risk free rate and inflation calculations. The Authority will maintain a copy of the pricing sources used for each bond in the sample so that third parties can replicate the pricing sources for all bond yield observations retrospectively.

[1160] The Authority considers that in practice the BVAL pricing source will find pricing data in the majority of cases. If the first preference contains any observations of historical data FMPS ensures that all observations will rely on this one pricing source for consistency. Events such as US Federal public holidays can result in days within the averaging period where no prices will be returned from the first preference. In these rare cases the bond ticker is manually appended with "@PCS Corp" to hard code the preferred pricing source. For example in Table 142 further below the ticker would be modified to "EXXXXXXXX@BGN Corp" as second preference for Euro denominated bonds. If no pricing is available from the second preference the observation is left blank. The Authority will maintain a copy of the pricing sources used for each bond in the sample so that third parties can replicate the pricing sources for all bond yield observations.

Corporate Bonds – All Subgroups'. Select this and in the resulting window select US Denominated Corporate Bonds – All Subgroups' again.

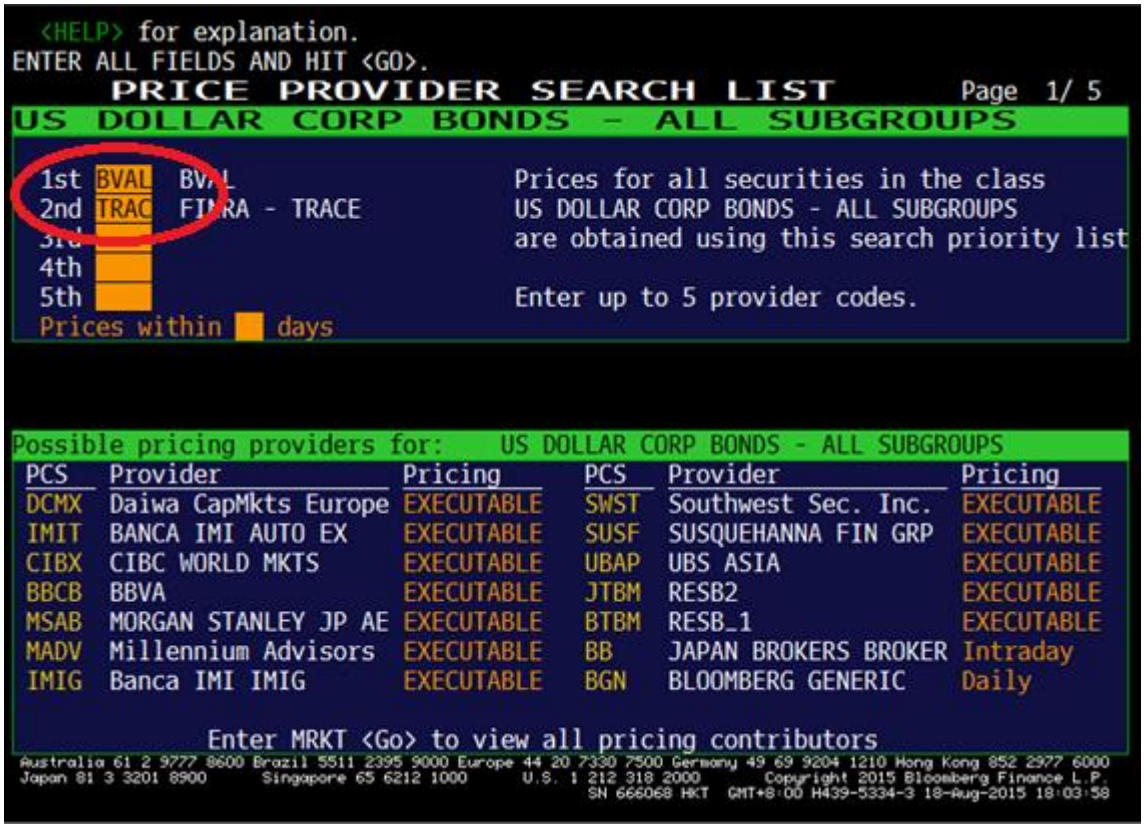
Figure 29 Security Pricing Classes List



Source: Bloomberg

34. Figure 30 shows where the pricing source settings in Table 141 should be entered in the pricing source window using the US dollar denominated bonds as an example. In particular, the first pricing source should be entered to the right of '1st' and the second pricing source to the right of '2nd'. Once this is complete select <GO> followed by 1 <GO> to save.

Figure 30 Pricing Source Window Default Setting - US Dollar Corporate Bond Example



Source: Bloomberg

35. Repeat the steps outlined in paragraphs 33 and 34 for the remaining currencies selecting:

    - 'Euro Currency Bonds – All Subgroups' > 'Original EUR Issued Bonds and Other Redenominated Bonds' > 'Euro Currency Bonds – All Subgroups' for Euro denominated bonds;
    - 'British Pound Bonds – All Subgroups' > 'British Pound Bonds – All Subgroups' for GBP denominated bonds; and
    - 'Australian Dollar Bonds – All Subgroups' > 'Australian Dollar Bonds – All Subgroups' for AUD denominated bonds.

36. Data is collected through a Microsoft Excel spreadsheet that interfaces with Bloomberg through the Bloomberg Application Programming Interface (**API**). The 'tickers' identifying each bond in the sample selection step above are the key input into this spreadsheet. The bond tickers are appended with " Corp" so that they can be read by the "Bloomberg Data Point" (**BDP**) or "Bloomberg Data History" (**BDH**) function in Excel which then retrieves various attributes for each bond in question.[1161] Once the pricing source defaults have been set, some key attributes are be exported into Excel:

    - Maturity date (MATURITY);
    - Currency (CRNCY);

[1161] The space before " Corp" is intentional. BDP retrieves current values while BDH is used to retrieve historical data.

- Amount issued (AMT_ISSUED);
- Issue date (ISSUE_DT);
- Bid price for the bond (px bid);
- Ask price for the bond (px ask); and
- Asset swap spread bid (asset swap spd bid);
- Asset swap spread ask (asset swap spd ask);
- Australian dollar exchange rate with each bond's native currencyat date of issue (for example for the US/Australian dollar exchange rate; USDAUD Curncy).

37. The key formulas for exporting the Bloomberg data into Excel are provided in Table 142. All formulas B2 through to E2 should be filled downward in Excel to retrieve the attributes for the entire cross section of bonds.

38. Once these key attributes have been exported, the formulas in Table 143 then convert the mid asset swap spread highlighted in K2 into a hedged Australian dollar equivalent. The formulas in Table 142 and Table 143 should be contained in the same spreadsheet. All formulas P2 through to R2 should be filled downward in Excel to retrieve the converted yields for the cross section of bonds.[1162]

39. The Excel worksheet based on the formulas in Table 142 and Table 143 provides a template to calculate the hedged AUD bond yields for the entire cross section of bonds in the benchmark sample on any given trading day. Specifically, once a trading date is entered into cell A1, the hedged AUD bond yield is returned in cells R2 downward.[1163] The hedged yields for the entire cross section of bonds are saved as values (rather than excel formulas) for each day in the 20 day averaging period.

[1162] The Bloomberg Swaps Toolkit must be enabled so that these formulas can call the swap manager tool in the Bloomberg terminal through Excel. Further information and example templates can be found in the Swaps Toolkit under DAPI <GO> in the Bloomberg terminal.

[1163] Note that this process can take a few minutes to populate. It is important to ensure the yields have populated fully and without error each time the date is changed in cell A1. At times this may require restarting Excel.

Table 142 Formula to Retrieve Bond Prices and Attributes– Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Bond Ticker	From A2 down	EXXXXXXXX Corp
Trading day date	A1	mm/dd/yyyy
Currency to convert to	B1	AUD
Payment frequency	C1	Q
Issue date	B2 down	=BDP(A2,"ISSUE_DT")
Maturity date	C2 down	=BDP(A2,"MATURITY")
Currency of bond issue	D2 down	=BDP(A2,"CRNCY")
Amount issued – currency of issuance (bond face value)	E2 down	=BDP(A2,"AMT_ISSUED")
Amount issued – Australian dollars (bond face value)	F2 down	=IF(D2="AUD",E2,E2*BDH(D2&"AUD Curncy","px_last",B2,B2))
Bid Price Label	G1	PX BID
Ask Price Label	H1	PX ASK
Bond bid price[1164]	G2 down	=BDH(A2, "px bid", $A$1, $A$1, "QuoteType", "P","fill","P")
Bond ask price	H2 down	=BDH(A2, "px ask", $A$1, $A$1, "QuoteType", "P","fill","P")
Asset swap spread bid[1165]	I2 down	=BDP(A2,"asset swap spd bid",$G$1,G2,"ASW_SWAP_CURRENCY",$B$1,"ASW_SWAP_PAY_RESET_FREQ",$C$1,"SETTLE_DT",TEXT($A$1,"YYYYMMDD"),"OAS_CURVE_DT",TEXT($A$1,"YYYYMMDD"))
Asset swap spread ask[1166]	J2 down	=BDP(A2,"asset swap spd ask",$H$1,H2,"ASW_SWAP_CURRENCY",$B$1,"ASW_SWAP_PAY_RESET_FREQ",$C$1,"SETTLE_DT",TEXT($A$1,"YYYYMMDD"),"OAS_CURVE_DT",TEXT($A$1,"YYYYMMDD"))
Asset swap spread mid	K2 down	=AVERAGE(I2:J2)
Determination Date	$L$1 down	dd/mm/yyyy

[1164] The Authority considers that the “fill” “P” option will not return values after the bond has matured, however will ensure a contiguous series whilst the bond is on issue.

Remaining term to maturity from determination date (dd/mm/yyyy)	L2 down	=YEARFRAC($L$1,C2,)

Source: ERA Research, Bloomberg

Table 143 Formula for Converting to Hedged Australian Dollar Equivalent Yields– Microsoft Excel Template Structure (continued on from Table 142)

Attribute	Cell	Formula or entry
Payment frequency for fixed leg of swap (leg 1)	M1 down	Semiannual
Payment frequency for floating leg of swap (leg 2)	N1 down	Quarterly
Deal type (fixed float)	O1 down	FXFL
Deal Structure ID (called from Bloomberg terminal)[1167]	P2 down	=BSTRUCTURE($O$1,"Leg[2].Currency",$B$1,"Leg[1].Currency",$B$1,"Leg[2].Spread",K2,"EffectiveDate",$A$1,"MaturityDate",C2,"Leg[1].PayFrequency",$M$1,"Leg[2].PayFrequency",$N$1,"Leg[2].ResetFrequency",$N$1)
Valuation ID (called from Bloomberg terminal)	Q2 down	=BPRICE(P2,"Target=Leg[1].FixedCoupon","Premium=0","Leg[2].Spread",K2,"ValuationDate",$A$1,"MarketDate",$A$1,"headers=false")
Australian dollar equivalent yield	R2 down	=BView(Q2,"Leg[1].FixedCoupon","headers=false")

Source: ERA Research, Bloomberg

Step 3: Averaging yields over the averaging period

40. The 20 day averaging period is based on eastern states trading days with the last day of the averaging period being on the DRP determination date. A table of AUD equivalent bond yields is established for the cross section of bonds in the sample with observations for every day across the averaging period.[1168] To build up this time

[1165] The Authority considers that using the option adjusted spread curve date is an appropriate override in order to explicitly fix this curve date to the trading day date entered through Excel.

[1166] The Authority considers that using the option adjusted spread curve date is an appropriate override in order to explicitly fix this curve date to the trading day date entered through Excel.

[1167] The Authority considers that setting the effective date to the trading date is appropriate to ensure the tenor of the swap matches the remaining term to maturity of the bond.

[1168] This is done by cutting and pasting observations from cell R2 down in Table 143 as values into B2 down in Table 144. To avoid 'overloading' the Excel API only one spreadsheet using the structure in Table 143 should be run on a Bloomberg terminal at a time.

series, the date entered in cell A1 at Table 142 should be changed to each of the trading days in the averaging period. The series of observations for each bond is then assessed to ensure it has a number of observations equal to at least half of the averaging period. Bonds that do not meet this requirement are deleted from the sample. The sample of yields for each bond is then averaged. This results in one averaged observation for each bond.

41. The Excel worksheet for calculating the 20 day average bond yield for each bond in the benchmark samples is provided at Table 144.

Table 144 Averaging Yields over the Averaging Period - Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Trading Day Dates	B1:U1	Each trading day date in the averaging period (20 dates for this Decision)
Bond Ticker	A2 down	EXXXXXXXX Corp
Australian dollar equivalent yields for first trading day	B2 down :U2 down	Bond values from R2 down in Table 143 for the 1st trading day through to the 20th trading day.
Average of 20 day yields	V2 down	=AVERAGE(B2:U2)

Step 4: Apply curve fitting techniques

42. To improve the validity of the yield estimates, three techniques are used to fit curves as part of the automatic formula to estimate the 10 year cost of debt used in the calculation of the annually updated DRP. These are:

- the Gaussian Kernel Methodology;
- the Nelson-Siegel Methodology; and
- the Nelson-Siegel-Svennson Methodology.

43. For ease of replication by third parties only Microsoft Excel is used for processing the data. Each of these techniques is discussed in turn below.[1169]

[1169] Microsoft Excel 2013 (15.0.4745.1000) 32 bit as part of Microsoft Office Professional Plus 2013 is the version currently used for these calculations.

Gaussian Kernel Methodology

44. The Gaussian Kernel Methodology is consistent with the approach used by the Reserve Bank of Australia as published in 'New Measures of Australian Corporate Credit Spreads'.[1170]

45. The Excel worksheet that replicates the Gaussian Kernel Methodology is provided in

46. Table 145. Note that the inputs required for each bond in the benchmark sample are: remaining term to maturity; bond face value in Australian dollars; and Australian dollar equivalent yield. These are the outputs reported in cells L2 and F2 in Table 142 and cell R2 in Table 143 respectively.

Table 145 Gaussian Kernel Point Estimation Methodology – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Remaining term to maturity	A1 down	L2 as output in Table 142
Amount issued – Australian dollars (bond face value)	B1 down	F2 as output in Table 142
Australian dollar equivalent yield	C1 down	Values in V2 down in Table 144
Absolute deviation from target tenor	D1 down	=ABS(A1-$K$1)
Squared deviation from target tenor	E1 down	=(A1-$K$1)^2
Gaussian kernel	F1 down	=(EXP(-E1/(2*$K$4)))/$K$8
Joint Weighting	G1 down	=F1*B1
Sum of Joint Weighting	Last cell column G	=SUM(G1:GSecond last row)
Weight	H1 down	=G1/(GLast row)
Weighted yield	I1 down	=C1*H1
Weighted maturity	J1 down	=A1*H1
Sum weighted maturity (effective term to maturity)	Last cell column J	=SUM(J1:JSecond last row)

[1170] Reserve Bank of Australia, *'New Measures of Australian Corporate Credit Spreads'*, *Bulletin*, December quarter 2013.

Attribute	Cell	Formula or entry
Target tenor	K1	Input target tenor (eg 10 for 10 years)
Smoothing parameter (sigma)	K2	1.5
Actual sigma	K3	=STDEV(A:A)
Sigma squared	K4	=K2^2
mean	K5	=AVERAGE(A:A)
pi	K6	=PI()
2 x Square root of pi	K7	=SQRT(2*K6)
2 x Square root of pi x smoothing parameter	K8	=K7*K2
Target tenor yield	K9	=SUM(I:I)

47. As the Gaussian kernel methodology is non-parametric, and thus requires no estimation of curves, the output for any target tenor input into cell K1 is instantly reported in cell K8.

48. The target tenor yields are calculated for 3, 5, 7 and 10 year terms. The associated effective term to maturity in the last cell of column J is also recorded for each tenor. A linear extrapolation out to an effective tenor of 10 years and interpolation to 7 years is performed using the following formula.

$$y_t(t) = y_t\left[et(7)\right] + \left(\frac{y_t\left[et(10)\right] - y_t\left[et(7)\right]}{et(10) - et(7)}\right)\left(t - et(7)\right)$$

Where:

t is the tenor to be interpolated or extrapolated to;

$y_t(t)$ is the semi-annual yield extrapolated out to 10 years;

τ is the input target tenor (for example in cell K1 above);

$y_t\left[\tau\right]$ is target tenor yield output from the Gaussian kernel method; and

$et(\tau)$ is the effective tenor output from the Gaussian kernel method.

49. The Excel Worksheet for calculating the target tenor yields is provided at Table 146.

Table 146 Linear Interpolation and Extrapolation of Gaussian Kernel Estimates – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Tenor	A1:D1	Values 3, 5, 7 and 10.
3 year target tenor yield (semi-annual basis)	A2	From cell K9 in Table 145.
5 year target tenor yield (semi-annual basis)	B2	From cell K9 in Table 145.
7 year target tenor yield (semi-annual basis)	C2	From cell K9 in Table 145.
10 year target tenor yield (semi-annual basis)	D2	From cell K9 in Table 145.
3 year effective tenor	A3	Last row of column J in Table 145.
5 year effective tenor	B3	Last row of column J in Table 145.
7 year effective tenor	C3	Last row of column J in Table 145.
10 year effective tenor	D3	Last row of column J in Table 145.
3 year target tenor annualized yield	A4	=((1+A2/200)^2-1)*100
5 year target tenor annualized yield	B4	=((1+B2/200)^2-1)*100
7 year target tenor annualized yield	C4	=((1+C2/200)^2-1)*100
10 year target tenor annualized yield	D4	=((1+D2/200)^2-1)*100
Interpolated 7 year yield (semi-annual basis)	E2	=C2+((D2-C2)/(D3-C3))*(7-C3)
Extrapolated 10 year yield (semi-annual basis)	F2	=C2+((D2-C2)/(D3-C3))*(10-C3)
Interpolated 7 year yield annualized	E4	=((1+E2/200)^2-1)*100
Extrapolated 10 year yield annualized	F4	=((1+F2/200)^2-1)*100

50. The value for F4 in Table 146 is the Gaussian Kernel cost of debt extrapolated to a tenor of 10 years. This value averaged with the 10 year cost of debt estimate from the other two methods is the Authority's final 10 year cost of debt estimate.

The Nelson Siegel method

51. The first step in the Nelson Siegel methodology involves the estimation of the value for the decay factor (λ) that provides the tenor at which the medium-term factor (β_{2t}) reaches its maximum influence. Diebold and Li (2006) propose that 30 months (2.5 years) is commonly used as a medium-term tenor.[1171] Setting τ to 2.5 and substituting it into the weighting factor attached to β_{2t} in the Nelson Siegel specification gives:

$$Max\left(\frac{1-e^{-2.5\lambda}}{2.5\lambda}-e^{-2.5\lambda}\right)$$

52. The Excel worksheet and Excel solver settings that are used to determine the value of λ that maximises β_{2t} are provided at Table 147, Figure 30 and Figure 31 respectively. Note that the GRG non-linear solver is used to find the maximum point (or peak) on a non-linear function, hence the selection of 'GRG Nonlinear' and 'Max' in Figure 31.

Table 147 Nelson Siegel Decay Factor Estimation – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
β_{2t} weighting factor	A1	=(((1-EXP(-$A$3*A2))/($A$3*A2))-EXP(-$A$3*A2))
Tenor (maturity) τ	A2	2.5
Decay factor λ (Starting value used)	A3	0.00000000000001 (that is 1E-14)

[1171] F. Diebold and C. Li, 'Forecasting the term structure of government bond yields', *Journal of Econometrics,* vol.130, no.2, pp. 337-364.

Figure 31 Nelson Siegel Decay Factor Estimation – Microsoft Excel Solver Settings

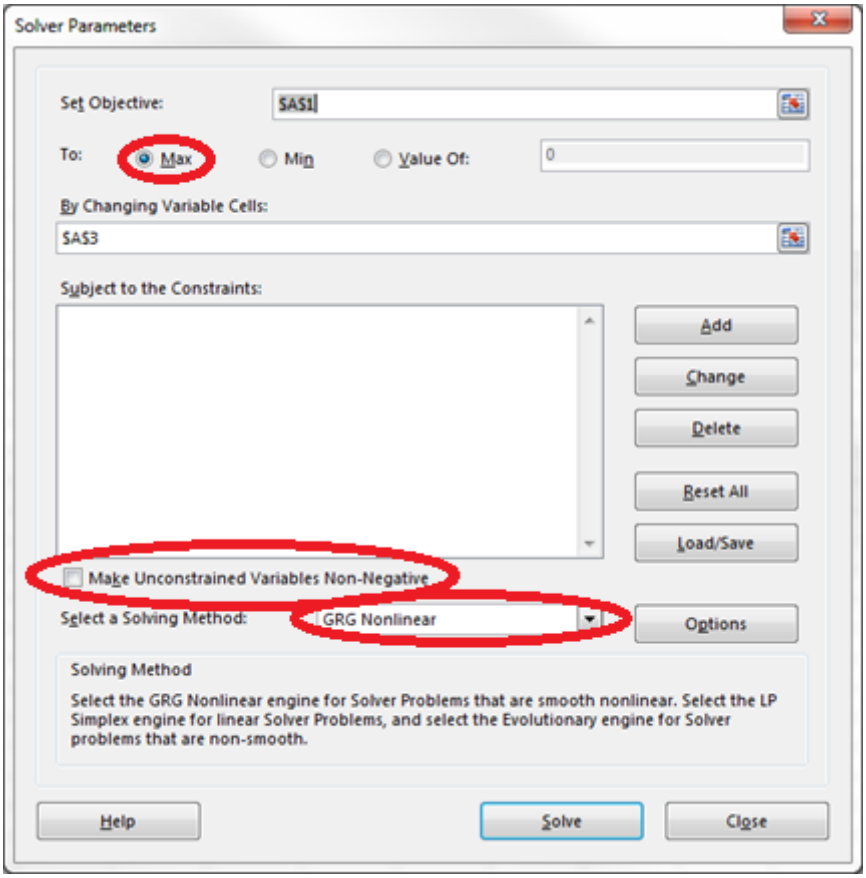
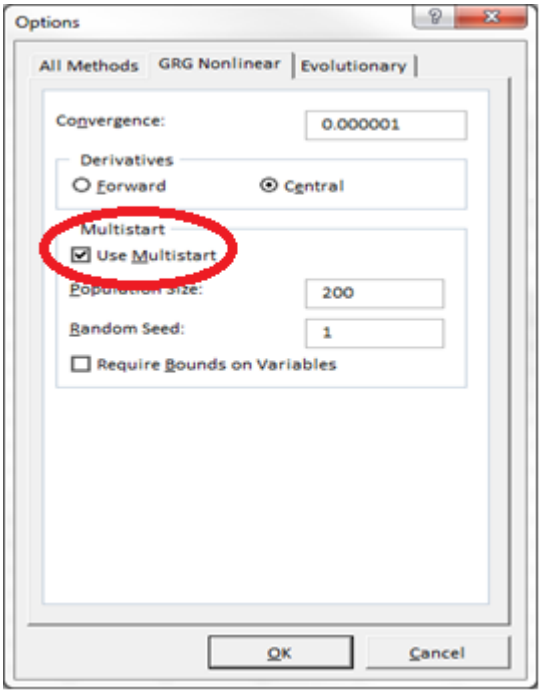


Figure 32 Microsoft Excel GRG Nonlinear Solver Settings



53. The convergence of 0.000001 is considered precise enough such that the solver will stop when the solution in the last iterations change by this amount.[1172] To ensure the peak is a global maximum (as opposed to just local) the solver carries out the optimisation from many different random starting points on the function reflected by the selection of the 'Multistart' option in Figure 32. The number of different starting points is based on the 'Population size' field and setting the 'Random seed' to 'one' ensures that the random selection process is always based on the same seed each time the solver is used. The central difference derivative method is selected for the greatest accuracy. In this case the problem is unconstrained and so no bounds are required on variables.

54. This estimation process yields a value for λ of 0.71731 which will be used as a starting value in the final fitting of the NS yield curve.[1173]

55. Starting values are still required for $\beta_{0t}, \beta_{1t}, \beta_{2t}$. These are obtained by:

- substituting the decay factor value (λ) as a constant into the terms attached to β_{1t}, $\left(\frac{1-e^{-\lambda\tau}}{\lambda\tau}\right)$ and β_{2t}, $\left(\frac{1-e^{-\lambda\tau}}{\lambda\tau}-e^{-\lambda\tau}\right)$;
- setting these terms as a function of each bond's remaining term to maturity as shown for cell L2 in Table 142, which will provide a β_{1t} weight and β_{2t} weight for every bond in the sample; and
- performing Ordinary Least Squares (**OLS**) regression using the Excel Data Analysis tools' 'Regression' function. The Excel structure for setting out the data to which the OLS regression is applied is shown in Table 148.

56. The Excel worksheet and regression settings are provided at Table 148 and Figure 33 respectively. The Y input values are the Australian dollar yield equivalents output for each bond as shown in cell R2 in Table 143. The X input values are the entire series of β_{1t} and β_{2t} weights associated with each of the bonds. Note that the 'Constant is zero' box shown in Figure 33 should be left unchecked so that an intercept term is included in the regression which will serve as a starting value for β_{0t}.

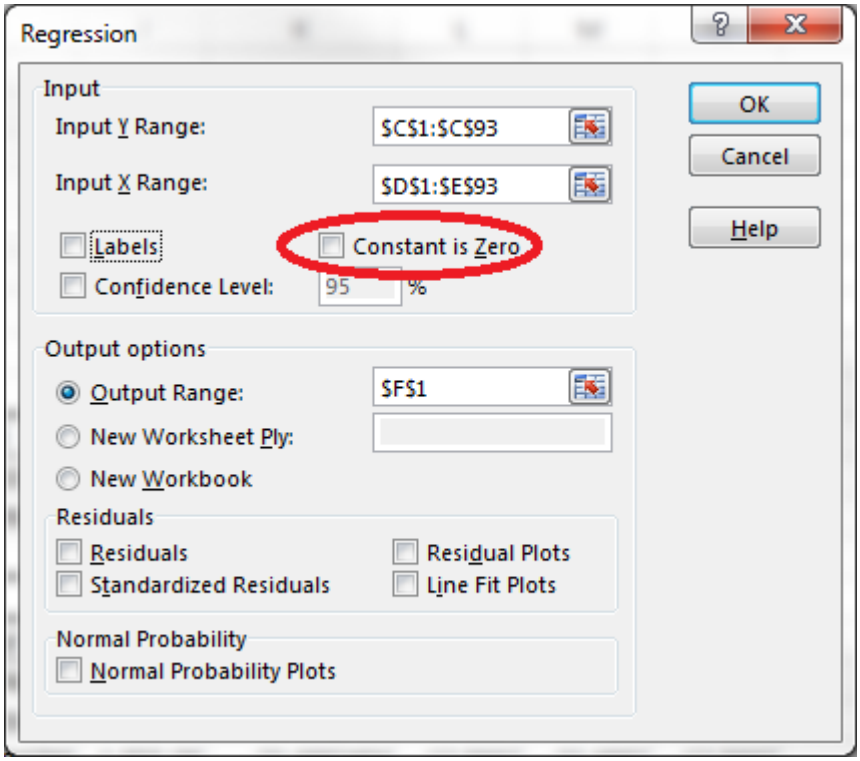
[1172] Diebold and Li (2006) published their decay method to 4 decimal places.

[1173] This solution is output in cell A3 in Table 147 once the solver has found a solution.

Table 148 Nelson Siegel Starting Value Regression – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Decay factor λ	A1	Link to solution in cell A3 in Table 147.
Maturity (τ)	B1 down	The results of from cell L2 in Table 142
Australian dollar equivalent yield	C1 down	Values in V2 down in Table 144
β_{1t} weight factor	D1 down	=((1-EXP(-$A$1*B1))/($A$1*B1))
β_{2t} weight factor	E1 down	=(((1-EXP(-$A$1*B1))/($A$1*B1))-EXP(-$A$1*B1))

Figure 33 Nelson Siegel Starting Value Regression – Microsoft Excel Regression Settings



57. The intercept, X Variable 1 and X Variable 2 that appear under the coefficients in the Excel regression output table are used respectively as the starting value estimates for β_{0t}, β_{1t} and β_{2t} in the Nelson Siegel curve fitting process while the value in cell A1 in Table 148 is used as the starting value for λ.[1174]

58. The Excel worksheet that replicates the Nelson Siegel curve fitting process is provided at Table 149.

[1174] This is output into cells G17,G18 and G19 in the example set out above.

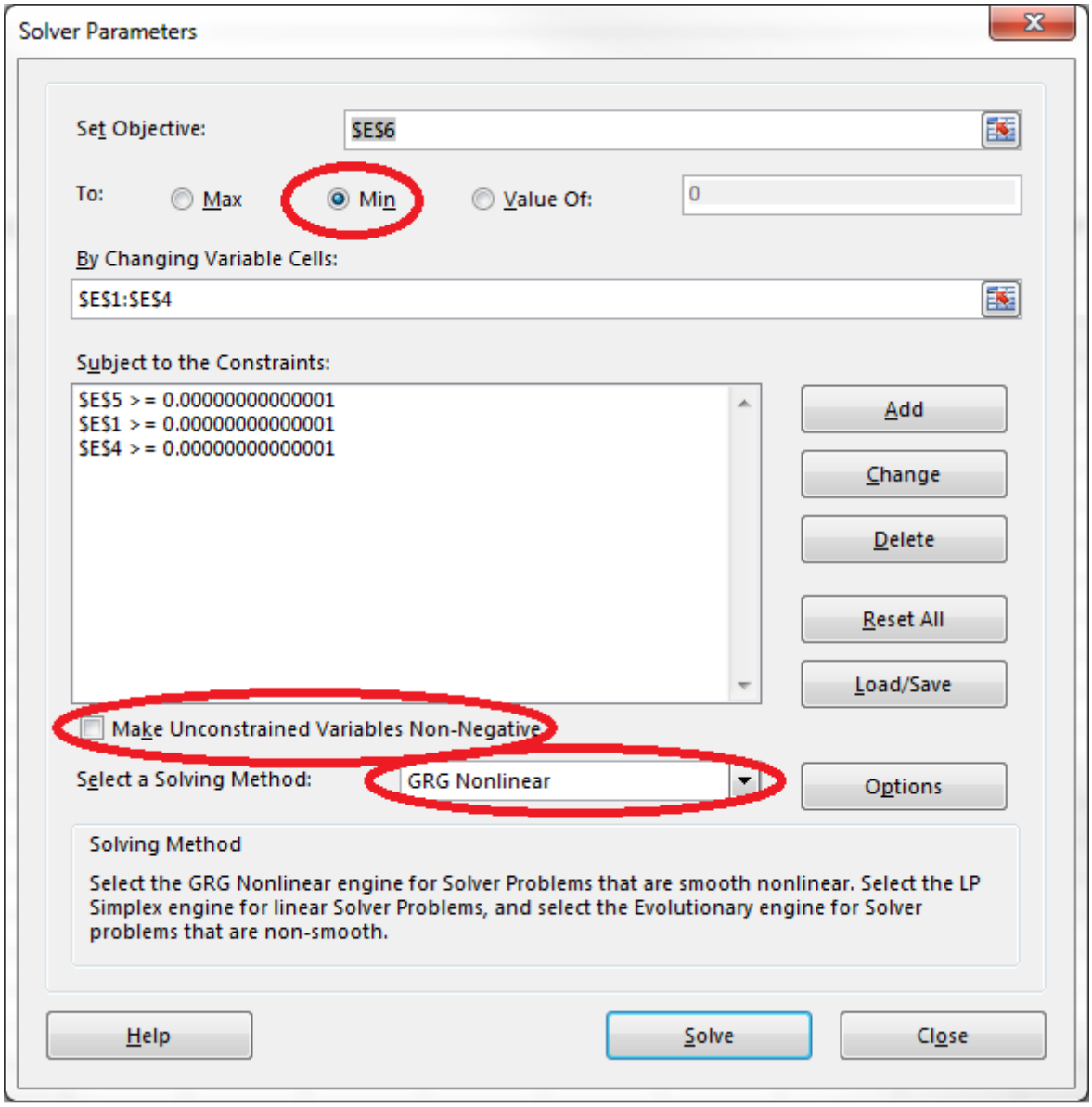
Table 149 Nelson Siegel Curve Fitting Methodology – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Remaining Term to Maturity	A1	Values as calculated by cell L2 in Table 142
Australian dollar equivalent yield	B1	Values in V2 down in Table 144
NS Functional Form	C1 down	=$E$1+$E$2*((1-EXP(-$E$4*A1))/($E$4*A1))+$E$3*(((1-EXP(-$E$4*A1))/($E$4*A1))-EXP(-$E$4*A1))
Squared Residual	D1 down	=(B1-C1)^2
β_{0t}	E1	Starting value for β_{0t} calculated above
β_{1t}	E2	Starting value for β_{1t} calculated above
β_{2t}	E3	Starting value for β_{2t} calculated above
λ	E4	Starting value for λ calculated above[1175]
$\beta_{0t}+\beta_{1t}$	E5	= E1+E2
Sum of Squared Residuals	E6	=SUM(D:D)

59. The Excel solver settings (including constraints) that are required to minimize the sum of the squared residuals at cell E6 in Table 149 (by changing the values in the cells E1 through to cell E5) are provided in Figure 34. The associated GRG Nonlinear solver settings are provided at Figure 32.

[1175] This cell is linked to the exact solution for the decay factor in order to avoid issues associated with truncating decimal places.

Figure 34 Nelson Siegel Parameter Constraints - Excel Solver Settings



60. The final solutions for $\beta_{0t}, \beta_{1t}, \beta_{2t}$ and λ in cells E1 to E4 in Table 149 must be entered back into the Nelson Siegel functional form to obtain tenor yields for 3, 5, 7 and 10 year terms.

61. The Excel Worksheet that calculates the semi-annual yields at each tenor (that is, as if bond interest payment are made every 6 months) is provided at Table 150. The additional Excel calculations that are required to annualise the output values for A2, B2, C2 and D2 in Table 150 so that it represents an effective annual interest rate at each tenor is provided in Table 151.

Table 150 Nelson Siegel Yield Estimation Methodology – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Tenor	A1:D1	Values 3, 5, 7 and 10.
3 year AUD yield (semi-annual basis)	A2	=$E1+$E2*((1-EXP(-$E4*A1))/($E4*A1))+$E3*(((1-EXP(-$E4*A1))/($E4*A1))-EXP(-$E4*A1))
5 year AUD yield (semi-annual basis)	B2	=$E1+$E2*((1-EXP(-$E4*B1))/($E4*B1))+$E3*(((1-EXP(-$E4*B1))/($E4*B1))-EXP(-$E4*B1))
7 year AUD yield (semi-annual basis)	C2	=$E1+$E2*((1-EXP(-$E4*C1))/($E4*C1))+$E3*(((1-EXP(-$E4*C1))/($E4*C1))-EXP(-$E4*C1))
10 year AUD yield (semi-annual basis)	D2	=$E1+$E2*((1-EXP(-$E4*D1))/($E4*D1))+$E3*(((1-EXP(-$E4*D1))/($E4*D1))-EXP(-$E4*D1))
β_{0t}	E1	Solution for β_{0t} output in cells E1 Table 149.
β_{1t}	E2	Solution for β_{1t} output in cells E2 Table 149.
β_{2t}	E3	Solution for β_{2t} output in cells E3 Table 149.
λ	E4	Solution for λ output in cells E4 Table 149.

Table 151 Annualising Semi-Annual Bond Yields - Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
3 year AUD yield (annual basis)	A3	=((1+A2/200)^2-1)*100
5 year AUD yield (annual basis)	B3	=((1+B2/200)^2-1)*100
7 year AUD yield (annual basis)	C3	=((1+C2/200)^2-1)*100
10 year AUD yield (annual basis)	D3	=((1+D2/200)^2-1)*100

62. The value for D3 in Table 151 is the Nelson Siegel 10 year cost of debt estimate. This value averaged with the 10 year cost of debt estimate from the other two methods is the Authority's final 10 year cost of debt estimate.

The Nelson-Siegel Svennson Methodology

63. The Nelson-Siegel Svennson Methodology assumes that the term structure of the cost of debt has the parametric form shown below:

$$\hat{y}_t(\tau) = \beta_{0t} + \beta_{1t}\left(\frac{1-e^{-\tau/\lambda_1}}{\tau/\lambda_1}\right) + \beta_{2t}\left(\frac{1-e^{-\tau/\lambda_1}}{\tau/\lambda_1} - e^{-\tau/\lambda_1}\right) + \beta_{3t}\left(\frac{1-e^{-\tau/\lambda_2}}{\tau/\lambda_2} - e^{-\tau/\lambda_2}\right)$$

Where

$y_t(\tau)$ is the yield at time t for maturity τ ; and

$\beta_{0t}, \beta_{1t}, \beta_{2t}, \beta_{3t}, \lambda_1, \lambda_2$ are the parameters of the model to be estimated from the data.

64. The Nelson-Siegel Svennson (**NSS**) methodology uses observed data from the bond market to estimate the parameters $\beta_{0t}, \beta_{1t}, \beta_{2t}, \beta_{3t}, \lambda_1$ and λ_2 by using the observed yields and maturities for bonds. A yield curve is produced by substituting these estimates into the above equation and plotting the resulting *estimated* yield $\hat{y}_t(\tau)$ by varying the maturity τ . $\hat{y}_t(\tau)$ has the interpretation of being the *estimated yield* for a benchmark bond with a maturity of τ for a given credit rating.

The NSS methodology uses two decay factors λ_1 and λ_2. At each annual update the starting values for these parameters are based on the previous years' final estimates. The first annual update will use the values 1.6416 and 4.5834 for λ_1 and λ_2 respectively. The values for these decay factors in the subsequent annual update will use the final values for the decay factors resulting from the process set out below, and so forth for the following years. An exception to this is if the previous years' yield curve estimates are determined to be non-robust as set out in Table 157. In this situation the decay factors λ_1 and λ_2 from the latest set of robust yield curve estimates will be used.

65. Starting values are still required for β_{1t}, β_{2t} and β_{3t}. These are obtained by:

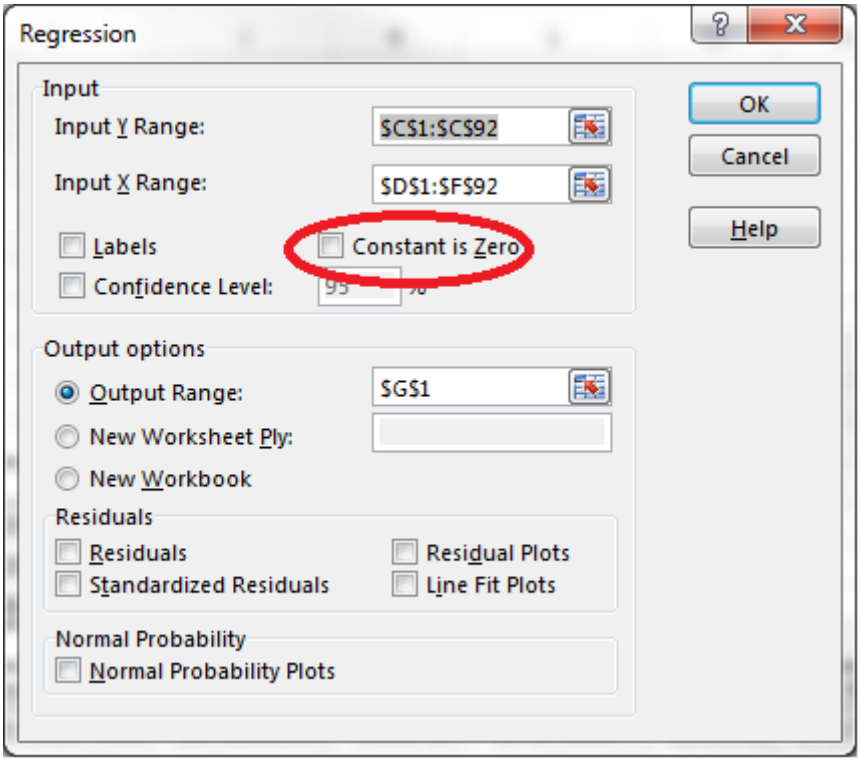
- substituting the decay factors (λ_1 and λ_2) as substitutes as constants into the terms attached to β_{1t}, $\left(\frac{1-e^{-\tau/\lambda_1}}{\tau/\lambda_1}\right)$, $\beta_{2t}\left(\frac{1-e^{-\tau/\lambda_1}}{\tau/\lambda_1} - e^{-\tau/\lambda_1}\right)$ and $\beta_{3t}\left(\frac{1-e^{-\tau/\lambda_2}}{\tau/\lambda_2} - e^{-\tau/\lambda_2}\right)$;
- setting these terms as a function of each bond's remaining term to maturity as shown for cell L2 in Table 142. This will result in a β_{1t} weight, β_{2t} weight and β_{3t} weight for every bond in the sample.
- performing an Ordinary Least Squares (**OLS**) regression is carried out using the Excel Data Analysis tools' 'Regression' function. The Excel structure for setting out the data to which the OLS regression is applied is shown in Table 152.

Table 152 Nelson Siegel Svennson Starting Value Regression – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Decay factor λ_1	A1	Last years' λ_1.
Decay factor λ_2	A2	Last years' λ_2.
Maturity (τ)	B1 down	The results of from cell L2 in Table 142
Australian dollar equivalent yield	C1 down	Values in V2 down in Table 144
β_{1t} weight factor	D1 down	=((1-EXP(-B1/$A$1))/(B1/$A$1))
β_{2t} weight factor	E1 down	=((((1-EXP(-B1/$A$1))/(B1/$A$1)))-(EXP(-B1/$A$1)))
β_{3t} weight factor	F1 down	=((((1-EXP(-B1/$A$2))/(B1/$A$2)))-(EXP(-B1/$A$2)))

66. The Excel worksheet and regression settings are provided at Table 152 and Figure 35 respectively. The Y input values are the Australian dollar yield equivalents output for each bond as shown in cell R2 in Table 143. The X input values are the entire series of β_{1t}, β_{2t} and β_{3t} weight factors associated with each of the bonds. Note that the 'Constant is zero' box shown in Figure 35 should be left unchecked so that an intercept term is included in the regression which will serve as a starting value for β_{0t}.

Figure 35 Nelson Siegel Svennson Starting Value Regression – Microsoft Excel Regression Settings



67. The intercept, X Variable 1, X Variable 2 and X Variable 3 that appear under the coefficients in the Excel regression output Table are used respectively as the starting value estimates for $\beta_{0t}, \beta_{1t}, \beta_{2t}$ and β_{3t} in the Nelson-Siegel Svennson curve fitting process while the values in cell A1 and A2 in Table 152 are used as the starting values for λ_1 and λ_2.[1176]

68. The Excel worksheet that replicates the Nelson-Siegel Svennson curve fitting process is provided at Table 153.

[1176] This is output into cells H17, H18, H19 and H20 in the example set out above.

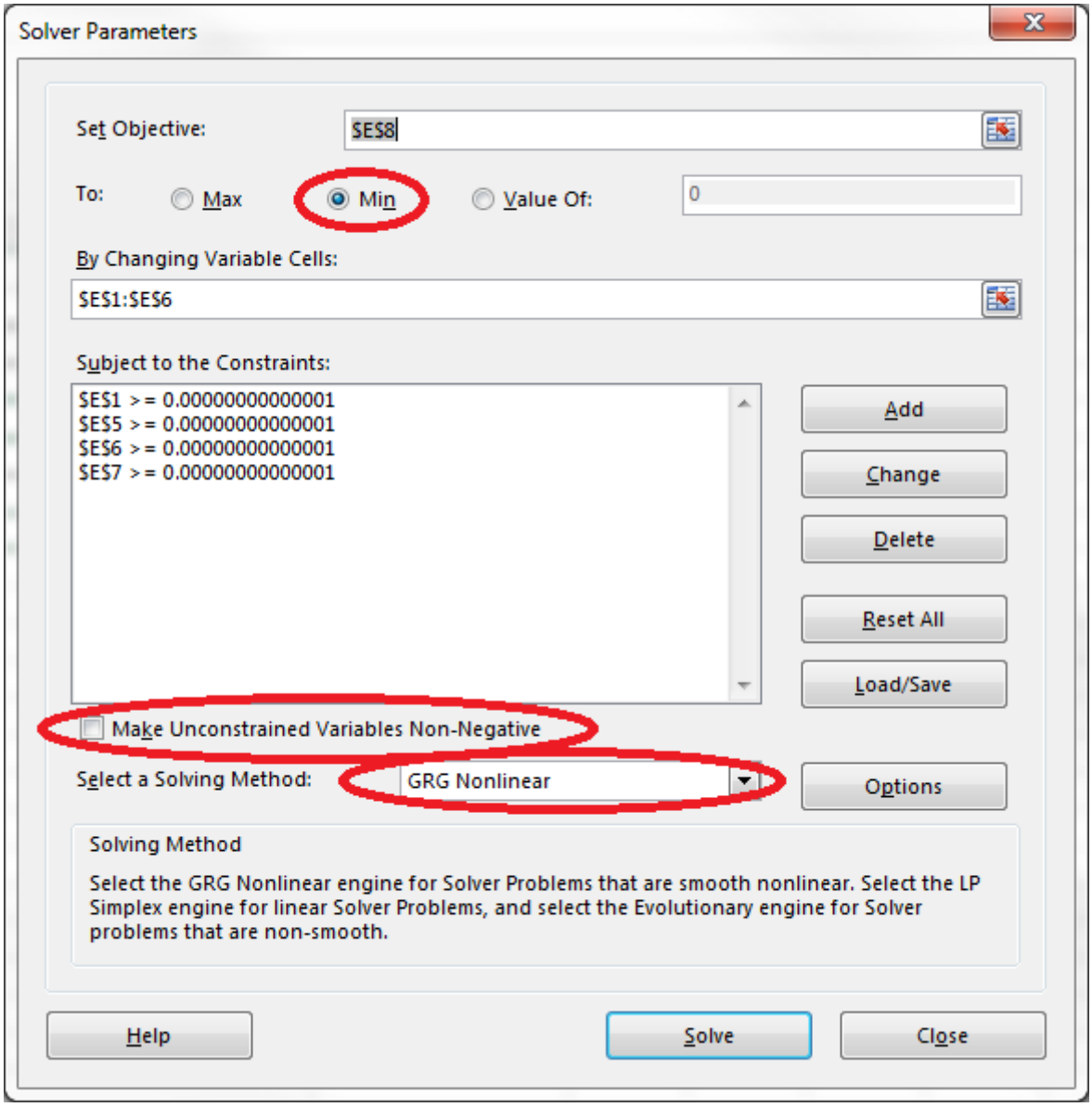
Table 153 Nelson Siegel Svennson Yield Curve Estimation Methodology – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Remaining Term to Maturity	A1	Values as calculated by cell L2 in Table 142
Australian dollar equivalent yield	B1	Values in V2 down in Table 144
NSS Functional Form	C1	=$E$1+$E$2*((1-EXP(-A1/$E$5))/(A1/$E$5))+$E$3*((((1-EXP(-A1/$E$5))/(A1/$E$5)))-(EXP(-A1/$E$5)))+$E$4*((((1-EXP(-A1/$E$6))/(A1/$E$6)))-(EXP(-A1/$E$6)))
Squared Residual	D1	=(B1-C1)^2
β_{0t}	E1	Starting value for β_{0t} calculated above
β_{1t}	E2	Starting value for β_{1t} calculated above
β_{2t}	E3	Starting value for β_{2t} calculated above
β_{3t}	E4	Starting value for β_{3t} calculated above
λ_1	E5	Last years' λ_1.
λ_2	E6	Last years' λ_2.
$\beta_{0t}+\beta_{1t}$	E7	= E1+E2
Sum of Squared Residuals	E8	=SUM(D:D)

69. The Excel solver settings (including constraints) that are required to minimize the sum of the squared residuals at cell E8 in Table 153 (by changing the values in the cells E1 through to cell E6) are provided in Figure 36. The associated GRG Nonlinear Solver Settings are provided at Figure 32.

.

Figure 36 Nelson Siegel Svennson Parameter Constraints – Microsoft Excel Solver Settings



70. The final solutions for $\beta_{0t}, \beta_{1t}, \beta_{2t}, \beta_{3t}, \lambda_1$ and λ_2 output in cells E1 to E6 in Table 153 must be entered back into the Nelson-Siegel Svennson functional form to obtain tenor yields for 3, 5, 7 and 10 year terms.

71. The Excel worksheet that calculates semi-annual yields at each tenor (that is, as if bond interest payment are made every 6 months) is provided at Table 154. The additional Excel Calculations that are required to annualise the output values for A2, B2, C2 and D2 in Table 154, so that outputs represent an effective annual interest rate at each tenor, are provided at Table 155.

Table 154 Nelson Siegel Svennson Yield Estimation Methodology – Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Tenor	A1:D1	Values 3, 5, 7 and 10.
3 year AUD yield (semi-annual basis)	A2	=$E1+$E2*((1-EXP(-A1/$E5))/(A1/$E5))+$E3*((((1-EXP(-A1/$E5))/(A1/$E5)))-(EXP(-A1/$E5)))+$E4*((((1-EXP(-A1/$E6))/(A1/$E6)))-(EXP(-A1/$E6)))
5 year AUD yield (semi-annual basis)	B2	=$E1+$E2*((1-EXP(-B1/$E5))/(B1/$E5))+$E3*((((1-EXP(-B1/$E5))/(B1/$E5)))-(EXP(-B1/$E5)))+$E4*((((1-EXP(-B1/$E6))/(B1/$E6)))-(EXP(-B1/$E6)))
7 year AUD yield (semi-annual basis)	C2	=$E1+$E2*((1-EXP(-C1/$E5))/(C1/$E5))+$E3*((((1-EXP(-C1/$E5))/(C1/$E5)))-(EXP(-C1/$E5)))+$E4*((((1-EXP(-C1/$E6))/(C1/$E6)))-(EXP(-C1/$E6)))
10 year AUD yield (semi-annual basis)	D2	=$E1+$E2*((1-EXP(-D1/$E5))/(D1/$E5))+$E3*((((1-EXP(-D1/$E5))/(D1/$E5)))-(EXP(-D1/$E5)))+$E4*((((1-EXP(-D1/$E6))/(D1/$E6)))-(EXP(-D1/$E6)))
β_{0t}	E1	Solution for β_{0t} output in cells E1 Table 153
β_{1t}	E2	Solution for β_{1t} output in cells E2 Table 153
β_{2t}	E3	Solution for β_{2t} output in cells E3 Table 153
β_{3t}	E4	Solution for β_{3t} output in cells E4 Table 153
λ_1	E5	Solution for λ_1 output in cells E5 Table 153
λ_2	E6	Solution for λ_2 output in cells E6 Table 153

Table 155 Annualising Semi-Annual Bond Yields - Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
3 year AUD yield (annual basis)	A3	=((1+A2/200)^2-1)*100
5 year AUD yield (annual basis)	B3	=((1+B2/200)^2-1)*100
7 year AUD yield (annual basis)	C3	=((1+C2/200)^2-1)*100
10 year AUD yield (annual basis)	D3	=((1+D2/200)^2-1)*100

72. The value at D3 in Table 155 is the NSS 10 year cost of debt estimate. This value averaged with the 10 year cost of debt estimate from the other two methods is the Authority's final 10 year cost of debt estimate.

Step 5: Estimate the regulatory debt risk premium

73. The annualized 10 year cost of debt estimate from each of the three methodologies provided above is averaged to arrive at the Authority's final estimate of the 10 year cost of debt. Specifically, this is the simple average of cell F4 in Table 146, D3 in Table 151 and D3 in Table 155. The DRP is then calculated as the spread between the 10 year cost of debt and the average value of the AUD 10 year IRS rate averaged over the same averaging period used for the observed AUD equivalent bond yields above. The average value of the AUD 10 year IRS rate is obtained by downloading AUD 10 year IRS rate data from Bloomberg for each of the trading days in the averaging period; calculating the average of these observations; and then annualising assuming semi-annual payments. The Excel worksheet that calculates the Authority's final estimate of the 10 year cost of debt is provided at Table 156.

Table 156 Debt Risk Premium Calculation - Microsoft Excel Template Structure

Attribute	Cell	Formula or entry
Trading day date	A1 down	dd/mm/yyyy
AUD 10 year IRS rate	B1 down	=BDH("ADSWAP10 Curncy","PX_LAST",A1,A1)
Average (20 day averaging period example)	B21	=AVERAGE(B1:B20)
Annualized average AUD 10 year IRS rate	B22	=((1+B21/100/2)^2-1)*100
10 year final cost of debt estimate	B23	=AVERAGE(Table 6!F4,Table 11!D3,Table 15!D3)[1177]
10 year DRP	B24	=B23-B22

74. The value at cell B24 in Table 156 is the Authority's final 10 year DRP estimate that is used in calculating the return on debt.

Contingency approaches to data related issues

75. In the event that there are unexpected problems with the data or results of applying the automatic formulas, the Authority will adopt the following actions outlined in Table 157.

[1177] This formula assumes that the Excel worksheets have been named after the tables outlined above. For example, Table 6 Linear Interpolation and Extrapolation of Gaussian Kernel Estimates – Microsoft Excel Template Structure is a worksheet in Excel labelled "Table 6". Table 6!F4 makes reference to cell F4 in Table 6.

Table 157 Contingency approaches to data related issues

Event	Changes to Approach
A) No bonds in the sample – resulting from the application of the bond yield approach criteria in Table 1 – have a remaining term to maturity equal to or greater than 10 years (from the last day of the nominated averaging period).	A linear extrapolation will be carried out using the formula outlined below this table. The yield inputs into that formula will be the averages of all three methods (Gaussian kernel, NS and NSS) at: • a 7 year tenor (where this means "effective tenor" when applied to the Gaussian kernel); and • at the effective tenor (where this means "effective tenor" when applied to the Gaussian kernel) that is equal to the effective tenor that results from adopting a target tenor of 10 years in the Gaussian kernel method. The effective tenor is the weighted average tenor of the sample using the Gaussian kernel weights associated with the target tenor.
B) The number of bonds in the sample result in non-robust parametric curve estimates.	Non-robust is defined as the standard deviation between each of the three yield estimates using each method (Gaussian kernel, NS and NSS reported on a semi-annual basis) being equal to or greater than 105 basis points using the '=stdev' formula in Microsoft Excel.[1178] Under this circumstance the averaging period will be extended back into the past by 20 trading day increments at a time, back from the earliest day in the averaging period. The averaging period will continue to be extended this way until the standard deviation between the three estimates falls under 105 basis points.
C) Bloomberg bond data becomes inaccessible.	The Reserve Bank of Australia (**RBA**) 'Aggregate Measures of Australian Corporate Bond Spreads and Yields' bond yield data for the BBB band credit rating will take the place of the Authority's estimates and will be extrapolated to 10 years using the equation outlined below this table.

$$y_t(10) = y_t[7] + \left(\frac{y_t[et(10)] - y_t[7]}{et(10) - 7} \right)(10 - 7)$$

Where:

$y_t[et(10)]$ is the average of all three methods estimated cost of debt (as per event A in Table 157) or the RBA's data (as per event C in Table 157).

$et(10)$ is the effective tenor resulting from the 10 year target reported by the Authority's Gaussian kernel approach (as per event A in Table 157) or that

[1178] The Authority has added further clarification on this contingency to ensure the yield estimates from the three different methods are used as inputs in the standard deviation formula.

corresponding to the effective tenor corresponding the RBA's 10 year estimate (as per event C in Table 157).

$y_t[7]$ is the average of all three methods estimated cost of debt at a 7 year tenor (as per event A in Table 157) or the RBA's data at the target tenor of 7 years (as per event C in Table 157).[1179]

Estimates prior to DRP_{2016}

76. The Reserve Bank of Australia's (**RBA**) data provides an available source of historic credit spreads for 10 year non-financial corporate bonds. The Authority has determined to adopt the RBA credit spread estimates for the historic DRP estimates – up to 31 March 2015 – for incorporation in the trailing average.[1180]

77. The RBA monthly estimates for the 10 year BBB spread (the series 'Non-financial corporate BBB-rated bonds – Spread to swap – 10 year') for the period June 2005 to March 2015 will be used for estimating the past DRP, prior to the Authority's 2 April 2015 estimate.

78. The monthly RBA estimates are interpolated to daily estimates, and a simple average of each year of daily observations is then made.

79. In this case, the DRP_t is estimated as shown below:

$$DRP_t = \frac{\sum_{D=1}^{Days\ in\ year} DRP_D}{Days\ in\ year}$$

Where

DRP_D is the DRP for day D in regulatory year t.

80. So for example:

- the average of daily DRPs for the period 1 July 2005 to 30 June 2006 provides the estimated annual DRP for 2005-06, which gives the first term DRP_t ($DRP_{2005\text{-}06}$) in the trailing average DRP estimate for 2014-15, *TA* $DRP_{2014\text{-}15}$;
  - the final term $DRP_{2014\text{-}15}$ in the trailing average DRP estimate for 2014-15, *TA* $DRP_{2014\text{-}15}$, is given by the daily interpolated RBA estimates for the period 1 July 2014 to 30 March 2015, with daily estimates for the final period of the financial year for 1 April 2015 to 30 June 2015 given by the Authority's 2 April 2015 estimate of the DRP, which is 1.982 per cent. The resulting year of daily estimates is averaged to give the DRP estimate for 2014-15 for inclusion in the

[1179] Event A requires the procedure outlined in paragraph 62 to interpolate the cost of debt at the 7 year tenor for the Authority's Gaussian kernel approach. This is not required for the NS and NSS curve 7 year estimates.

[1180] Reserve Bank of Australia, *Aggregate Measures of Australian Corporate Bond Spreads and Yields - F3*, www.rba.gov.au/statistics/tables/index.html#interest-rates, updated monthly.

trailing average estimate to apply for the six months July to December 2014;

- similarly, the average of daily DRPs for the period 1 January 2006 to 31 December 2006 provides the estimated annual DRP for 2006, which gives the first term DRP_{2006} in the trailing average DRP estimate for 2015, $TA\ DRP_{2015}$;
  - it may be noted here that given the automatic formula for the trailing average, the term DRP_{2006} in the trailing average DRP estimate for 2015 would drop out of the trailing average estimate for 2016, $TA\ DRP_{2016}$, and be automatically replaced by the term DRP_{2016} ;
  - the final term DRP_{2015} in the trailing average DRP estimate for 2015, $TA\ DRP_{2015}$, is given by the daily interpolated RBA estimates for the period 1 January 2015 to 30 March 2015, with daily estimates for the final period of the financial year for 1 April 2015 to 31 December 2015 given by the Authority's 2 April 2015 estimate of the DRP, which is 1.982 per cent. The resulting year of daily estimates is averaged to give the DRP estimate for 2015 for inclusion in the trailing average estimate to apply for calendar year 2015. This is shown in detail in the next section.

Composition of DRP estimators for the AA4 regulatory period

81. As noted above, the annual update of the trailing average debt risk premium component of the rate of return in each year of the Access Arrangement Period is to be calculated by applying the following automatic formula:

$$TA\ DRP_0 = \frac{\sum_{t=0}^{-9} DRP_t}{10}$$

Where

$TA\ DRP_0$ $TA\ DRP_0$ is the equally weighted trailing average of the DRP to apply in the following year as the annual update of the estimate used in the current year; and

DRP_t is the DRP estimated for each of the 10 regulatory years $t = 0, -1, -2\ldots, -9$.

2014-15 financial year

82. For the 2014-15 financial year estimate of the DRP (which applies in the PTRM model for the six months 1 July 2014 to 31 December 2014) the following estimates are included in the trailing average:

- t=-9: July 2005 to June 2006 : $DRP_{2005\text{-}06}$: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-8: July 2006 to June 2007 : $DRP_{2006\text{-}07}$: simple average of (interpolated daily) RBA DRP estimates for the period;

- t=-7: July 2007 to June 2008 $DRP_{2007-08}$:: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-6: July 2008 to June 2009 : $DRP_{2008-09}$: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-5: July 2009 to June 2010 : $DRP_{2009-10}$: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-4: July 2010 to June 2011 : $DRP_{2010-11}$: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-3: July 2011 to June 2012 : $DRP_{2011-12}$: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-2: July 2012 to June 2013 : $DRP_{2012-13}$: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-1: July 2013 to June 2014 : $DRP_{2013-14}$: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=0: July 2014 to June 2015 : $DRP_{2014-15}$: weighted average comprising 75% (interpolated daily) RBA DRP estimates for the period July 2014 to March 2015 and 25% the Authority's current 2 April 2015 DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate).

83. As noted above, the Authority's 2 March 2015 estimate contributes to the t=0 estimate in the 2014-15 DRP hybrid trailing average, for that period that falls after March 2015 (prior to that date, RBA actual data is available).

84. The resulting DRP_t estimates, consistent with the above, contributing to the financial year 2014-15 trailing average DRP estimate TA $DRP_{2014-15}$ for this Final Decision, which is 2.429 per cent, are published here as follows:

financial year 2005-06: $DRP_{2005-06}$: 0.631 per cent;

financial year 2006-07: $DRP_{2006-07}$: 0.976 per cent;

financial year 2007-08: $DRP_{2007-08}$: 1.816 per cent;

financial year 2008-09: $DRP_{2008-09}$: 5.525 per cent;

financial year 2009-10: $DRP_{2009-10}$: 2.509 per cent;

financial year 2010-11: $DRP_{2010-11}$: 2.005 per cent;

financial year 2011-12: $DRP_{2011-12}$: 3.000 per cent;

financial year 2012-13: $DRP_{2012-13}$: 2.988 per cent;

financial year 2013-14: $DRP_{2013-14}$: 3.016 per cent;

financial year 2014-15: $DRP_{2014-15}$: 1.825 per cent.

2015 calendar year

85. For the 2015 calendar year estimate (which apply from 1 January 2015 to 31 December 2015, before being superseded by the 1 January 2016 update), the following estimates will be included in the trailing average:

- t=-9: January to December 2006: DRP_{2006}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-8: January to December 2007: DRP_{2007}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-7: January to December 2008: DRP_{2008}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-6: January to December 2009: DRP_{2009}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-5: January to December 2010: DRP_{2010}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-4: January to December 2011: DRP_{2011}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-3: January to December 2012: DRP_{2012}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-2: January to December 2013: DRP_{2013}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=-1: January to December 2014: DRP_{2014}: simple average of (interpolated daily) RBA DRP estimates for the period;
- t=0: January to December 2015: DRP_{2015}: weighted average comprising 25% (interpolated daily) RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate).

86. As noted above, the Authority's 2 March 2015 estimate contributes to the t=0 estimate in the 2015 DRP hybrid trailing average, for that period that falls after March 2015 (prior to that date, RBA actual data is available).

87. The DRP_t estimates, consistent with the above, contributing to the calendar 2015 trailing average DRP estimate TA DRP_{2015} for this Final Decision, which is 2.502 per cent, are published here as follows:

calendar year 2006: DRP_{2006}: 0.724 per cent;

calendar year 2007: DRP_{2007}: 1.241 per cent;

calendar year 2008: DRP_{2008}: 3.489 per cent;

calendar year 2009: DRP_{2009}: 4.624 per cent;

calendar year 2010: DRP_{2010}: 2.127 per cent;

calendar year 2011: DRP_{2011}: 2.371 per cent;

calendar year 2012: DRP_{2012}: 3.172 per cent;

calendar year 2013: DRP_{2013}: 3.068 per cent;

calendar year 2014: DRP_{2014}: 2.250 per cent;

calendar year 2015: DRP_{2015}: 1.953 per cent.

2016 to 2019 calendar years

88. The first annual update will apply for the tariff variation for the 2016 calendar year. All annual updates of the debt risk premium should be determined based on the automatic formulas set out in this Appendix. The resulting annual adjustment to the rate of return should be incorporated in the relevant Annual Tariff Variation.

89. For the 2016 calendar year, the Authority will adopt the following estimators:

- t=-9: January to December 2007: DRP_{2007}: simple average of (interpolated daily) RBA DRP estimates for the period (1.241 per cent);
- t=-8: January to December 2008: DRP_{2008}: simple average of (interpolated daily) RBA DRP estimates for the period (3.489 per cent);
- t=-7: January to December 2009: DRP_{2009}: simple average of (interpolated daily) RBA DRP estimates for the period (4.624 per cent);
- t=-6: January to December 2010: DRP_{2010}: simple average of (interpolated daily) RBA DRP estimates for the period (2.127 per cent);
- t=-5: January to December 2011: DRP_{2011}: simple average of (interpolated daily) RBA DRP estimates for the period (2.371 per cent);
- t=-4: January to December 2012: DRP_{2012}: simple average of (interpolated daily) RBA DRP estimates for the period (3.172 per cent);
- t=-3: January to December 2013: DRP_{2013}: simple average of (interpolated daily) RBA DRP estimates for the period (3.068 per cent);
- t=-2: January to December 2014: DRP_{2014}: simple average of (interpolated daily) RBA DRP estimates for the period (2.250 per cent);
- t=-1: January to December 2015: DRP_{2015}: weighted average comprising 25% (interpolated daily) RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate) (1.953 per cent);
- t=0: January to December 2016: DRP_{2016}: 100% the automatic formula (t=0) DRP estimate.

90. The Authority's t=0 DRP estimate for calendar 2016 will be developed in similar fashion to the current 2 April 2015 estimate, the method and results for which were outlined above. The averaging period for the t=0 estimate would be the nominated 20 trading days in the four month window 1 July to 31 October 2015, as per the averaging period requirement.

91. For 2017, the Authority will estimate the t=0 DRP estimate, based on the nominated 20 business days in the four month window 1 July to 31 October 2016, as per the averaging period requirement. For the 2017 calendar year, the Authority will adopt the following estimators:

- t=-9: January to December 2008: DRP_{2008}: simple average of (interpolated daily) RBA DRP estimates for the period (3.489 per cent);

- t=-8: January to December 2009: DRP_{2009}: simple average of (interpolated daily) RBA DRP estimates for the period (4.624 per cent);
- t=-7: January to December 2010: DRP_{2010}: simple average of (interpolated daily) RBA DRP estimates for the period (2.127 per cent);
- t=-6: January to December 2011: DRP_{2011}: simple average of (interpolated daily) RBA DRP estimates for the period (2.371 per cent);
- t=-5: January to December 2012: DRP_{2012}: simple average of (interpolated daily) RBA DRP estimates for the period (3.172 per cent);
- t=-4: January to December 2013: DRP_{2013}: simple average of (interpolated daily) RBA DRP estimates for the period (3.068 per cent);
- t=-3: January to December 2014: DRP_{2014}: simple average of (interpolated daily) RBA DRP estimates for the period (2.250 per cent);
- t=-2: January to December 2015: DRP_{2015}: weighted average comprising 25% (interpolated daily) RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate) (1.953 per cent);
- t=-1: January to December 2016: DRP_{2016}: 100% the automatic formula (t=-1) DRP estimate;
- t=0: January to December 2017: DRP_{2017}: 100% the automatic formula (t=0) DRP estimate.

92. For 2018, the Authority will estimate the t=0 DRP estimate, based on the nominated 20 trading days in the ~~three~~ four month window 1 July to 31 October 2017, as per the averaging period requirement. For the 2018 calendar year, the Authority will adopt the following estimators:

- t=-9: January to December 2009: DRP_{2009}: simple average of (interpolated daily) RBA DRP estimates for the period (4.624 per cent);
- t=-8: January to December 2010: DRP_{2010}: simple average of (interpolated daily) RBA DRP estimates for the period (2.127 per cent);
- t=-7: January to December 2011: DRP_{2011}: simple average of (interpolated daily) RBA DRP estimates for the period (2.371 per cent);
- t=-6: January to December 2012: DRP_{2012}: simple average of (interpolated daily) RBA DRP estimates for the period (3.172 per cent);
- t=-5: January to December 2013: DRP_{2013}: simple average of (interpolated daily) RBA DRP estimates for the period (3.068 per cent);
- t=-4: January to December 2014: DRP_{2014}: simple average of (interpolated daily) RBA DRP estimates for the period (2.250 per cent);
- t=-3: January to December 2015: DRP_{2015}: weighted average comprising 25% (interpolated daily) RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate) (1.953 per cent);
- t=-2: January to December 2016: DRP_{2016}: 100% the automatic formula (t=-2) DRP estimate
- t=-1: January to December 2017: DRP_{2017}: 100% the automatic formula (t=-1) DRP estimate;

- t=0: January to December 2018: DRP_{2018}: 100% the automatic formula (t=0) DRP estimate.

93. The last annual update for the AA4 period will occur as part of the 1 January 2019 tariff variation. For 2019, the Authority will estimate the t=0 DRP estimate, based on the nominated 20 trading days in the ~~three~~ four month window 1 July to 31 October 2018, as per the averaging period requirement. For the 2019 calendar year, the Authority will adopt the following estimators:

- t=-9: January to December 2010: DRP_{2010}: simple average of (interpolated daily) RBA DRP estimates for the period (2.127 per cent);
- t=-8 January to December 2011: DRP_{2011}: simple average of (interpolated daily) RBA DRP estimates for the period (2.371 per cent);
- t=-7: January to December 2012: DRP_{2012}: simple average of (interpolated daily) RBA DRP estimates for the period (3.172 per cent);
- t=-6: January to December 2013: DRP_{2013}: simple average of (interpolated daily) RBA DRP estimates for the period (3.068 per cent);
- t=-5: January to December 2014: DRP_{2014}: simple average of (interpolated daily) RBA DRP estimates for the period (2.250 per cent);
- t=-4: January to December 2015: DRP_{2015}: weighted average comprising 25% (interpolated daily) RBA DRP estimates for the period January to March 2015 and 75% the Authority's current (t=0) DRP estimate (interpolated daily to the prior RBA 31 March 2015 estimate) (1.953 per cent);
- t=-3: January to December 2016: DRP_{2016}: 100% the automatic formula (t=-3) DRP estimate;
- t=-2: January to December 2017: DRP_{2017}: 100% the automatic formula (t=-2) DRP estimate;
- t=-1: January to December 2018: DRP_{2018}: 100% the automatic formula (t=-1) DRP estimate;
- t=0: January to December 2019: DRP_{2019}: 100% the automatic formula (t=0) DRP estimate.

Appendix 9 Modelling depreciation outcomes to 2080

1. The Authority in the Draft Decision considered that ATCO's proposed Historic Cost Accounting (**HCA**) approach, combined with the proposed transition approach, is not consistent with the criteria in rule 89(1)(a) of the NGR.

2. ATCO's argument was that the HCA approach minimises the extent of departure – over the long run to 2080 – from the purported declining LRMC trend. ATCO's consultant NERA maintained that its indicative modelling to 2080 demonstrated that nominal HCA depreciation will be more 'flat' than the Current Cost Accounting (**CCA**) approach, leaving less of a gap to an argued declining LRMC over the longer term.

3. The Authority in the Draft Decision examined the revenue and LRMC claims to 2080 made by NERA associated with the HCA and CCA depreciation approaches for ATCO's network. The Authority concluded that NERA's modelling was flawed, and therefore that NERA's claims with regard to the CCA approach were not supported, because:

   - a realistic portrayal of future revenue to 2080 shows that the average revenue per GJ is declining over time under both depreciation approaches, implying that the long run marginal revenue must be declining under both approaches; and
   - evidence relating to the trend for the LRMC of gas services does not support the conclusion that it will decline strongly in future, but is likely to remain close to flat in real terms.

4. ATCO in response continues to maintain that the non-indexed HCA approach will, over the longer term, be less divergent from LRMC than an indexed CCA approach. ATCO's consultant NERA revised its modelling, concluding that the non-indexed approach still minimises the gap between the change in unit price per GJ and the indicative LRMC trend, in constant prices. Having regard to NERA's analysis, ATCO still considers that the non-indexed approach best promotes efficient growth in the market for reference services.

5. ATCO considers that the Authority's indicative 2080 modelling revisions in the Draft Decision fall into error from the commencement of the fourth access arrangement period onwards. NERA believes Authority's model is in need of revision such that the volume forecast used to derive average prices is commensurate with the level of capital expenditure used to derive the annual revenue requirement in each year.

Accounting for changes since the Draft Decision

6. The Authority has significantly increased the forecast capital expenditure for the AA4 period in this Final Decision, as compared to the Draft Decision.

7. To account for that, the Authority has revised the indicative modelling comparing the two depreciation approaches out to 2080. The revised modelling:

   - accounts for the revised forecast capital expenditure, customer numbers, average consumption per customer and volumes for the 2014 to 2019 period that is included in this Final Decision;
   - accounts for the rate of return adopted for this Final Decision over the period 2014 to 2019, but thereafter adopts a long run estimate of the expected rate of

return, of 9.4 per cent for the period 2020 to 2080 (which is consistent with the Wright return on equity estimated at paragraph 1354);[1181].

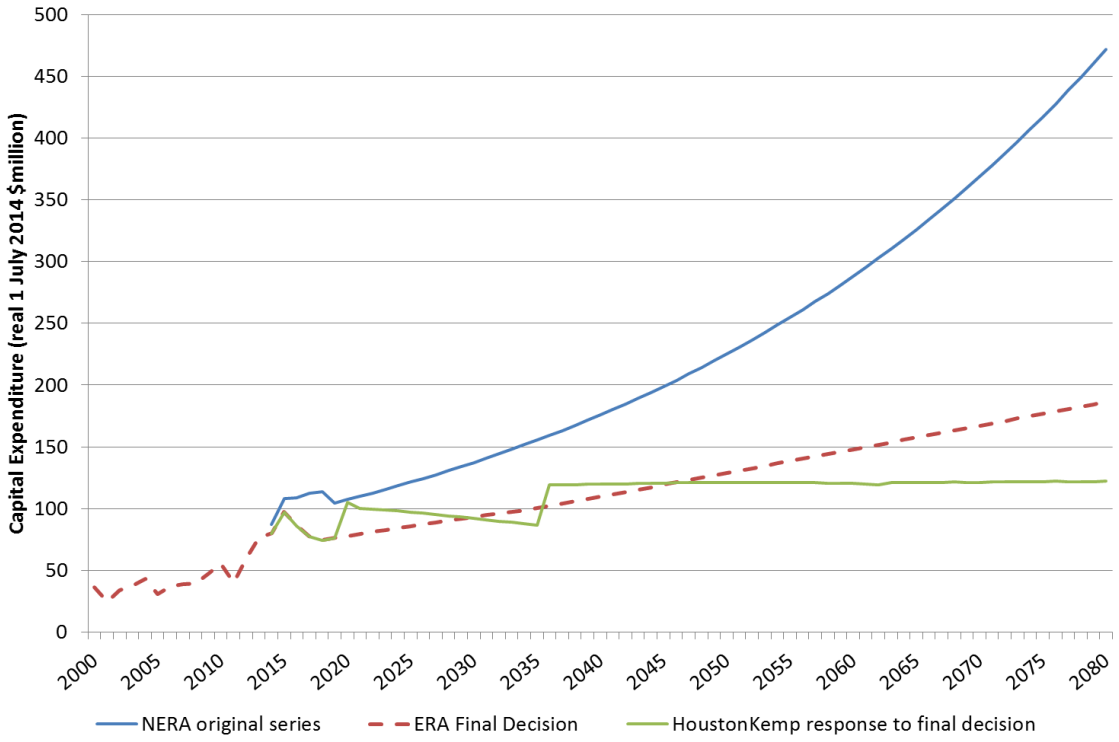
- revises the estimate of tax depreciation and debt shield to account for the lower level of capital expenditure as compared to NERA's original modelling;
- grows customer numbers and new capital expenditure from 2020 on at a trend rate that is consistent with the Australian Bureau of Statistics (**ABS**) B series population projections;
- continues the trends apparent in customer consumption, with B3 customers' average consumption falling to 11 GJ per B3 customer by 2036, then remaining steady thereafter;[1182] and
- achieves volume growth that is in line with the assumptions for capital expenditure and customer connections, as well as expected further declines in average consumption.

8. The resulting capital expenditure per connection is now marginally increased (the last column in Table 98 in the main body of the text above), reflecting the higher base at 2019 from which the capital expenditure is grown from 2020 to 2080 (Figure 37). The capital expenditure growth rate in the Authority series post 2020 tails off slowly in line with expectations for slowing population growth in the ABS series (and hence does not exhibit exponential growth, unlike the NERA original series).

[1181] The long run estimate for the WACC is based on the Wright long run return on equity of 11.48 per cent, an assumed long run BBB debt risk premium of 2.1% (the average from the RBA's available BBB credit spread series), and a long run real average risk free rate of 10 year bonds of 2.4 per cent from the Brailsford, Handley and Maheswaran data series (1883 to 2014 updated), which is then made nominal by assuming expected future inflation of 2.5 per cent. This is for heuristic purposes only for the very long run period out to 2080.

[1182] The downward trend is truncated at 2036, as the Authority is uncertain as to the very long term trend for average consumption.

Figure 37 Projected capital expenditure



Source: ERA estimates; NERA/HoustonKemp modelling

9. Summary outcomes for population, connections, capital expenditure and volumes in the Authority's revised modelling are shown in Table 158.

Table 158 Connections, capital expenditure and volumes for the depreciation heuristic to 2080 (per cent per annum)

	2001-2009 (actual)	2010-2019 (forecast)	2020-2080 (projected)
Population	2.00%	2.48%	1.55%
Connections	4.11%	2.18%	1.47%
Capital expenditure (real)	3.73%	6.94%	1.47%
Volumes[a]	2.39%	1.79%	0.85%

Notes a) The Authority has adjusted the volume estimates for this amended Final Decision to correct an error in the series. The series on which the growth rates are based combines the actual historic, forecast and projected volumes *excluding prudent discounts*. This aligns with the growth rates reported for connections (which here also exclude connections for those customers receiving prudent discounts).[1183]

Source *ERA analysis*

[1183] The Authority notes that prior to 2010, the 'excluding prudent discounts' series provides for a more realistic reflection of connections and volume growth. Over the period 2005 to 2014 the number of

10. HoustonKemp provided a further response to the Authority's points above as part of ATCO's submission on the proposed changes to the Final Decision.[1184] HoustonKemp now appears to accept that its claims with regard to capital expenditure were erroneous. HoustonKemp has accepted the Authority's modelling, albeit with one key change – it has adjusted the projected capital expenditure over the period 2020 to 2080 to be almost constant in real terms (Figure 37). The Authority considers that given the indicative nature of the modelling to 2080, there are limited differences between HoustonKemp's capital expenditure and the Authority's capital expenditure set out in Figure 37, with the exception perhaps past 2050 or so, where the HoustonKemp estimates appear low.

11. That said, the Authority considers that HoustonKemp's use of the growth rate in new connections to inform capital expenditure growth from 2020 has the effect of clustering capital expenditure around 2020 and 2036, as may be observed in Figure 37. HoustonKemp's approach is unhelpful on two counts. First, 'new growth' capex is only around 40 per cent of total capex, with the rest mainly 'sustaining' capex, required to maintain the existing network, so adopting the Houston Kemp method will overemphasise fluctuations in capital expenditure that are driven by fluctuations in the new connections numbers. Second, related to those fluctuations, there are challenges aligning the *forecasts* to 2019 with the *projections* which start in 2020, given the constraints of the model (particularly the interactions between population, connections, the declining trend in average annual consumption, and volumes).

12. A result is that new connections jumped by 38 per cent in 2020 in the Final Decision modelling – a point which HoustonKemp highlight.[1185] HoustonKemp's capital expenditure then jumps by 38 per cent in 2020. In response, the Authority has smoothed this 2020 conjunction in the modelling (see the next section below). However, it remains true that such a focus on a single particular year in such indicative modelling is unhelpful. What is more important is that new connections achieve their long run growth projection of around 0.5 per cent on average from 2020 through to 2080, as occurs in the Authority's modelling. At the same time, growing capex smoothly in line with the long term trend in total connections – allowing for *both* sustaining and growth investment – is a more sensible approach.[1186]

Average revenue per GJ

13. Average revenue per GJ outcomes under the two approaches – revised to address the changes set out above – shows that the CCA approach delivers a higher revenue per GJ in the later years compared to HCA (Figure 38). At the same time, the HCA approach results in a significant relative increase in revenue in the near term.

---

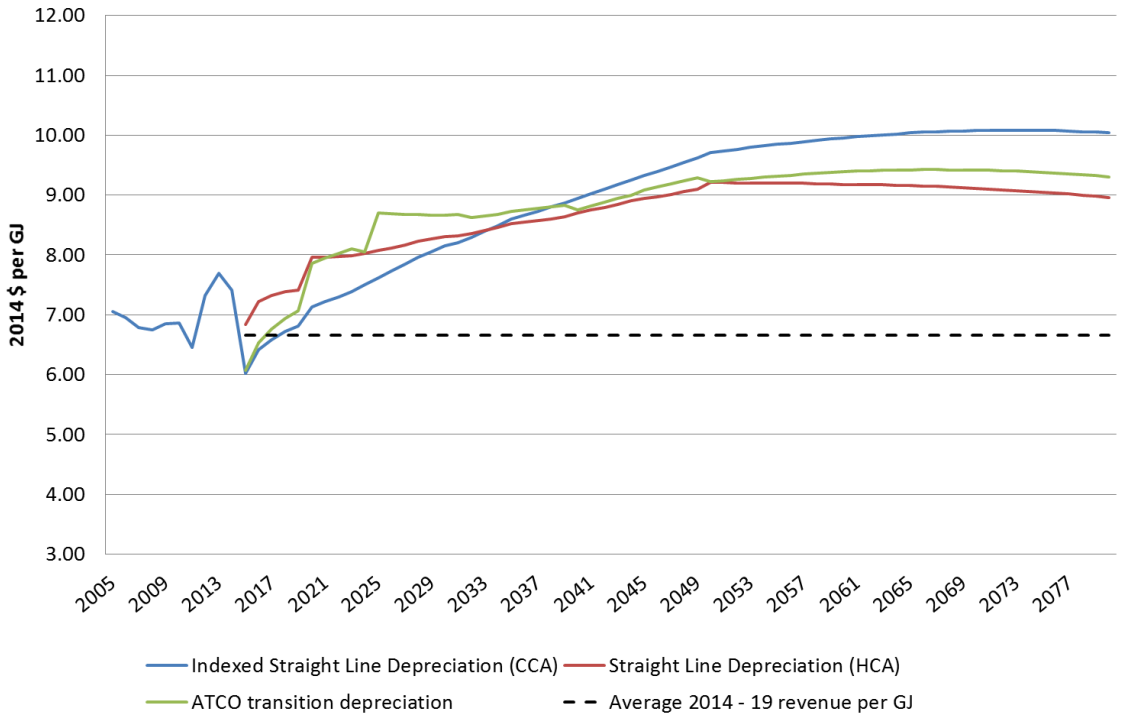
customers receiving prudent discounts declined markedly, as did associated volumes. It should also be noted that prudent discounts are subtracted from revenue for the purpose of setting reference tariffs.

1184 ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision, 31 August 2015*, Attachment.

1185 ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision, 31 August 2015*, Attachment., p. 18.[1186] Sustaining capital growth is likely to become proportionately more important in capital expenditure in future under the assumptions of the modelling, given the slowing in population growth and hence in connections over the period to 2020 to 2080.

1186 Sustaining capital growth is likely to become proportionately more important in capital expenditure in future under the assumptions of the modelling, given the slowing in population growth and hence in connections over the period to 2020 to 2080.

Figure 38 Average revenue per GJ, constant prices



Note The figure is adjusted for changes to the WACC and volumes consistent with this amended Final Decision. In particular, the volume estimates are corrected for an error in the series – the series on which the volume growth rates are based now combines the actual historic, forecast and projected volumes *excluding prudent discounts*. This aligns with the growth rates reported for connections, which also exclude customers receiving prudent discounts.[1187] The volume series also has been smoothed to ameliorate step changes around 2020 and 2036.

Source ERA analysis

14. The change in the slope of the curves – from downward sloping in the Draft Decision to upward sloping here – is the result of the significant increase in the allowed 2019 capital expenditure base. The outcomes in Figure 38 are sensitive to this base, and to the average capital expenditure per connection over the period 2020 to 2080, which has now increased substantially, as may be observed from the last column in Table 98. The Authority considers that this sensitivity demonstrates the highly indicative nature of the long run estimates. In this context, the Authority notes that the analysis does not take into account any changes in trends in capital contributions, which may change the capital requirements of any future growth in the network.

15. Notwithstanding those caveats, it may be observed that long run *average* revenue per GJ under the current assumptions is clearly rising (Figure 38). This is being driven by an apparent increase in the capital costs per GJ, which combined with the declining average consumption per customer in the model, results in a significant

[1187] The Authority notes that prior to 2010, the 'excluding prudent discounts' series provides for a more realistic reflection of connection and volume growth. Over the period 2005 to 2014 the number of customers receiving prudent discounts declined markedly, as did associated volumes. It also may be noted that prudent discounts are subtracted from revenue for the purpose of setting reference tariffs.

increase in long run average costs. The increase in long run average revenue reflects the increasing long run average cost.[1188] A higher residual fixed cost per connection is being recouped from a proportionately smaller number of GJ's over time.

16. Given that average cost is rising in the long run, it follows that long run marginal cost per GJ must also be above average cost by construction. In this regulatory context, long run marginal cost will include all the overall costs of providing the additional supply of GJ, including the additional capital required to deliver the additional GJs over the long run.

17. The Authority notes that HoustonKemp has not responded to this point in its comments responding to the Final Decision. Instead, HoustonKemp places reliance on a comparison of the indicative projected long run average revenue per GJ with an inferred flat LRMC reflected in the ABS data for the Electricity, gas and water industry (see Figure 41 below). With regard to average incremental costs from the indicative modelling – as an indicator for LRMC – HoustonKemp selects highly specific periods to suggest that this supports the ABS data regarding LRMC, ignoring the clear underlying rising trends in LRMC from the modelling. This is discussed in more detail in what follows.

18. Aligning the trend in prices with long run marginal costs is important for effective long term capital planning by the utility.

19. As noted above, long run marginal cost includes both operating costs and capital costs, given that in the long run, all inputs to production are variable. Various approaches to measuring LRMC are available, including:[1189]

- marginal incremental costs – following Turvey's perturbation method, the change in the present worth of the next increment in capacity investment divided by the change in demand required to implement that capacity;
- average incremental costs – defined as the net present value of total costs divided by the net present value of the increased capacity; and
- long run incremental costs – a capital annuity divided by the change in capacity.

20. In line with the trends in Figure 38, analysis by the Authority confirms that average incremental costs per GJ (**AIC**, the second approach outlined above) in the long run model are rising (Table 159).[1190] It follows that LRMC is rising.

1188 The long run average costs are recouped through average revenue given the regulatory requirement that the service provider be able to recover efficient costs. Hence the long run average revenue curves in Figure 38 mirror long run average costs exactly.

1189 Marsden Jacobs Associates, *Estimation of Long Run Marginal Cost*, 3 November 2004, p. 10.

1190 Average incremental cost provides for a simple means to estimate LRMC. Average incremental cost is given by the net present value of the incremental costs of increased capacity (for example the required capex and incremental opex), divided by the net present value of the incremental output (in this case, the increase in GJ capacity over the base) (see Marsden Jacobs Associates, *Estimation of Long Run Marginal Cost*, 3 November 2004, p. 13).

Table 159 Long run marginal costs per GJ for specified periods (real 2014 $ per 'incremental' GJ)

	2006 - 2019	2020 - 2035	2036 - 2080
Average incremental capacity (capital expenditure) cost per GJ	26	110	32
Average incremental operating cost per GJ	6	102	74
Average incremental capacity cost (capital expenditure) plus marginal operating cost per GJ	31	212	106

Notes Relevant real costs and volumes for each specified period were discounted back to 2014 net present terms using the long run real WACC (see paragraph 7).

The table is adjusted for changes to the WACC and volumes consistent with this amended Final Decision. The volume estimates are corrected for an error in the series – the series on which the volume growth rates are based combines the actual historic, forecast and projected volumes *excluding prudent discounts*. This aligns with the growth rates reported for connections, which also exclude customers receiving prudent discounts.[1191] The volume series has also been smoothed to ameliorate step changes around 2020 and 2036.

Source *ERA analysis*

21. The inference is then that the rising trend in average revenue per GJ portrayed in Figure 38 also are reflective of the rising LRMC trend.[1192]

22. HoustonKemp in its further response to the Authority's points above submits that:[1193]

- LRMC is forward looking, and therefore cannot be considered prior to 2015;
- average incremental costs can only be considered over similar length periods;
- correcting for this, adopting the periods 2015 to 2036, 2037 to 2058, and 2059 to 2080 indicates the LRMC 'is likely to 'decrease markedly from 2015 onwards' (Figure 39).[1194]

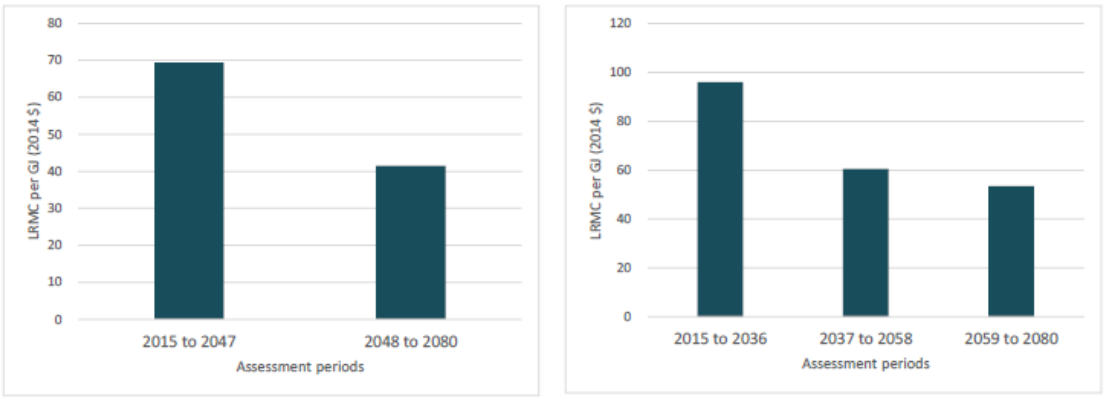
[1191] The Authority notes that prior to 2010, the 'excluding prudent discounts' series provides for a more realistic reflection of connection and volume growth. Over the period 2005 to 2014 the number of customers receiving prudent declined markedly, as did associated volumes. It may be noted that prudent discounts are subtracted from revenue for the purpose of setting reference tariffs.

[1192] Under particular conditions, it can be shown that long run average prices (average revenue) and LRMC are linked. The relationship is closer, the more incremental (less lumpy) are the capital investments required to increase capacity (see D. Biggar, *An exploration of NERA's proposed approach to estimating long run marginal cost*, 27 January 2012, p. 11).

[1193] ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision, 31 August 2015*, Attachment, p. 29.

[1194] ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision, 31 August 2015*, Attachment, p. 22.

Figure 39 HoustonKemp's estimates of LRMC per GJ using the AIC method



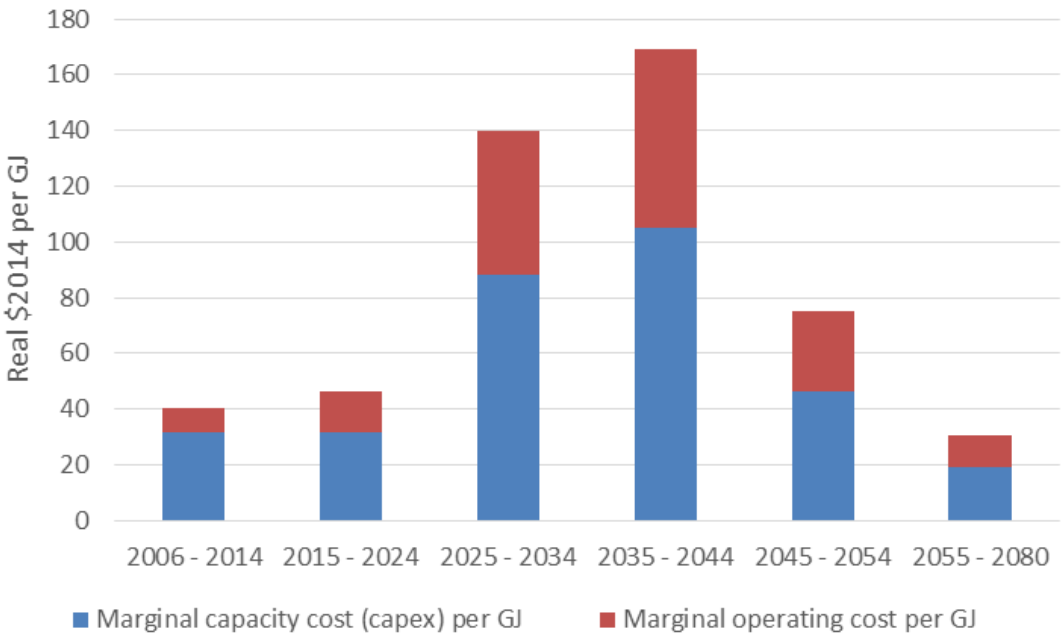
Source ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision*, 31 August 2015, Attachment, p. 29.

23. However, the Authority considers that it is equally valid to look forward to the trend in LRMC from the perspective of a historic year, as it did in the Final Decision.[1195] To truncate the AIC analysis, by ignoring previous average incremental costs, is not instructive as to the emerging trends in LRMC during the current access arrangement period and the next.

24. Second, the Authority considers that HoustonKemp has been highly selective in its choice of periods to illustrate 'relative stability'. Analysis by the Authority shows that LRMC is rising strongly over the period to around 2050, consistent with the trends in average revenue per GJ over that period (compare the results in Figure 38 and Figure 40). The Authority places most emphasis on the 'near' term to 2050, rather than 2080, as the indicative modelling is likely to be more credible in that timeframe. The data is strongly supportive of steeply rising average revenue per GJ and LRMC. On that basis, the Authority concludes that the CCA depreciation approach will meet the requirements of the NGR and NGO, as it will align average revenue with LRMC, whereas ATCO's proposed transition to the HCA approach will not.

[1195] The Authority does not agree with HoustonKemp that the periods of the AIC analysis must be identical, as the analysis provides averages derived from ratios of costs per unit. However, the Authority has calculated equal ten year blocks to 2054 to show that this is not an issue for its analysis (see Figure 40).

Figure 40 Additional Authority estimates of LRMC using the AIC method (real 2014 $ per 'incremental' GJ)



Source ERA analysis

25. Third, the Authority does not agree with HoustonKemp when it states:[1196]

> In other words, the transition approach and indexed straight line depreciation give rise to similar prices from 2015 to 2025, and so, to the extent relevant, the transition approach alleviates the effect of any short term price shocks associated with adopting straight line depreciation. Further, we note that the higher rate of return applied by the Authority from 2020 onwards, as compared with the 2014 to 2019 period, is a significant contributor to the higher average prices from 2020 to 2024.

26. Rather, the outcomes illustrated here are not sensitive to the rate of return. Applying the rate of return from this amended Final Decision (6.02 per cent) from 2020 to 2080 still results in the revenue requirement for ATCO's proposed transition being 8 per cent higher over the fifth access arrangement period 2020 to 2024 than the CCA depreciation method. It is 11 per cent in the sixth access arrangement period.[1197] This is likely to result in a very significant price shock in the next two access arrangement periods.

27. The Authority considers that as the LRMC of a delivered GJ is rising, a sharp rise in average revenue in the period 2020 to 2050 is reflective of the sharp increase in LRMC. This sharp increase is more consistent with the CCA depreciation approach, as compared to ATCO's proposed transition approach. It follows that CCA depreciation will assist in signalling efficient investment, expansion and growth in the network in the medium to long run, with the increasing long run average revenue assisting to offset the sharp increases in LRMC of network service provision.

1196 ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision, 31 August 2015*, Attachment, p. 35.

1197 Recall that the use of the long run WACC post 2020 raises revenue under ATCO's proposed transition approach by close to 10 per cent over the fifth and sixth access arrangement periods (see paragraph 2053 in the main body of text).

28. Furthermore, with apparent rising LRMC per GJ, the CCA depreciation approach allocates capital costs more evenly between customers present and future, providing for recovery of capital costs that is more equitable for all customers.

29. The HCA depreciation approach, on the other hand, drags forward revenue in real terms from the future to the present. The Authority remains of the view that this is not in the long run interests of all customers, given the resulting implicit subsidy from one group of customers to another. In addition, it is likely to dissuade efficient capital investment in the medium to long term, given the sharply rising LRMC. This will not result in efficient growth in the market for reference services.

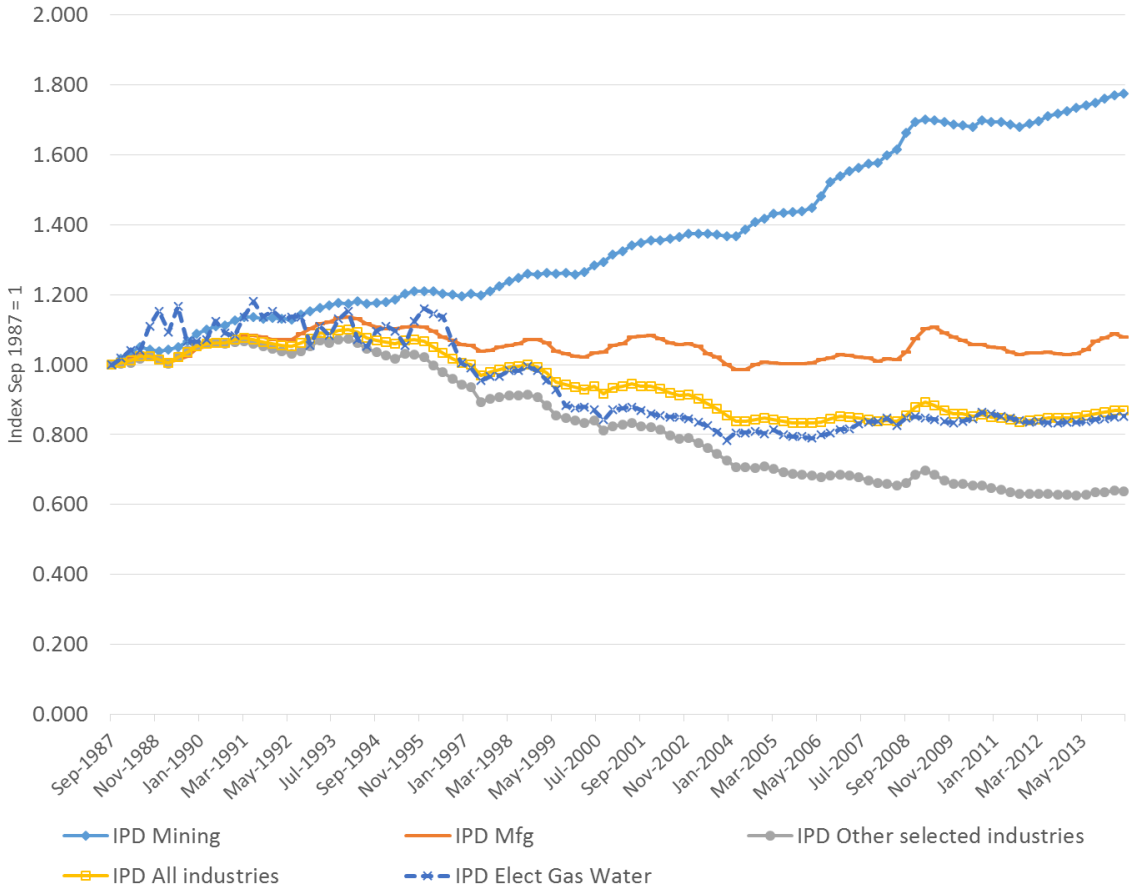
Average revenue per connection

30. At the same time, the CCA approach remains preferred for signalling efficient connection. Despite declining average consumption, new customers continue to connect to gas. A connection provides access to an alternative, competitive source of energy services. In line with the foregoing paragraphs, the long run marginal cost of connection will reflect the overall cost of developing the network and connecting additional customers.

31. With that in mind, the Authority examined the average revenue per connection.

32. First, the Authority expects that the long run marginal cost of connection is likely to remain flat or perhaps slightly rising in real terms, given the recent trends in the long run capital costs of the industry (Figure 41). The evidence on the long run price of capital for the Electricity, gas and water industry is mixed. While there was a concerted downward trend in the price deflator in the period 1995 to 2003, this will have reflected the productivity gains unlocked by the microeconomic reform of the industry during that period. Since that time the trend has reverted to that seen prior to 1995, with a flat to slightly rising capital implicit price deflator, which diverges away from that of Other selected industries. When combined with rising wage outcomes for the industry, as noted by NERA, this suggests that the overall trend for the Electricity, gas, water and waste price index, and hence its long run marginal cost, is flat or perhaps even slightly increasing.

Figure 41 Capital implicit price deflators (IPD), by industry, 1987 to 2014



Note: IPD is Implicit Price Deflator

Source: ERA estimates, informed by ABS catalogue 5625.0 tables 2A and 3b, as well as unpublished ABS chain volume estimates for capital expenditure for the Electricity, gas, water and waste industries.

33. Second, this expectation for flat to rising costs per connection is confirmed by the rising trend in the actual marginal costs of connection, as represented by the average incremental costs of connection (Table 160).

34. The flat to rising trend in LRMC over the medium to long term to 2050 is confirmed by breaking down the LRMC per connection estimates from Table 160 over 10 year periods (Figure 42).[1198] Again, the Authority considers that the 'nearer' periods out to 2050 are likely to be more reflective of outcomes for the future, given the very long periods involved and the resulting indicative nature of the modelling.

35. In line with this flat to rising trend in the long run marginal cost, the long run average revenue per connection under the CCA depreciation approach is relatively flat over time, whereas ATCO's proposed transitional approach declines significantly (Figure 43).

[1198] As noted above, the Authority does not agree with HoustonKemp that LRMC cannot be estimated on a forward looking basis from a point in the past, such as 2006, as is estimated here (see ATCO, *Re: ATCO Gas Australia submission on ERA's proposed amendments to the Final Decision*, 31 August 2015, Attachment, p. 15). It is simply the point from which one looks forward.

Table 160 Long run marginal costs per connection for specified periods (real 2014 $ per 'incremental' connection)

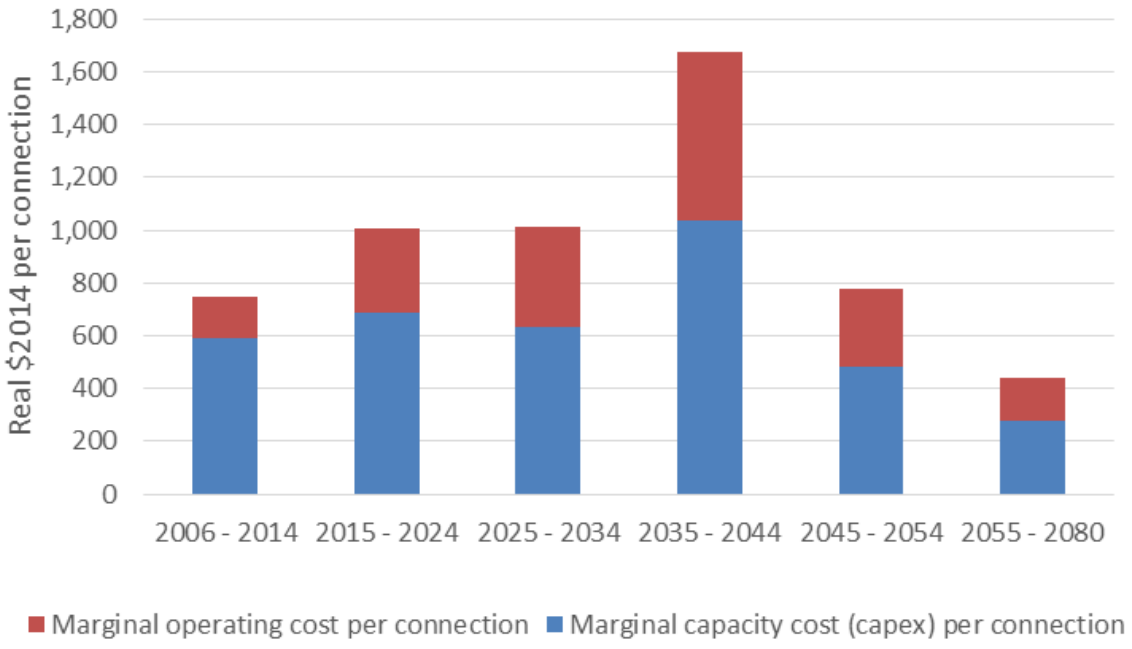
	2005 - 2019	2020 - 2035	2036 - 2080
Average incremental capacity (capital expenditure) cost per connection	557	805	422
Average incremental operating cost per connection	119	743	975
Average incremental capacity cost (capital expenditure) plus marginal operating cost per connection	676	1549	1396

Notes: Relevant nominal costs and connections for each specified period were discounted back to 2014 net present terms using the long run real WACC (see paragraph 7).

The table is adjusted for changes to the WACC and to the connection numbers in this amended Final Decision. The connection estimates are corrected to smooth the series around 2020, thereby reducing an anomalous jump between the fourth access arrangement forecast connections (at 2019) and the projected connections (at 2020 and then to 2080).

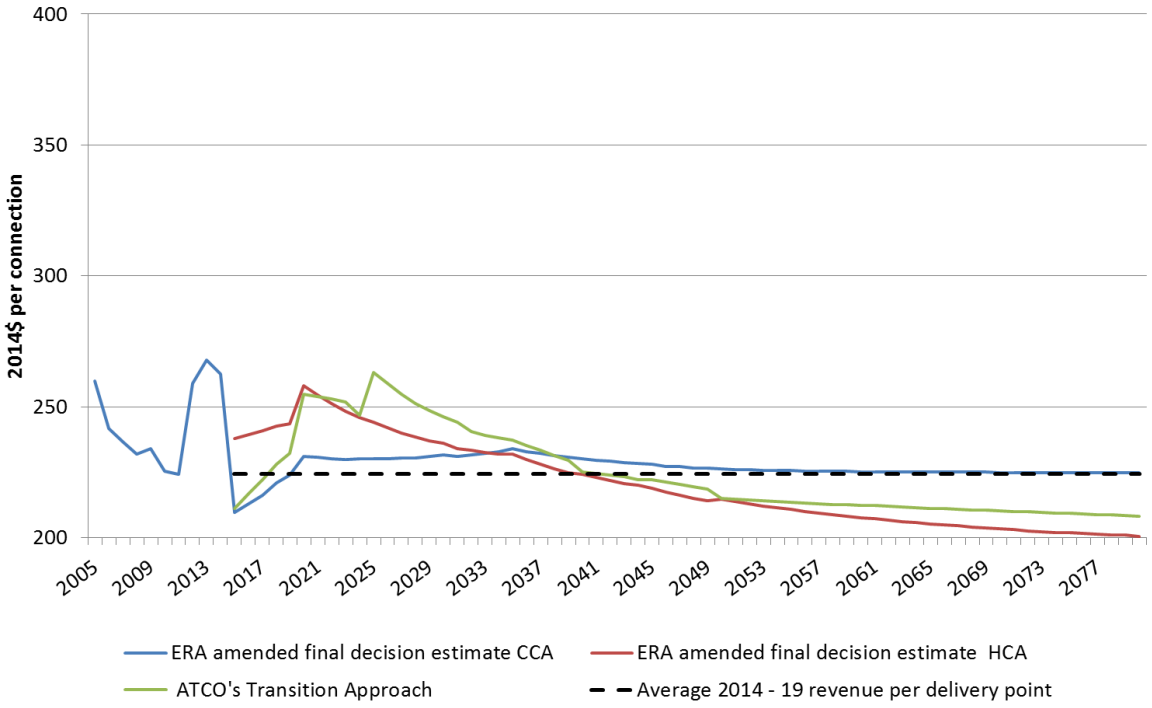
Source *ERA analysis*

Figure 42 Additional Authority estimates of LRMC using the AIC method (real 2014 $ per 'incremental' connection)



Source *ERA analysis*

Figure 43 Average revenue per connection, constant prices



Source ERA analysis

36. The effect of HCA in dragging forward revenue from the future to the present is clearly illustrated in Figure 43. This results in a declining average revenue per connection over time, which is not consistent with the flat to rising LRMC of connections. The increasing gap may dissuade efficient capital investment in the medium to long term, given the rising LRMC. Depreciation cash flow dragged forward to the current time may not be available to cover the cost of future expansions in the network, which may then become uneconomic. HCA, therefore, is also not consistent with the requirements of the NGR 89, as it is less likely to achieve efficient growth in the market for reference services than the CCA approach.

37. Dragging forward revenues from future rising connection costs to the present, as occurs under the HCA depreciation approach, is also not in the long term interests of consumers, current or future. As noted in the Draft Decision, it has the effect of current consumers subsidising future consumers.

Appendix 10 Public Reference Tariff Model

This appendix is published as a separate publication on the ERA's website.