Revised decision of the Economic Regulation Authority's access arrangement for the Mid-West and South-West Gas Distribution Systems

Revised following order of the Australian Competition Tribunal

25 October 2016

Economic Regulation Authority
WESTERN AUSTRALIA

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Introduction

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 Systems (**GDS**) to the Economic Regulation Authority (**Authority**) for approval. The Authority published these documents on its website.[1]

2. The Authority undertook its assessment in accordance with the requirements in the National Gas Law (**NGL**) and National Gas Rules (**NGR**) as implemented in Western Australia by the *National Gas Access (Western Australia) Act 2009* (**NGL (WA)**).

3. The Authority issued its Draft Decision regarding ATCO's proposed access arrangement revisions on 14 October 2014. The Draft Decision listed 45 Required Amendments for ATCO to make to its proposed access arrangement revisions to enable the Authority to approve the proposed access arrangement revisions

4. On 27 November 2014, ATCO submitted to the Authority an amended version of its proposed access arrangement revisions for the GDS (herein referred to as the **revised proposal**), as allowed by rule 60(1) of the NGR, together with an amended access arrangement. On 23 December 2014, ATCO submitted a corrected version of its revised proposal 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.[2] 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.

5. On 30 June 2015, the Authority issued its Final Decision regarding ATCO's revised proposal. The Final Decision of the Authority was to not approve ATCO's revised proposal. As a consequence of not approving ATCO's revised proposal, the Authority was required to propose its own revisions to the access arrangement for the GDS.

6. On 21 August 2015, the Authority issued a public notice inviting interested parties to make submissions on proposed amendments to the Final Decision.

7. Following consultation, the Authority made amendments to the Final Decision it published on 30 June 2015, pursuant to clause 20 of schedule 2 to the NGL (WA). The Authority published the resulting Amended Final Decision on 10 September 2015. The Authority also published its Access Arrangement Decision for the GDS, revisions to the access arrangement and access arrangement information for the GDS on the same date. The Access Arrangement Decision for the GDS, being a reviewable regulatory decision and pursuant to rule 64(6) of the NGR, set the date of 1 October 2015 for the revisions to the access arrangement to take effect.

8. The Authority published minor corrections to its Access Arrangement on 29 September 2015.

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

9. On 1 October 2015 ATCO made an application to the Australian Competition Tribunal (**Tribunal)** for leave to appeal the Access Arrangement Decision made by the Authority on 10 September 2015. The application was referenced as ACT 10 of 2015.

10. On 1 December 2015, the Tribunal granted leave to ATCO to apply for a review of the Access Arrangement Decision made by the Authority.

11. The hearing of those applications took place in February 2016 and April 2016 and the Tribunal delivered its written reasons for the application on 13 July 2016 (**Tribunal's Determination**).

12. In the application made by ATCO (ACT 10 of 2015), the Tribunal determined that:

    1) Pursuant to s 259(2)(c) of the *National Gas Access (Western Australia) Law* ('**NGL**'), the *Final Decision on Proposed Revisions to the Access Arrangement Decision for the Mid-West and South-West Gas Distribution System*, including appendices published on 10 September 2015 ('**Amended Final Decision**'), and the *Economic Regulation Authority's Revised Access Arrangement Decision for the Mid-West and South-West Gas Distribution System'*, including appendices ('**Access Arrangement Decision**'), are set aside and remitted to the Economic Regulation Authority ('**ERA**') to make the decisions again in accordance with the following directions:

        a) the ERA is to decide the constituent components of the Amended Final Decision and Access Arrangement Decision that involve the estimated cost of corporate income tax (gamma) by reference to a gamma of 0.25; and

        b) the ERA is to consider, and to the extent appropriate, to vary interrelated constituent components of the Amended Final Decision and Access Arrangement Decision, having regard to s 28(1)(b)(iii) of the NGL, where necessary in light of variations made to the Amended Final Decision and Access Arrangement Decision by reason of sub-para (a) above.

13. By this decision the Authority gives effect to the Tribunal's Determination and remakes its Access Arrangement Decision as directed by the Tribunal. The Authority has published a revised tariff model at Appendix 1 to this decision, which calculates the financial impact of this decision on tariffs.

Authority's Access Arrangement Revisions

Legislative Requirements

14. Rule 64 of the NGR states:

    (1) If, in an access arrangement final decision, the [*Authority*] refuses to approve an access arrangement proposal (other than a variation proposal), the [*Authority*] must itself propose an access arrangement or revisions to the access arrangement (as the case requires) for the relevant pipeline.

    …

    (2) The [Authority's] proposal for an access arrangement or revisions is to be formulated with regard to:

        (a) the matters that the Law requires an access arrangement to include; and

        (b) the service provider's access arrangement proposal; and

        (c) the [Authority's] reasons for refusing to approve that proposal.

(3) The [Authority] may (but is not obliged to) consult on its proposal.

(4) The [Authority] must, within 2 months after the access arrangement final decision, make a decision giving effect to its proposal.

(5) When the [Authority] makes a decision under this rule, it must:

(a) give a copy of the decision to the service provider; and

(b) publish the decision on the [Authority's] website and make it available for inspection, during business hours, at the [Authority's] public offices.

(6) The access arrangement or the revisions to which the decision relates takes effect on a date fixed in the determination or, if no date is so fixed, 10 business days after the date of the decision.

Decision

15. Pursuant to rule 62(2) of the NGR, the Amended Final Decision published on 10 September 2015 was to refuse to approve ATCO's revised proposal.

16. As a consequence of the Amended Final Decision, the Authority proposed revisions to the access arrangement for the GDS as required by rule 64(1) of the NGR. The Authority's access arrangement was given effect by the Access Arrangement Decision published on 10 September 2015.

17. In accordance with the Tribunal's Determination and pursuant to its directions, the Authority has re-made its Access Arrangement Decision by this document. The Authority's decision is to not approve ATCO's revised proposal. The Authority's reasons are set out in the Amended Final Decision published on 10 September 2015 and revised to the extent set out in this decision.

18. The Authority provided ATCO 10 business days to comment on a draft revised reference tariff model and proposed amendments to the Access Arrangement. ATCO responded by providing feedback on the model and a report from Frontier Economics on the relationship between gamma and the market risk premium. The Authority's consideration of ATCO's response has been incorporated into this decision.

19. Pursuant to this decision, the Authority has amended its revisions to the access arrangement for the GDS. The access arrangement as amended in accordance with the Tribunal's Determination, which the Authority proposes to give effect to by this decision, is available on the ERA's website.

20. The Authority has also revised its access arrangement information as a result of implementing the directions as set out in the Tribunal's Determination. The access arrangement information is available on the ERA's website.

21. Pursuant to rule 64(6) of the NGR, the amendments to the access arrangement for the GDS will take effect on and from 1 January 2017. Reference tariffs up until 31 December 2016 remain as published. However, the reference tariffs to take effect from 1 January 2017 account for the changes as though they had applied from 1 July 2014, so as to ensure that ATCO is no better or worse off, on a net present value basis.

Gamma

22. Pursuant to order 1(a) of the Tribunal's Determination in ATCO's application, the Authority has revised the Access Arrangement Decision using a gamma (imputation or franking credit value, γ) of 0.25 in place of the previously determined value of 0.40.

23. As outlined in paragraph 12, the Authority must vary interrelated constituent components of the Access Arrangement Decision, having regard to s.28(1)(b)(iii) of the NGL(WA).

24. The constituent components of the Decision are the 'building blocks' contributing to the net present value of revenue over the access arrangement period. Rule 76 of the NGR states:

> 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.

25. The change in gamma affects;

- NGR 76 (c) – the estimated cost of corporate income tax; and
- NGR 76 (a) – the return on the projected capital base.

Impact on the cost of corporate income tax

26. Gamma (γ) influences building block (c) – the estimated cost of corporate income tax for the year – directly, in the post-tax revenue model. The estimated cost of corporate income tax, and the value of imputation credits, are reflected in the model's cash flows – consistent with Rule 87A of the NGR:

> 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.

27. Revenue recovered through tariffs includes the service provider's modelled tax expense. Gamma represents the value of a partial rebate of this tax expense to investors through their tax returns. This rebate reduces the tax expense that needs to be recovered by the service provider because the investor is receiving it from the taxation office. Reducing gamma from 0.4 to 0.25 reduces the value of the rebate. The reduced value of the rebate thereby increases the tax expense that needs to be recovered by the service provider. Holding all other factors constant, this will increase the revenue required by the service provider and hence tariffs.

28. The dollar impact of gamma on the cost of corporate income tax is shown in the eighth row of Table 6.

Impact on the rate of return

29. Gamma is also inter-related with building block (a) – the rate of return on the capital base (paragraph 24).

30. The rate of return on the capital base is comprised of three yield streams for investors:

- dividends
- capital gains
- imputation credits

31. The Authority estimates the rate of return utilising the Sharpe Lintner Capital Asset Pricing Model (**CAPM**):

$$E_t(R_i) = R_{F,t} + \beta_i \times MRP_t$$

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.

32. The revenue yield for investors, relating to imputation credits, is accounted for in the estimate of the market risk premium (**MRP**). In calculating the MRP for the Amended Final Decision, the Authority supplemented the observed market estimate of the MRP with the yield associated with the value of imputation credits.[3] In the Amended Final Decision, the Authority explicitly used a gamma of 0.4 as an input to the MRP estimate.

[3] Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, pp. 253-254.

33. The process of supplementing the MRP estimate with the yield associated with the value of imputation credits is referred to as 'grossing up'. It is achieved by adjusting the dividend yield observed in the market.[4] The formula used for grossing up dividend yields is as follows:[5]

$$E[D_t] = E[d_t] \times \left(1 + \rho \times \left(\frac{T}{1-T}\right) \times \theta\right)$$

where

d_t is the dividend in year t

ρ is the proportion of dividends which are fully franked

D_t is the grossed up cash dividend in year t

T is the corporate tax prevailing in that year

θ is the value of distributed imputation credits consistent with the Authority's estimate of gamma.

34. Gamma represents the value Australian equity market participants attach to imputation credits. A higher value results in a higher imputation credit value, higher yield and thus higher 'grossed up' (that is, accounting for gamma) MRP. Conversely, a lower gamma results in a lower imputation credit value, lower yield and thus lower grossed up MRP. It follows that with a lower value for gamma – pursuant to the Tribunal's orders – the estimate of the MRP will be lower, the overall rate of return lower, and the revenue related to the rate of return on capital also lower. This lower revenue offsets, to a degree, the increased revenue flowing in the estimate of corporate taxation, outlined above.

35. As outlined in paragraph 18, ATCO submitted a response on the revisions to the market risk premium resulting from the reduction in gamma and theta. It proposed that the market risk premium should remain unchanged from the Amended Final Decision at 7.6 per cent. The Authority did not accept the arguments submitted by ATCO and its consultant. The Authority's reasoning is explained in Appendix 2.

Estimating the MRP

36. The forward looking MRP for input to the Sharpe Lintner CAPM is unobservable. The Authority therefore accounted for a range of information in the Amended Final Decision in order to estimate the MRP. That information included a range for the:

- MRP that reflected historic excess returns above the risk free rate. This was conditioned with variables that indicate risk expectations over the regulatory period, including interest rate spreads, market volatility, as well as current expectations for dividend yields; and
- forward looking MRP based on the Dividend Growth Model (**DGM**).

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[4] Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, pp. 233-255.

[5] Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, p. 254.

Historic excess returns

37. The range for the MRP utilising the historic data was based on two alternate methods:

- the Ibbotson approach – which averages the 'grossed up' MRP calculated for each historic year; and
- the Wright approach – which determines an average of the 'grossed up' return on equity over the historic period, then subtracts from that average the current risk free rate, so as to give an estimate of the 'grossed up' MRP.

The Ibbotson estimate of the MRP

38. Table 1 below was used to establish the Ibbotson lower bound for the estimate of the MRP in the ATCO Amended Final Decision. This table drew on long run historical Australian stock market return data sourced from Brailsford, Handley and Maheswaran and from NERA Consulting. For the Amended Final Decision, it was extended out to 2014, using data from the Reserve Bank of Australia, Bloomberg and the Australian Bureau of Statistics, consistent with the methodology outlined in Brailsford, Handley and Maheswaran's 2012 study. As noted above, the Ibbotson approach calculates the MRP for each individual historic year, by subtracting the historic risk free rate from the historic market return on equity, *before* averaging the resulting yearly MRP observations.

Table 1 Long run historical MRP Averages based on the Ibbotson approach: Amended Final Decision

Ibbotson MRP	Arithmetic			Geometric		
	NERA	BHM	**Average**	NERA	BHM	**Average**
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 and Maheswaran (2012), NERA (2013), Reserve Bank of Australia, Bloomberg, Australian Bureau of Statistics and ERA Analysis

39. For the Amended Final Decision, the Authority used the average of the lowest *arithmetic* mean of 5.8 per cent (column 3 of Table 1) and the highest *geometric* mean of 5.2 per cent (column 5 of Table 1) to arrive at the lower bound of 5.5 per cent. These estimates incorporated a 'grossing up' of historic dividends, utilising the Authority's gamma estimate of 0.4.

40. The results of amending the estimates to account for a gamma of 0.25 as an input, pursuant to the Tribunal's orders, are shown in Table 2.

Table 2 Long run historical MRP Averages based on the Ibbotson approach: Revised for gamma of 0.25

Ibbotson MRP	Arithmetic			Geometric		
	NERA	BHM	**Average**	NERA	BHM	**Average**
1883-2014	6.5%	6.3%	**6.4%**	5.1%	5.0%	**5.0%**
1937-2014	6.0%	6.1%	**6.1%**	4.1%	4.1%	**4.1%**
1958-2014	6.5%	6.5%	**6.5%**	4.0%	4.0%	**4.0%**
1980-2014	6.0%	6.0%	**6.0%**	3.6%	3.6%	**3.6%**
1988-2014	5.4%	5.4%	**5.4%**	3.6%	3.6%	**3.6%**

Source: Brailsford, Handley and Maheswaran (2012), NERA (2013), Reserve Bank of Australia, Bloomberg, Australian Bureau of Statistics and ERA Analysis

41. Applying the same approach used in the Final Decision, the minimum arithmetic mean with gamma of 0.25 is 5.4 per cent (column 3 of Table 2). The maximum geometric mean is 5.1 per cent (column 5 of Table 2). The average of these two values is 5.3 per cent when rounded to one decimal place. Rounding to one decimal place was applied in the Amended Final Decision methodology.

42. However, in the process of this revision, the Authority has become aware that the original calculations underlying this table contained an error. The error pertained to the calculation of the MRP based on the NERA data. The error resulted in a 20 basis point increase in both the 1883-2014 arithmetic and geometric mean MRP estimates (to see the increase, compare the values in row 3, columns 2, 4, 5 and 7, in Table 2 above to the corresponding corrected entries in Table 3 below). The increase in the *arithmetic* mean from 6.5 to 6.7 per cent makes no difference to the remitted MRP estimate because the methodology applied in the Amended Final Decision only used the *minimum* of the arithmetic means (1988-2014 values given in row 7 of Table 3) – which is unchanged after accounting for the error at 5.4 per cent (Table 3). The increase in the geometric mean, however, results in an increase in the maximum geometric mean MRP from 5.1 per cent (row 3, column 5 of Table 2) to 5.3 per cent (row 3, column 5 of Table 3).

Table 3 Long run historical MRP Averages based on the Ibbotson approach: Revised for gamma of 0.25 and error corrected

Ibbotson MRP	Arithmetic			Geometric		
	NERA	BHM	**Average**	NERA	BHM	**Average**
1883-2014	6.7%	6.3%	**6.5%***	5.3%	5.0%	**5.1%**
1937-2014	6.0%	6.1%	**6.1%**	4.1%	4.1%	**4.1%**
1958-2014	6.5%	6.5%	**6.5%**	4.0%	4.0%	**4.0%**
1980-2014	6.0%	6.0%	**6.0%**	3.6%	3.6%	**3.6%**
1988-2014	5.4%	5.4%	**5.4%**	3.6%	3.6%	**3.6%**

Source: Brailsford, Handley and Maheswaran (2012), NERA (2013), Reserve Bank of Australia, Bloomberg, Australian Bureau of Statistics and ERA Analysis

43. The average of the minimum and maximum based on these error corrected figures (5.4 per cent and 5.3 per cent respectively for arithmetic and geometric) is 5.4 per cent when rounded to 1 decimal place as per the methodology applied in the Amended Final Decision. This figure of 5.4 per cent therefore forms the lower bound for the revised historic MRP range. That is 0.1 per cent lower than the 5.5 per cent lower bound of the Amended Final Decision.

The Wright estimate of the MRP

44. The revised Wright estimate of the MRP, based on the historical data, gamma of 0.25 and correction of the identified error, is 8.8 per cent. The calculations contributing to this resulting historic upper bound are outlined in Table 4 below. The revised figure compares to the Final Decision estimate of 8.9 per cent, which was based on a gamma of 0.4.

Table 4 Long run historical MRP based on the Wright approach: Revised for gamma of 0.25 and error corrected

Wright MRP	NERA	BHM	Average
Nominal returns excluding imputation (1883-2014)	12.00%	11.64%	11.82%
Grossed up nominal returns (1883-2014)	12.12%	11.76%	11.94%
Grossed up real returns (1883-2014)	8.88%	8.52%	8.70%
Expected Inflation	1.90%	1.90%	1.90%
Grossed up nominal return on equity (1883-2014)	10.94%	10.58%	10.76%
5 year Risk Free Rate of Return	1.96%	1.96%	1.96%
Market Risk Premium	**8.98%**	**8.62%**	**8.80%**

Source: Brailsford, Handley and Maheswaran (2012), NERA (2013), Reserve Bank of Australia, Bloomberg, Australian Bureau of Statistics and ERA Analysis

The DGM estimate of the MRP

45. The value of imputation credits affects the 'grossed up' value of the dividend yield contributing to the DGM estimate of the MRP. The lower value for gamma, pursuant to the Tribunal's orders, reduces the 'grossed up' dividend yield. Reducing the (grossed up) value of the dividends reduces the estimated value of 'k', the return on equity implied by the DGM.[6]

46. The DGM range in the Amended Final Decision was 5.6 per cent to 9.7 per cent, which was judged as being consistent with a gamma of 0.4. It may be noted that:

- the lower bound of the DGM range was estimated consistent with a franking proportion of 0.75;[7] with

[6] For example, k is calculated in the Authority's DGM, which is based on the 'two stage' formula, as follows:

$$P_0 = \frac{m \text{ x } D_0}{(1+k)^{m/2}} + \sum_{t=1}^{N} \frac{E(D_t)}{(1+k)^{m+t-0.5}} + \frac{\frac{E(D_N)(1+g)}{k-g}}{(1+k)^{m+N-0.5}}$$

where:

P_0 is current price the of the equity index;

m is the fraction of the current year remaining;

D_0 is the grossed up dividend per share reported for the current year;

$E(D_t)$ is the grossed up 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.

[7] This aligns with Brailsford, Handley and Maheswaran's (2008) approach, where the authors note that 'we assume dividends are, on average, 75 per cent franked at the current year's statutory tax rate'

- the associated theta assumption of 0.55.[8]

47. Reducing gamma to 0.25 in typical DGM studies, all other things equal, has been estimated to reduce the associated MRP estimates by as much as 50 basis points.[9]

48. The implications of a reduced gamma in the DGM model are that each of the dividend forecasts needs to be readjusted to incorporate the reduced value of gamma. The formula in paragraph 33 is used to carry out this adjustment.

49. Applying the reduced theta in this formula consistent with the revised gamma decreases the Authority's March 2015 two stage estimate by around 30 basis points.[10]

50. It follows that – on the basis that the estimated return on equity is lower and the estimate of the risk free rate does not change – the estimate of the MRP will be lower, by as much as 50 basis points.

Adjusting the estimate of the MRP

51. In the Amended Final Decision, the 'Ibbotson' based lower bound and 'Wright' based upper bound for the *historical* MRP range was 5.5 to 8.9 per cent.[11] Based on the calculations set out above, the revised range for the MRP is 5.4 per cent to 8.8 per cent.

52. The DGM range in the Amended Final Decision was 5.6 per cent to 9.7 per cent. The revised range is estimated to be some 30 to 50 basis points lower at either bound. The mid-point of the DGM range, which was 7.7 per cent, is therefore now lower, around 7.4 per cent.

53. In the Amended Final Decision, the Authority first considered the mid-point of the historic range, which was 7.2 per cent.[12] That mid-point has now declined by 0.1 per cent, to 7.1 per cent.

54. The Authority then considered that: [13]

- the conditioning data,[14] 'taken together, suggest that the forward looking MRP should be somewhat above the mid-point estimate using historical data on risk premium';

(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). Brailsford, Handley and Maheswaran also assumed that franking credits were 100 per cent distributed.

8 Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, Table 16, p. 157.

9 DBP, *Proposed Revisions DBNGP Access Arrangement 2016 – 2020 Regulatory Period Supporting Submission: 60 Response to the Australian Competition Tribunal Decisions*, 22 March 2016, Appendix A, p. 22.

10 Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, p. 258. Also see footnote 8 above.

11 Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, p. 260.

12 Ibid, p. 268.

13 Ibid, p. 268.

14 The 'conditioning data' were time series of the:

- the range for the MRP should be somewhat higher than the mid-point estimate using historic data, given the range for the DGM estimates, although the Authority recognised that the DGM estimates exhibit upward bias.

55. The Authority also noted that ATCO had proposed the forward looking MRP of 7.6 per cent.

56. On balance of the foregoing, the Authority considers that it would have chosen an estimate of the MRP of 7.5 per cent at the time of its decision.[15] This revision accounts for the information utilised at the time of the Amended Final Decision, including the revised estimates from the historic data and from the DGM.

57. The Authority considers that this revised estimate of 7.5 per cent is supported by the following calculation, which demonstrates consistency with the Amended Final Decision:

- The previous MRP of 7.6 per cent was 62 per cent across the 'spread' of the historic estimates' range of 5.5 per cent to 8.9 per cent;[16]
- The revised MRP of 7.5 per cent is also 62 per cent across the 'spread' of the revised historic estimates' range of 5.4 per cent to 8.8 per cent.

58. Furthermore, the Amended Final Decision – which accounted for the DGM estimates – resulted in a final MRP of 7.6 per cent. That final estimate involved an uplift over the mid-point of the historic range of 0.4 percentage points (7.2 per cent).

59. Now, with the gamma revision to 0.25, the revised mid-point of the historic range, set out above, is 7.1. Hence, the corresponding revised MRP estimate of 7.5 per cent also implies a 0.4 percentage point uplift. This is consistent with the uplift applied previously which accounted for the DGM estimates. Some consideration was given to applying a lower uplift, so as to reflect the reduction in the estimated bounds for the DGM range. However, the Authority tempers the effect of the DGM estimates, given their upward bias, consistent with the method applied in the Amended Final Decision.[17] Accordingly, the previous uplift was retained.

60. Overall, the Authority has determined to apply an MRP estimate of 7.5 per cent in order to account for the revised gamma input of 0.25 in this decision.

- Bloomberg's series on 'consensus of analyst' expectations for All Ordinaries dividend yields;
- interest rate swap spreads on 5 year corporate bonds;
- default spreads on 5 year corporate bonds; and
- the stock market volatility index.

[15] The Authority's ATCO Final Decision estimates applied at the averaging period date, which was 2 April 2015.

[16] The 62 per cent proportion represents how far the Final Decision MRP (7.6 per cent) was through the range consisting of the upper (8.9 per cent) and lower (5.5 per cent) bound in the Final Decision.

[17] In the Amended Final Decision, the Authority stated that (Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, p. 268):

> …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.

The rate of return with a gamma of 0.25

61. The resulting revised WACC estimates – for 2014-15, 2015 and 2016 – are as follows (Table 5). Each of the *nominal after-tax WACCs* has declined by between 0.02 per cent and 0.03 per cent compared to the estimate made with a gamma of 0.4 (that is, the revised annually updated 2016 estimate is 6.09 per cent, as compared to the previous 6.12 per cent).

62. These revised estimates will be incorporated in the revenue calculations for the access arrangement period, flowing from the remitted changes. As noted above, the resulting tariff changes – required to deliver the changed net present value of revenue to ATCO over the access arrangement period – will be incorporated in the 2017 tariff update. The tariffs up to the 2016 year are unchanged.

Table 5 Rate of return for the Final Decision and (annually updated) for 2016

WACC component	for 2014-15	for 2015	for 2016
	(as at 02 Apr 2015)	(as at 02 Apr 2015)	(annual update)
Nominal Risk Free Rate	**1.96%**	**1.96%**	**1.96%**
Real Risk Free Rate	0.06%	0.06%	0.06%
Inflation Rate	**1.90%**	**1.90%**	**1.90%**
Debt Proportion	60%	60%	60%
Equity Proportion	40%	40%	40%
Debt Risk Premium (10 year trailing average)	**2.429%**	**2.502%**	**2.676%**
5 year IRS (effective yield)	**2.431%**	**2.431%**	**2.431%**
Return on Debt; 5 year Interest Rate Swap Spread	0.467%	0.467%	0.467%
Return on Debt; Debt Issuing Cost (0.125%) + Hedging (0.114%)	0.24%	0.24%	0.24%
Return on debt	**5.099%**	**5.172%**	**5.346%**
Australian Market Risk Premium	**7.5%**	**7.5%**	**7.5%**
Equity Beta	**0.7**	**0.7**	**0.7**
Corporate Tax Rate	30%	30%	30%
Franking Credit	25%	25%	25%
Nominal After Tax Return on Equity	**7.21%**	**7.21%**	**7.21%**
Nominal After Tax WACC	**5.95%**	**5.99%**	**6.09%**
Real After Tax WACC	3.97%	4.02%	4.00%

63. The amendments to the access arrangement and the access arrangement information reflect this decision of the Authority.

Other minor changes to Access Arrangement

64. On 29 September 2015, the Authority published minor corrections to the approved Access Arrangement for the GDS. These corrections were to align Annexure A of the Access Arrangement with the Authority's Final Decision and tariff modelling to ensure that ATCO could recover its efficient forecast costs. It was the Authority's understanding that the B3 tariff charging parameters in the Access Arrangement approved on 10 September 2015 were expressed inconsistently with those used for tariff modelling purposes. The tariff parameters were expressed on a rounded unit of gas measure per day in the Access Arrangement which would have resulted in tariffs that were not consistent with the allowed forecast revenue.

65. In the Access Arrangement published on 29 September 2015, the tariff unit charges that are expressed in dollars were not changed. However, the units of gas usage were changed to an annual basis rather than a daily basis.

66. Despite the changes made to the Access Arrangement, ATCO had charged Alinta Energy based on the rounded MJ per day measure not the GJ per year basis as stipulated in the amended Access Arrangement. Alinta Energy sought the Authority's views on whether ATCO was complying with the Access Arrangement and whether there was any validity to the concerns raised in response by ATCO.

67. The Authority met with both Alinta Energy and ATCO to discuss the issue. ATCO's labelling for its demand allocation for B3 customers in its model was split between 0 to 2 GJ, 2 to 10 GJ and over 10 GJ. As part of these discussions, ATCO stated that the demand allocation actually used in its model, was split between 0 to 1.825 GJ, 1.825 to 9.855 GJ and over 9.855 GJ (these splits are based on a rounded MJ per day basis).

68. In its Amended Final Decision, the Authority used ATCO's percentage allocation of demand to each band together with an assumption that these band limits were 2 GJ and 10 GJ to calculate the annual average charge for a B3 customer. The annual average charge was used to determine the price path of B3 tariffs. In contrast, ATCO's model used its percentage allocation of demand with band limits of 1.825 GJ and 9.855 GJ.

69. The Authority considers that if the wording in the approved Access Arrangement continued to use the GJ per year band limits and was strictly enforced then ATCO would be unable to recover its efficient costs if its demand was to eventuate as forecast. The Authority considers that this outcome would be inconsistent with the NGR.

70. As a result, the Authority has decided to correct the tariff model and the Access Arrangement. The tariff model should use the same band limits used for the calculation of tariffs and demand. The Access Arrangement should be revised to reflect the B3 tariff components on a MJ per year basis.

Quantifying tariff revenue adjustments

71. The Authority has decided that reference tariffs should be revised from 1 January 2017 to incorporate the amendments of this decision. As noted above at paragraph 21, the Authority will account for the changes as though they had applied from 1 July 2014, so as to ensure that ATCO is no better or worse off, on a net present value basis.

72. The Authority has made the changes to its reference tariff model to revise the value of imputation credits, the MRP and the B3 usage bands. The reference tariff variation mechanism automatically adjusts the 2017 to 2019 tariffs to account for the difference between the reference tariffs approved and the reference tariffs that should have applied up until 31 December 2016 based on the Authority's changes. This is because the tariff model equalises reference tariff revenue and building block revenue (Total Revenue), on a net present value basis, over the full five and a half year regulatory period. The reference tariff model uses actual approved reference tariffs up until 31 December 2016, and varies the 2017 to 2019 tariffs to equalise the net present value of Total Revenue.

73. The Total Revenue has increased as part of this decision to $921.53 million nominal (or $761.00 million in present value terms as at 30 June 2014). The outcome of these changes is presented in the following tables.

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

Nominal $ million	Final Decision in September 2015	2016 Tariff Variation	Revised B3 usage band, Gamma and MRP in October 2016
Regulatory Operating Expenditure	394.35	394.38	394.38
Operating Expenditure	393.59	393.59	393.59
Return on Working Capital	0.77	0.79	0.79
Return on Capital Base	384.03	389.09	387.30
Regulatory Depreciation	124.28	124.28	124.28
Depreciation	245.74	245.74	245.74
Inflationary Gain	(121.46)	(121.46)	(121.46)
Regulatory Corporate Income Tax	12.57	12.46	15.57
Corporate Income Tax	20.95	20.76	20.76
Imputation Credits	(8.38)	(8.30)	(5.19)
Total Revenue	**915.22**	**920.20**	**921.53**

Table 7 Authority Approved Revised Present Value of Revenue Building Blocks (AA4)[18]

Present Value in Real $ million at 30 June 2014	Final Decision in September 2015	2016 Tariff Variation	Revised B3 usage band, Gamma and MRP in October 2016
Regulatory Operating Expenditure	326.43	325.88	326.15
Operating Expenditure	325.77	325.20	325.48
Return on Working Capital	0.66	0.68	0.68
Return on Capital Base	316.78	320.21	319.01
Regulatory Depreciation	101.38	101.19	101.28
Depreciation	201.60	201.23	201.40
Inflationary Gain	(100.22)	(100.04)	(100.13)
Regulatory Corporate Income Tax	11.74	11.64	14.56
Corporate Income Tax	19.56	19.40	19.41
Imputation Credits	(7.83)	(7.76)	(4.85)
Total Revenue	**756.33**	**758.92**	**761.00**

74. Reducing gamma decreases the value of imputation credits by around $3.11 million nominal (or $2.91 million in present value terms) over the access arrangement period. This increases the net tax, which then increases the Total Revenue.

75. The increase in regulatory corporate income tax is partially offset by the reduction in the return on the capital base due to the lower MRP.

76. Based on the Authority's revised tariff modelling, the value of equity raising costs (which is a capital item) and return on working capital have changed slightly. The Authority has not amended its assumptions or approach to determining equity raising costs or the return on working capital. These changes are purely a result of the change to gamma, MRP and the B3 usage band. This change to equity raising costs led to a very small change in the Regulatory Asset Base and Depreciation.

77. In the Authority's Amended Final Decision, tariffs were generally forecast to decline as shown in the table below.

78. Although the tariffs are still forecast to decline, the magnitude of the change is smaller than previously forecast before the adjustment.

79. The changes do not affect the B3 Standing Charge because it was calculated separately and fixed during the Amended Final Decision to ensure this charge was at a level to meet avoidable costs by 2019. The B3 usage charge for the consumption of the first 2 GJ was removed from the start of the fourth access arrangement period.

[18] The present values for all building block components change in this table due to the lower revised rate of return (discount rate).

Table 8 Authority's Final Decision - Tariffs (Nominal) Percentage Change from Previous Period

	2015	2016	2017	2018	2019
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%)

80. During the 2016 Tariff Variation process when the trailing average debt risk premium was updated the tariffs were recomputed. The year to year decline in tariffs from 2016 was marginally lower as shown in the table below. This was a result of the trailing average debt risk premium being a higher value than at the time of the Amended Final Decision which led to a higher nominal rate of return.

Table 9 Authority's Revised Tariffs (Nominal) Percentage Change from Previous Period at 2016 Tariff Variation

	2015	2016	2017	2018	2019
A1, A2 and B1 Tariffs	(2.5%)	(7.9%)	(7.9%)	(7.9%)	(7.9%)
B2 Standing charge	(2.5%)	(7.9%)	(7.9%)	(7.9%)	(7.9%)
B2 Usage Charge 100 GJ	(2.5%)	(7.9%)	(7.9%)	(7.9%)	(7.9%)
B2 Usage Charge > 100 GJ	(2.5%)	(7.9%)	(7.9%)	(7.9%)	(7.9%)
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%	(14.3%)	(21.2%)	(25.9%)	(33.9%)
B3 Usage Charge >10 GJ	10.5%	(14.3%)	(21.2%)	(25.9%)	(33.9%)

81. The annual change in tariffs for 2017, 2018 and 2019 after revising the B3 usage bands, gamma and MRP are shown in the table below. The tariffs have only decreased marginally compared to the expected tariffs computed at the 2016 Tariff Variation.

Table 10 Authority's Revised Tariffs (Nominal) Percentage Change from Previous Period after Revising B3 Usage Band, Gamma and MRP

	2015	2016	2017	2018	2019
A1, A2 and B1 Tariffs	(2.5%)	(7.9%)	(7.5%)	(7.5%)	(7.5%)
B2 Standing charge	(2.5%)	(7.9%)	(7.5%)	(7.5%)	(7.5%)
B2 Usage Charge 100 GJ	(2.5%)	(7.9%)	(7.5%)	(7.5%)	(7.5%)
B2 Usage Charge > 100 GJ	(2.5%)	(7.9%)	(7.5%)	(7.5%)	(7.5%)
B3 Standing Charge	9.9%	5.0%	13.8%	12.5%	11.5%
B3 Usage Charge First 1.825 GJ	(100.0%)	-	-	-	-
B3 Usage Charge >1.825<9.855 GJ	10.5%	(14.3%)	(21.3%)	(25.1%)	(32.6%)
B3 Usage Charge >9.855 GJ	10.5%	(14.3%)	(21.3%)	(25.1%)	(32.6%)

Implementation of Corrections to Access Arrangement

82. The Authority has implemented the corrections required to the Access Arrangement and Access Arrangement Information and has re-published both documents.

83. The Authority had determined revised tariffs commencing on 1 January 2017 to ensure revenue neutrality on a present value basis for both the amendment to gamma and the change to the B3 tariff components in the tariff variation mechanism.

84. The following tariffs will commence on 1 January 2017 (subject to any other variation as per the tariff variation mechanism in the Access Arrangement):

Table 11 Revised 2017 Tariffs

Nominal $ Million	Units	Revised 2017 Tariff
Tariff A1		
Standing charge	$/year	38,802.08
Demand charge		
First 10km	$/GJkm	163.54
Distance > 10km	$/GJkm	86.08
Usage charge		
First 10km	$/GJkm	0.03470
Distance > 10km	$/GJkm	0.01733
Tariff A2		
Standing charge	$/year	21,482.89
First 10TJ	$/GJ	2.08
Volume > 10TJ	$/GJ	1.11
Tariff B1		
Standing charge	$/year	1,082.19
First 5TJ	$/GJ	4.13
Volume > 5TJ	$/GJ	3.54
Tariff B2		
Standing charge	$/year	271.18
First 100GJ	$/GJ	6.90
Volume > 100GJ	$/GJ	4.11
Tariff B3		
Standing charge	$/year	93.15
First 1.825GJ	$/GJ	0.00
Volume > 1.825 and < 9.855GJ	$/GJ	10.40
Volume > 9.855GJ	$/GJ	4.49

Appendix 1 Revised Tariff Model

This appendix is published as a separate publication on the ERA's website.

Appendix 2 Response on the relationship between gamma and the market risk premium

85. As noted at paragraph 18, the Authority's Secretariat invited ATCO to comment on proposed revisions to the Access Arrangement. One of these proposed amendments was to change the Market Risk Premium (**MRP**) due to the Tribunal's determination on the value of imputation credits (**gamma**). ATCO provided a submission to the Secretariat on 20 September 2016.

86. ATCO submit that despite a reduction in gamma from 0.4 to 0.25 (reduction in theta from 0.53 to 0.35) there should be no reduction to the MRP. ATCO relies upon the advice set out by Frontier Economics' in its report 'The relationship between gamma and the market risk premium'.[19]

87. Frontier's reasoning that there should be no adjustment to the MRP is as follows:

- the data sources underlying some of the MRP calculations contain errors (as the ERA accepts);
- some of the externally observed DGM based estimates already reflect a theta of 0.35;
- when the MRP range is based on the appropriate data and estimates the range supports the continued use of 7.6 per cent - not 7.5 per cent under the proposed revision.[20]

88. Each of these points are discussed below.

Impact of error in data

89. The Authority acknowledged an error in the calculation of the MRP based on the Ibbotson method when revising the Final Decision to reflect the reduction in gamma pursuant to orders by the Australian Competition Tribunal (see paragraph 42). The error in the calculations was corrected in this decision. Otherwise, the Authority's methodology used for calculating the MRP would not have been applied as outlined in the Amended Final Decision.

90. The methodology used for calculating the revised Ibbotson lower bound was not changed from the Final Decision. The method:

- uses return on equity data published by two sources - Brailsford, Handley and Maheswaran's (**BHM**) 2012 data set and NERA Economic Consulting's (**NERA**) 2013 data set dating back to 1883;[21]
- 'grosses up' dividend yields by adjusting the dividend yield to reflect the value imputation credits (using theta, franking proportion and the corporate tax rate);

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[19] Frontier Economics, *The relationship between gamma and the market risk premium: Report prepared for ATCO gas Australia*, September 2016.

[20] Ibid, p. 23.

[21] See Brailsford, Handley and Maheswaran, The historical equity risk premium in Australia: post-GFC and 128 years of data*, Accounting and Finance*, vol.52, no.1, 2012, pp. 237-247 and NERA Economic Consulting, *The Market Risk Premium: Analysis in Response to the AER's Draft Rate of Return Guidelines:* A report for the Energy Networks Association, October 2013, pp. 46-50.

- adds these yields to the market return on equity based on capital gains to create a series of annual grossed up nominal returns;
- constructs an MRP time series by deducting the risk free rate in each calendar year from the realised market return on equity in that year for all years;
- calculates the arithmetic and geometric mean of the NERA and Brailsford et al time series of annual MRP observations for five subsets of time. This produces 10 estimates for the arithmetic mean and 10 estimates for the geometric mean;
- averages the arithmetic means of BHM and NERA for each subset of time, producing 5 additional arithmetic mean estimates;
- averages the geometric means of BHM and NERA for each subset of time, producing 5 additional geometric mean estimates;
- averages the lowest of the 15 arithmetic mean estimates with the highest of the 15 geometric mean estimates to produce to final 'Ibbotson' estimate.

91. The Ibbotson estimates for the Amended Final Decision and this decision are shown in Table 1 and Table 3 respectively of this decision.

92. The average of the lowest arithmetic mean and highest geometric mean in Table 1 rounded to 1 decimal place is 5.5 per cent. This figure was applied as the Ibbotson lower bound in the Amended Final Decision.

93. Table 3 presents estimates that have been recalculated correcting for the error and using a theta of 0.35. The average of the lowest arithmetic mean and highest geometric mean rounded to 1 decimal place is 5.4 per cent. This figure is applied as the Ibbotson lower bound in this decision.

94. A reconciliation of the Ibbotson lower bound of this decision with the Amended Final Decision is shown in Table 12.

Table 12 Reconciliation of this decision and Amended Final Decision Ibbotson MRP Estimate

	Ibbotson MRP Estimate	Change in Ibbotson MRP estimate
Amended Final Decision	**5.5%**	
reduce theta to 0.35		-0.2%
	5.3%	
error correction		0.1%
This Decision	**5.4%**	

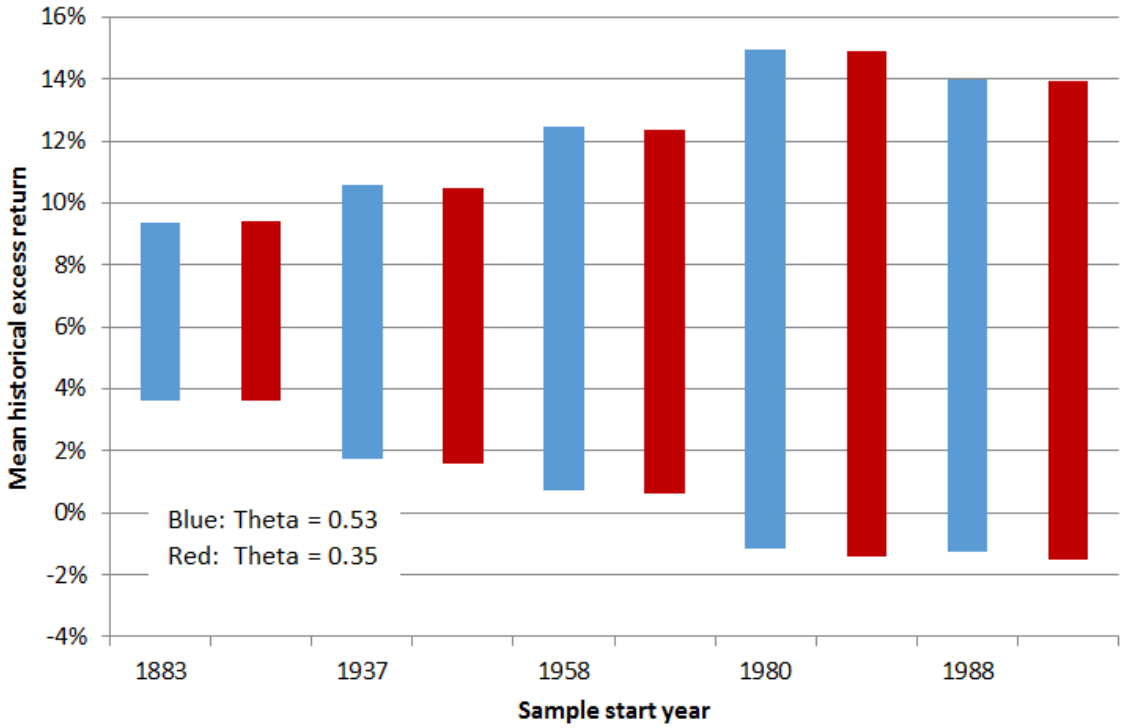
95. Reducing theta from 0.53 to 0.35 reduces the Ibbotson lower bound by around 0.2 per cent or 20 basis points. Correcting the error increases the Ibbotson lower bound by around 0.1 per cent or 10 basis points. The net effect is a reduction in the Ibbotson lower bound of 10 basis points to 5.4 per cent.

96. Frontier Economics submits that the most relevant and reliable source of evidence under the Ibbotson approach is the long-run arithmetic mean, which is based on data spanning 1883 to 2014. It reasons that this is because the long-run arithmetic mean has the smallest confidence interval around the estimate and is therefore statistically

more reliable.[22] These estimates are marked with an asterisk in Table 1 and Table 3. Frontier highlights that these estimates move up very slightly, but the change is negligible relative to the breadth of the confidence interval depicted by the difference between the first two bars from the left in Figure 1.[23]

97. Frontier then contends that the averages based on shorter subsets of time suffer from a high degree of statistical uncertainty. This is evident in the large confidence intervals that it constructed around the estimates based on a confidence level of 95 per cent. Frontier compares the size of the reduction in the MRP resulting from the change in theta to the size of the confidence intervals in later periods. This is shown as the difference between the blue and red bars from 1937 onward in Figure 1. Frontier notes that the size of the confidence intervals is 100 times (or more) greater than the change resulting from the reduction in theta. The implication is that the change resulting from theta is negligible in comparison to the uncertainty around the estimates.[24]

Figure 1 Confidence interval for ERA Ibbotson estimates – Amended Final Decision vs. Proposed Revision



Source: Frontier Economics, September 2016

98. The methodology used to derive the MRP in the Amended Final Decision was not appealed, and so stands. As outlined in paragraph 12, the Authority must vary interrelated constituent components of the Amended Final Decision and Access Arrangement Decision, having regard to s.28(1)(b)(iii) of the NGL. The Authority considers that the variation to interrelated components, such as the MRP, must be made only to the extent that it reflects the change in the parameter being varied

[22] Frontier Economics, *The relationship between gamma and the market risk premium: Report prepared for ATCO Gas Australia*, September 2016, pp. 6-7.

[23] Ibid, p. 8.

[24] Ibid, pp. 8-9.

directly pursuant to orders by the Australian Competition Tribunal, which in this case is gamma.

99. For this reason the Authority has preserved the method of estimating the MRP applied in the Amended Final Decision and only altered the Ibbotson MRP estimates shown in Table 1 and Table 3 to the extent that they are effected by the change in gamma and theta.

100. The Authority notes a number of issues with Frontier's analysis. It appears that Frontier has assumed the MRP data are independent, identically and normally distributed. This is a highly unrealistic assumption because the MRP data are 'non-stationary', which invalidates Frontier's calculation of confidence intervals. This issue was addressed in the Authority's Rate of Return Guidelines and is discussed further in paragraph 109.[25] It also appears that Frontier has erroneously added the distance between the zero axis and negative lower bounds onto the upper bounds for the confidence intervals in 1980-2014 and 1988-2014 making them too wide. Lastly, Frontier's analysis ignores the fact that the estimates were split into five subcategories, and that the data quality in the early periods is relatively poor compared to later periods. Further, the period from 1988 onwards potentially reflects a structural change, resulting from the introduction of dividend imputation in Australia.[26] Consequently, Frontier is advocating the incorporation of poorer quality data in its estimates, without acknowledging or analysing the trade-off between sample size and data quality.

101. The Authority does not accept Frontier's view that changes in the longest-term arithmetic mean – resulting from the change in gamma (and theta) – should form the basis for revision of the Ibbotson lower bound. This is because it is a significant change from the methodology used to calculate the MRP in Amended Final Decision. The Authority's approach preserves the methodology and discretion used to calculate the MRP in the Amended Final Decision as far as practicable.

102. The methodology used for calculating the revised Wright upper bound for this decision was not changed from the Amended Final Decision. The method:

- uses return on equity data published by two sources – BHM (2012) and NERA (2013) dating back to 1883 and for both series;
- 'grosses up' dividend yields by adjusting the dividend yield to reflect the value of imputation credits (using theta, franking proportion and the corporate tax rate);
- adds these yields to the market return on equity based on capital gains to create a series of annual grossed up nominal returns;
- discounts realised inflation out of each annual total return to create a real total return series;
- calculates a real grossed up return by applying an arithmetic mean to the whole series;
- recalculates a nominal grossed up return on equity by inflating this estimate using the expected inflation estimate for the coming 5 year period;

[25] Economic Regulation Authority, Explanatory statement for the rate of return guidelines: Meeting the requirements of the National Gas Rules, 16 December 2013, pp. 141-154.

[26] T. Brailsford, J. Handley and K. Maheswaran, The historical equity risk premium in Australia: post-GFC and 128 years of data, *Accounting and Finance*, vol.52, no.1, 2012, pp. 240-241.

- calculates an MRP for each data series by deducting the 'on-the-day' 5 year risk free rate of return from both of the nominal grossed up return on equity calculations; and
- calculates the final 'Wright' estimate by averaging the resulting MRPs calculated using each series.

103. The Wright estimation process for the Amended Final Decision and this decision are shown in Table 13 and Table 14 respectively.

Table 13 MRP based on the Wright approach: Amended Final Decision

Wright MRP	NERA	BHM	Average
Nominal returns excluding imputation (1883-2014)	12.00%	11.64%	11.82%
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	1.90%	1.90%	1.90%
Grossed up nominal return on equity (1883-2014)	11.01%	10.65%	10.83%
5 year Risk Free Rate of Return	1.96%	1.96%	1.96%
Market Risk Premium	**9.05%**	**8.69%**	**8.87%**

Source: Brailsford, Handley and Maheswaran (2012), NERA (2013), Reserve Bank of Australia, Bloomberg, Australian Bureau of Statistics and ERA Analysis

104. The effect of the reduced theta decreases the grossed up nominal returns shown by the difference in second rows of Table 13 and Table 14 which are highlighted in grey.

Table 14 MRP based on the Wright approach: This Decision

Wright MRP	NERA	BHM	Average
Nominal returns excluding imputation (1883-2014)	12.00%	11.64%	11.82%
Grossed up nominal returns (1883-2014)	12.12%	11.76%	11.94%
Grossed up real returns (1883-2014)	8.88%	8.52%	8.70%
Expected Inflation	1.90%	1.90%	1.90%
Grossed up nominal return on equity (1883-2014)	10.94%	10.58%	10.76%
5 year Risk Free Rate of Return	1.96%	1.96%	1.96%
Market Risk Premium	**8.98%**	**8.62%**	**8.80%**

Source: Brailsford, Handley and Maheswaran (2012), NERA (2013), Reserve Bank of Australia, Bloomberg, Australian Bureau of Statistics and ERA Analysis

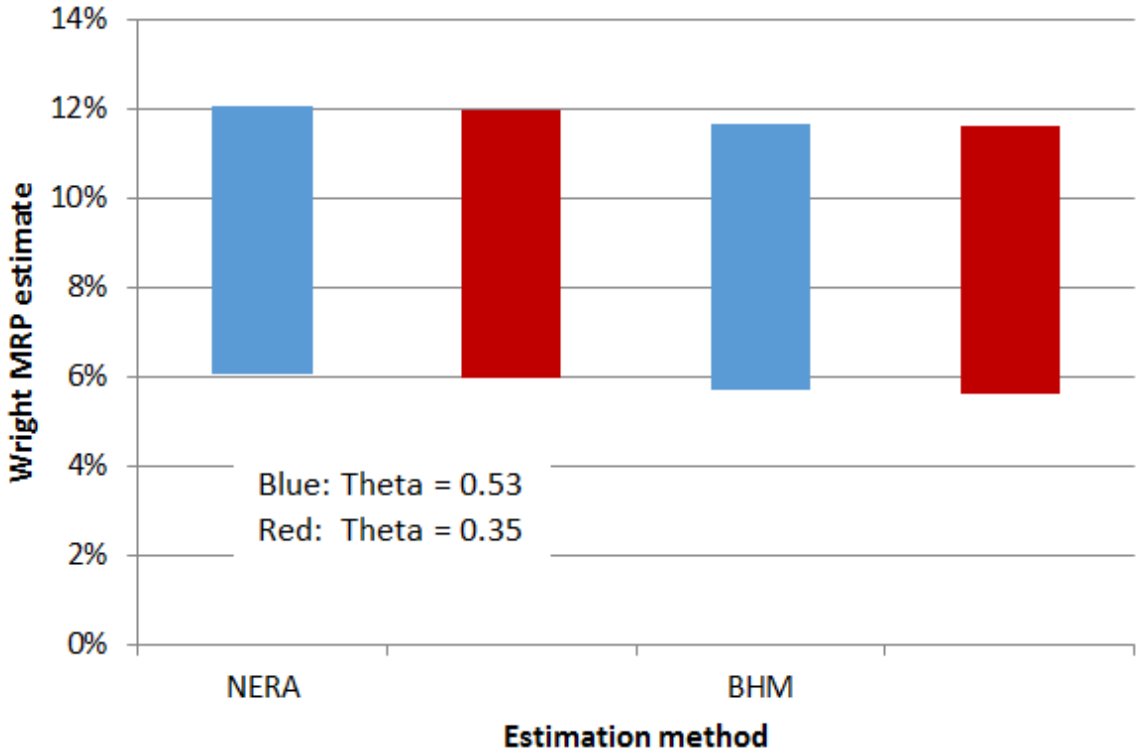
105. The error correction issue has no impact on the Wright estimate. This is shown in the reconciliation of this decision and Amended Final Decision Wright estimate in Table 15.

Table 15 Reconciliation of this decision and Amended Final Decision Wright MRP Estimate

	Wright MRP Estimate	Change in estimate
Amended Final Decision	**8.87%**	
reduce theta to 0.35		-0.07%
	8.80%	
error correction		0%
This Decision	**8.80%**	

106. Frontier Economics submits that the 7 basis point decrease (0.07 per cent) is 'tiny relative to the statistical uncertainty of the estimates'. It illustrates the statistical uncertainty of the estimates in the diagram reproduced in Figure 2 below. The 7 basis point change is illustrated as the difference between the blue bar and the red one immediately to the right of it for both the NERA (2013) and BHM (2012) data.

Figure 2 Confidence intervals for ERA Wright estimates –Amended Final Decision vs. Proposed Revision



Source: Frontier Economics, September 2013

107. On this basis, it concluded that the change in the Wright MRP is immaterial and so there is no sensible foundation for changing the MRP.[27]

108. On this point the Authority again emphasises that this decision seeks to preserve the methodology applied in estimating the MRP in the Amended Final Decision. Only the inputs affected by the change in gamma (and thus theta) are modified. All treatment of the inputs thereafter is aimed at preserving the methodology applied in the Amended Final Decision. Frontier effectively proposes adding a step to the methodology that involves statistical inference. This involves a number of assumptions, for example, on the distribution and 'stationarity' of the data.

109. The Authority examined the statistical properties of the MRP data in some detail in the Rate of Return Guidelines. One of the main issues in applying statistical methods to the MRP series above is that it is non-stationary, meaning the mean and variance change through time and that these parameters may not necessarily revert to a long run average.[28] The Authority adopted the Wright method – in addition to the Ibbotson method – on the basis that the MRP may not be stationary. The Ibbotson method calculates the mean MRP. If the MRP is not stationary there is no reason to expect

[27] Ibid, p. 11.

[28] Economic Regulation Authority, Explanatory statement for the rate of return guidelines: Meeting the requirements of the National Gas Rules, 16 December 2013, pp. 141-154.

reversion to the Ibbotson MRP. Adoption of the Wright MRP method caters for this possibility. Frontier's application of statistical methods to the Wright MRP above implicitly assume stationarity of the MRP data. This is illogical because the method was adopted to cater for non-stationarity (or absence of mean reversion) in that data.

110. For the reasons above the Authority does not accept Frontier's application of confidence intervals to the Wright MRP data or its resulting inferences on the significance of the change in the MRP resulting from theta. The Authority views this as an unjustified and illogical augmentation of the MRP methodology.

Externally observed DGM estimates

111. The Authority used externally observed DGM-based MRP estimates to inform the final MRP determination in the Amended Final Decision. The estimates are reproduced in Table 16.

Table 16 DGM estimates of the MRP

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.

112. Frontier Economics suggests that a 'blanket 30 basis point reduction' was applied to all DGM estimates to reflect the reduction in theta (and thus gamma). Frontier contends that this fails to recognise that the majority of these estimates are already based on a theta of 0.35.[29] With respect to the selection of DGM estimates, Frontier submits that it is not clear why the 2013 ERA estimate remains in the table when the Authority has produced an updated and timely estimate. Frontier highlights that the range would be reduced from 5.6-9.7 to 5.9-9.7 if the 2013 ERA estimate is removed. It also notes that all estimates other than the 2015 ERA estimate involve a risk free rate that is materially above 1.96 per cent. Frontier concludes that had these MRPs been computed by subtracting 1.96 per cent the resulting range would have been 7.99 to 11.54 per cent. Accordingly, Frontier views the results in Table 16 as support for an MRP of 7.6 per cent when theta is set to 0.35.[30]

113. The Authority acknowledges that some of the DGM based estimates in Table 16 are already based on a theta of 0.35. However, Frontier overlooks the following in its analysis.

114. Firstly, the two highest DGM estimates are based on a theta of 0.5 and 0.75. These would decrease if the applied theta was reduced to 0.35. This would reduce the upper bound.

115. Secondly, the contemporaneous 'on-the-day' risk free rate must be subtracted from the DGM rate of return on equity estimate. This ensures consistency between the market conditions in which each rate prevailed. The MRP range of 7.99 to 11.54 per cent computed by subtracting the March 2015 risk free rate of 1.96 per cent from DGM estimates in earlier years is therefore meaningless.

116. Thirdly, the composition of estimates in Table 16 is not subject to revision. This is because the methodology used to derive the MRP in the Amended Final Decision was not appealed, and so stands. This means the 2013 ERA estimate must not be excluded.

117. Lastly, and importantly, despite the commentary on the effect of the reduction in theta on the DGM range, the application of the DGM information in this decision was ultimately similar to that in the Amended Final Decision. This was outlined in paragraphs 58 and 59 as follows:

> …the amended Final Decision – which accounted for the DGM estimates – resulted in a final MRP of 7.6 per cent. That final estimate involved an uplift over the mid-point of the historic range of 0.4 percentage points (7.2 per cent)
>
> Now, with the gamma revision to 0.25, the revised mid-point of the historic range, set out above, is 7.1. Hence, the corresponding revised MRP estimate of 7.5 per cent also implies a 0.4 percentage point uplift. This is consistent with the uplift applied previously which accounted for the DGM estimates. Some consideration was given to applying a lower uplift, so as to reflect the reduction in the estimated bounds for the DGM range. However, the Authority discounts the validity of the DGM estimates, given their upward bias. Accordingly, the previous uplift was retained.

118. This highlights that the downward revisions of the DGM range – discussed in paragraphs 49 and 52 – are tempered in this decision, consistent with the method

[29] Ibid. p 13.

[30] Frontier Economics, *The relationship between gamma and the market risk premium: Report prepared for ATCO Gas Australia*, September 2016, p. 14.

applied in the Amended Final Decision.[31] In addition, the uplift over the mid-point of the historic range – applied to reach the final estimate – takes into account the forward looking indicators, as well as the DGM estimates. These factors work to mitigate any changes that arise from the reduction in the bounds of the DGM estimates.

Selecting a point estimate

119. The outputs of the calculations discussed in paragraphs 89 to 118 together with a set of forward looking indicators form the set of inputs used in the Authority's MRP estimation process. The forward looking indicators are unchanged from the Amended Final Decision and so have not been discussed in any detail in this decision.

120. To arrive at a point estimate in the Amended Final Decision the Authority:

a) established a range for the MRP of 5.5 – 8.9 per cent that reflects historic excess returns;

b) noted the mid-point of the historic range (7.2 per cent);

c) considered that the forward looking indicators justified a point estimate somewhat above the mid-point of the historic range;

d) noted that the bounds of the DGM estimate (5.6 per cent to 9.7 per cent) would result in a mid-point of 7.7 per cent;

e) acknowledged that the MRP based on the DGM tends to be overestimated;

f) noted that ATCO proposed an MRP estimate of 7.6 per cent; and

g) exercised its judgement to determine an MRP of 7.6 per cent for the Final Decision.

121. In its submission, Frontier Economics set out its interpretation of the process the Authority followed to select a point estimate for the MRP. The process is consistent with that set out above up to point c).[32]

122. From point d) onward Frontier's submission differs in that it omits the acknowledgment of the mid-point of 7.7 per cent and acknowledgment of upward bias in the DGM estimates. Frontier also insert the following phrase:

> At this point, the Amended Final Decision notes that ATCO proposed an MRP of 7.6% and the ERA adopts that figure…[33]

123. On this point, the Authority must clarify that while it adopted a figure of 7.6 per cent for the MRP, it did not adopt ATCO's proposal. ATCO's proposed MRP estimate of 7.6 per cent was derived independently through a specific methodology.[34] The Authority noted ATCO's MRP estimate of 7.6 per cent, as Frontier has highlighted,

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[31] Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, p. 268.

[32] Ibid, p. 15.

[33] Ibid, p. 16.

[34] Notably, ATCO proposed the inclusion of independent expert valuation reports and a specific weighting system. For further details see ATCO Gas Australia, *Response to the 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.

but did not accept the method used to derive this estimate. The Authority applied the methodology set out in paragraph 120.

124. Frontier Economics then set out its interpretation of this decision. In particular, it references the following:

> The Authority considers that this remitted estimate of 7.5 per cent is supported by the following calculation, which demonstrates consistency with the Amended Final Decision:
>
> • The previous MRP of 7.6 per cent was 62 per cent across the 'spread' of the historic estimates' range of 5.5 per cent to 8.9 per cent;
>
> • The revised MRP of 7.5 per cent is also 62 per cent across the 'spread' of the revised historic estimates' range of 5.4 per cent to 8.8 per cent.[35]

125. It submits that this justification for adopting an MRP of 7.5 per cent estimate is 'very different from the approach that was actually adopted in the Amended Final Decision'. It reasons that this is because the Authority did not decide that the conditioning variable and DGM evidence supported an estimate 62 per cent between the upper and lower bound in the Amended Final Decision. It highlights that instead, the Authority:

> "exercised its judgment" in a qualitative way that resulted in it allowing the MRP that ATCO had proposed.[36]

126. With respect to this interpretation, the Authority emphasises the following two points which have already been discussed above.

127. Firstly, no error of judgment or fact was found in the methodology used to derive the MRP in the Amended Final Decision. As outlined in paragraph 98, the Authority considers the variation to interrelated components, such as the MRP, must be made only to the extent that it reflects the change in the parameter being varied, which in this case is gamma. The methodology and discretion underlying the MRP determination in the Amended Final Decision must not be altered, but rather preserved. The Authority has sought to preserve the methodology and discretion applied in the Amended Final Decision by recalculating the inputs used in that Decision and then mechanistically replicating the impact of the qualitative information on the selection of a point from within the range based on these calculations. The impact of the qualitative information was a point estimate 62 per cent across the 'spread' of the historic estimates' range.

128. Secondly, Frontier's rationale implies that the Authority exercised discretion in the Amended Final Decision that supported the adoption of ATCO's MRP estimate. As set out in paragraph 123, the Authority must clarify that while it adopted a figure of 7.6 per cent for the MRP, it did not adopt ATCO's proposal. The Authority noted ATCO's MRP estimate of 7.6 per cent, but did not accept the method used to derive this estimate. The Authority applied the methodology set out in paragraph 120 instead.

129. The Authority's consideration of the conditioning variable evidence and the DGM estimates in the Amended Final Decision justified a point estimate above the mid-point of the historic range. Specifically, that evidence resulted in an MRP estimate

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[35] Frontier Economics, *The relationship between gamma and the market risk premium: Report prepared for ATCO Gas Australia*, September 2016, p. 16.

[36] Ibid, p 17.

that is 62 per cent between the historic lower and upper bounds. The revised estimate of the MRP is then at a point within the revised range which is consistent with the Authority's consideration of the conditioning variable evidence and the DGM estimates in the Amended Final Decision.

130. As outlined in paragraphs 117 and 118, in the Amended Final Decision the Authority's consideration of the conditioning variable evidence and the DGM estimates resulted in an 'uplift' over the mid-point of 0.4 per cent. That is, the final determination of 7.6 per cent was 0.4 per cent higher than the mid-point of 7.2 per cent established on the historic range. The revised MRP estimate of 7.5 per cent, which is 62 per cent between the revised lower and upper bound, also implies a 0.4 per cent uplift over the mid-point of the revised historic range (7.1 per cent). This uplift could have been lower for this decision, because the bounds of the DGM estimates in Table 16 decrease as theta is reduced to 0.35. However, as outlined in paragraphs 113 to 118, the impact of any downward revision due to the change in the DGM estimates is tempered, consistent with the method applied in the Amended Final Decision. The preservation of the 0.4 per cent uplift ensures that the revised estimate of the MRP is at a point within the revised historic range that is consistent with the previous point in the historic range in the Amended Final Decision, after the Authority's consideration of the DGM and forward looking indicators evidence.

Conclusion

131. ATCO relies on the Frontier Economics reasoning to justify its submission that no adjustment should be made to the MRP determined in the Amended Final Decision as a result of gamma being reduced to 0.25 and theta being reduced to 0.35.

132. The Authority does not accept Frontier's reasoning on the following basis.

133. Frontier's analysis of the impact of the (acknowledged) errors in the data involves a significant change from the methodology used to calculate the MRP in Amended Final Decision. Again, the methodology used to derive the MRP in the Amended Final Decision was not appealed, and so stands. In addition, Frontier's application of statistical methods in its analysis of the Wright estimate is illogical. This is because the Wright estimate was adopted in recognition of the MRP data's statistical properties. These statistical properties mean the data is not amenable to statistical methods that do not address violations of the assumption that the data are identically, independently and normally distributed.

134. Frontier's analysis of the DGM estimates:

- overlooks factors that would reduce the upper bound of the observed DGM estimates;
- retrospectively applies risk free rates incorrectly to derive a higher DGM estimate range;
- proposes alterations to the composition of estimates which amount to a change in the methodology used to calculate the MRP in the Amended Final Decision; and

- overlooks the fact that any revisions the Authority applied to the DGM estimates are tempered in this decision, consistent with the approach adopted in the Amended Final Decision.[37]

135. Further, Frontier's interpretation of the methodology and discretion applied in the Amended Final Decision suggests that the Authority adopted ATCO's MRP proposal. The Authority did not adopt ATCO's MRP proposal. It adopted the methodology set out in the Amended Final Decision which resulted in an MRP *figure* which was the same as the figure proposed by ATCO.

136. Frontier submits that the methodology and discretion applied in this decision to calculate the MRP is different from the Amended Final Decision. However, on the contrary, the Authority has explicitly sought to preserve the methodology and discretion applied in the Amended Final Decision. This is because no error of judgment or fact was found in the Authority's methodology used to derive the MRP. The methodology and discretion have been preserved by observing where the point estimate fell within the range of the Amended Final Decision. The Authority then replicates where it fell in the revised range. The revised estimate of the MRP is at a point within the revised range which is consistent with the Authority's consideration of the conditioning variable and DGM evidence in the Amended Final Decision.

137. With respect to selecting a point estimate within the range for this decision, Frontier's submission implies that had the approach used in the Amended Final Decision been applied in this decision, ATCO's proposed MRP of 7.6 per cent would be 'allowed'. While the Authority noted ATCO's MRP estimate of 7.6 per cent in the Amended Final Decision, it did not accept the method used to derive this estimate. The Authority applied its own methodology which involved much more information than ATCO's proposed figure of 7.6 per cent.

138. In conclusion, the Authority notes a final point. The valuation of imputation credits is a component of the MRP. In the Amended Final Decision the MRP of 7.6 per cent was explicitly paired with a gamma of 0.4 (with an implied theta of 0.53). It is therefore logical to expect the MRP to decrease when the valuation of imputation credits decrease.

139. Conversely, it is illogical to expect no change in the MRP. For this decision the Authority has revised the MRP downward by 10 basis points. ATCO has not provided any evidence to convince the Authority to depart from this revision.

Additional Errors Noted

140. In addition to its submission on the reasons why the MRP should be unchanged from the Final Decision, Frontier Economics provided an outline of errors in this decision. Most of the errors contained in this outline were set out as part of its reasoning why the MRP should be unchanged from the Final Decision. Errors that were not already discussed are:

- the proposed revision gives disproportionate weight to the geometric mean evidence;
- the proposed revision combines a lower bound with a point estimate;

[37] Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, p. 268.

- the DGM evidence incorrectly transposes Lally's (2013) estimates and fails to use the most up to date estimate for the Australian Energy Regulator;
- the lower bound should have been based on a higher Lally (2013) estimate of 6.93.[38]

141. Frontier submits that the geometric mean estimate has an 'important place in the ERA's process for selecting the MRP point estimate'. It further submits that this is unreasonable and uses the following shortened quote in its report as support:

> The Authority's view is that arithmetic means are preferred in most circumstances… the Authority is inclined to the arithmetic mean as a preferred estimator.[39]

142. The full quote in the Amended Final Decision detailed the reasons for the Authority deviating from its preference for Arithmetic means:

> 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. An unbiased estimator is likely to lie somewhere between the two estimates.
>
> 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. [40]

143. This was based on McKenzie and Partington's 2012 supplementary report on the equity MRP.[41] Accordingly, the Authority considered that the average of the lowest arithmetic mean and the highest geometric mean provided a reasonable lower bound. This formed part of the MRP methodology in the Amended Final Decision. No error of judgment or fact was found in the methodology used to derive the MRP in the Amended Final Decision. The Authority is therefore not persuaded to exclude the geometric mean from the average used to produce the lower bound.

144. Frontier submits that it makes no logical sense to combine a 'reasonable lower bound' established as outlined in paragraph 43 with a point estimate from the Wright approach to establish the upper bound of the range. In response to this, the Authority refers back to the same reasons outlined in paragraph 109.[42] The Authority is not persuaded to depart from the methodology applied in the Amended Final Decision.

145. Within Lally's 2013 report on the dividend growth model Frontier highlights that the Authority selected estimates that are not comparable with the other DGM estimates in Table 16. It further submits that the Authority selected an estimate from this report that was not consistent with the long-run growth rate of 4.6 per cent assumed by the Authority. Because of this, Frontier's view is that a figure of 5.90 per cent has been wrongly transposed in place of the correct figure of 5.96 per cent as the lower end

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[38] Frontier Economics, *The relationship between gamma and the market risk premium: Report prepared for ATCO Gas Australia*, September 2016, pp. 18-22.

[39] Ibid, p. 19.

[40] Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, pp. 260-261.

[41] M. McKenzie and G. Partington, *Supplementary report on the equity MRP*, 22 February 2012, p. 5.

[42] Frontier Economics, *The relationship between gamma and the market risk premium: Report prepared for ATCO Gas Australia*, September 2016, p. 20.

of Lally's range.[43] The purpose of Table 16 was to consider a range of DGM estimates. The Authority did not require the methodology underlying these estimates to be the same as that used for the Authority's internal DGM estimates. Frontier's claim that the wrong estimates have been selected is not based on changes to theta and therefore goes beyond the scope of this decision. The estimates in Table 16 formed part of the Authority's methodology in the Amended Final Decision, which was not appealed. Accordingly, Table 16 is not subject to revision, apart from the inference of the reasonable bounds for the DGM estimates, which are informed by the relevant value of theta. The revised lower bound is established by the Authority's August 2013 estimate, but now based on a theta of 0.35.[44] The revised lower bound is reduced by around 30 basis points (Table 17).

146. The upper bound continues to be given by Capital Research's February 2012 estimate. The Authority in its Amended Final Decision methodology considered that this upper bound provided a less relevant estimate in comparison with all other estimates.[45]

[43] Ibid.

[44] Economic Regulation Authority, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, 16 December 2013, p. 127.

[45] Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, as amended 10 September 2015, pp. 260.

Table 17 Revised DGM estimates of the MRP

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 0.25			0.35		**5.3 =< MRP < 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.

147. Frontier submits that the Amended Final Decision contained an out of date Australian Energy Regulator DGM estimate.[46] Again, the Authority re-iterates that the methodology for the Amended Final Decision MRP decision was not appealed. Accordingly, the Authority does not modify the composition of the estimates in Table 16, beyond adjusting the inferred bounds, informed by the reduction in gamma or theta.

[46] Ibid, p. 21.