Final Rate of Return Guidelines (2018)

Meeting the requirements of the National Gas Rules

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Economic Regulation Authority

WESTERN AUSTRALIA

Economic Regulation Authority

4th Floor Albert Facey House
469 Wellington Street, Perth

Mail to:
Perth BC, PO Box 8469
PERTH WA 6849

T: 08 6557 7900

F: 08 6557 7999

E: info@erawa.com.au

W: www.erawa.com.au

National Relay Service TTY: 13 36 77
(to assist people with hearing and voice impairment)

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1. Introduction

1. The Economic Regulation Authority is responsible for approving third party access arrangements in Western Australia for services on gas transmission and distribution pipelines. These pipelines are currently the Dampier to Bunbury Natural Gas Pipeline, the Goldfields Gas Pipeline and the Mid-West and South-West Gas Distribution Systems. The ERA's responsibilities are established under the National Gas Law and National Gas Rules as applied in Western Australia.[1]

2. The National Gas Rules require the ERA to produce rate of return guidelines,[2] and to review these guidelines "at intervals not exceeding five years for the first interval and three years for all subsequent intervals, with the first interval starting from the date the first rate of return guidelines are published under these rules".[3] These reviews provide an opportunity to undertake a comprehensive review of approaches for determining the allowed rate of return on capital.

3. The ERA first published the rate of return guidelines on 16 December 2013 (referred to throughout this document as the 2013 guidelines).

4. This document – the *Final Rate of Return Guidelines (2018)* – sets out the ERA's current position on determining the allowed rate of return on capital.

5. The companion to this document – the *Final Explanatory Statement for the Rate of Return Guidelines (2018)* – provides the ERA's reasoning supporting the position set out in the Final Rate of Return Guidelines (2018).

1.1 The requirement

6. The National Gas Rules require that the rate of return guidelines set out:

    - "The methodologies that the [ERA] proposes to use in estimating the allowed rate of return, including how those methodologies are intended 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".[4]

    - "The estimation methods, financial models, market data and other evidence that the [ERA] 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".[5]

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[1] The *National Gas Access (WA) Act 2009* implements the National Gas Access (Western Australia) Law and National Gas Rules for Western Australia. All references to National Gas Law (NGL) and National Gas Rules (NGR) referred to throughout this document are references to the NGL and NGR which apply in Western Australia.

[2] Australian Energy Market Commission, *National Gas Rules*, Sydney, AMEC, 2017, clause 87(3); or, in short, National Gas Rules 87(13).

[3] National Gas Rules 87(16)(a).

[4] National Gas Rules 87(14)(a).

[5] National Gas Rules 87(14)(b).

7. In its review, the ERA has assumed that:

    - A rate of return 'approach' refers to the systems or methods used in the development of the rate of return guidelines, and encompasses the subsidiary methods, estimation methods, financial models, market data and other evidence;

    - 'Estimation methods' refers to the procedures used for estimating the rate of return, including through financial models.

    - 'Financial models' refers to those mathematical and statistical representations that are used to inform the rate of return – for example, the Sharpe-Lintner Capital Asset Pricing Model.

    - 'Market data' refers to any input data that is used to determine the rate of return – for example, financial data or sample data from firms that are comparable to the benchmark efficient entity.

    - 'Other evidence' may be broad-ranging, but must be relevant to the estimation of the rate of return to be considered.

    - 'Estimation material' may be used to refer to any of the relevant information relating to estimating methods, financial models, market data and other evidence.

8. The guidelines will provide guidance for subsequent gas access decisions of the ERA for Western Australian gas pipelines and networks.

1.2   Application of guidelines

9. At the date of this publication, the rate of return guidelines are not mandatory in Western Australia.[6]   The ERA or service providers may depart from the guidelines when reviewing an access arrangement, provided that an adequate explanation for any proposed change, in terms of the National Gas Law and National Gas Rules, is provided.

10. However, the Council of Australian Governments' Energy Council has been developing a framework for binding rate of return guidelines.[7]   The *Statutes Amendment (National Energy Laws) (Binding Rate of Return Instrument) Act 2018* has been proclaimed in South Australia, which is the lead parliament for national energy legislation in Australia.

11. This will have implications for the application of these rate of return guidelines to future determinations.   If the Western Australian Government chooses to adopt these changes, then these guidelines will become a mandatory instrument.

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[6]   National Gas Rules 87(18).

[7]   COAG Energy Council, *Binding Rate of Return Guideline*, October 2017, available at:
www.coagenergycouncil.gov.au/publications/binding-rate-return-guideline
AER, *Consultation paper: Process for reviewing the rate of return guidelines*, Commonwealth of Australia, July 2017, p. 7.

1.3   Reviewing the guidelines

12.   As part of its review of the guidelines, the ERA assessed its approach to setting the rate of return for covered gas pipeline and network access arrangements.

13.   The ERA focused on the overall methods, estimation methods, financial models, market data and other evidence for developing the rate of return. This was consistent with the requirements of the National Gas Law and the National Gas Rules.

14.   Where relevant, as a means of illustration, the ERA has set out current indicative estimates of the rate of return and associated parameters. However, the specific values arising from the application of the ERA's approach to estimating the rate of return will be determined at each subsequent access arrangement review, by applying the approaches set out in these guidelines.

2. The broad regulatory framework

15. This chapter sets out the relevant requirements of the National Gas Law and National Gas Rules. These requirements establish the regulatory framework for the rate of return decision-making process.

2.1 The National Gas Law

16. The National Gas Law provides for a legislated, uniform national framework governing access to monopoly gas infrastructure, and arrangements for price oversight. The National Gas Objective sets out the aim of the National Gas Law.[8]

> 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.

17. The National Gas Law and the national gas objective are intended to promote economic efficiency.[9]

> 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.

18. The revenue and pricing principles in the National Gas Law give effect to the national gas objective.[10] The revenue and pricing principles establish that the National Gas Objective is to be promoted by targeting economically efficient outcomes, through effective incentives.[11]

> A service provider should be provided with effective incentives in order to promote economic efficiency with respect to reference services the service provider provides. The economic efficiency that should be promoted includes—

> (a) efficient investment in, or in connection with, a pipeline with which the service provider provides reference services; and

> (b) the efficient provision of pipeline services; and

> (c) the efficient use of the pipeline.

19. This specification of "effective incentives in order to promote economic efficiency" in the revenue and pricing principles is entirely consistent with an incentive regulation approach.

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[8] National Gas Law, s. 23.

[9] Holloway, P., *Second Reading Speech: National Gas (South Australia) Bill 2008, Parliamentary Debates (SA),* Legislative Council, 30 April 2008.

[10] Holloway, P., *Second Reading Speech: National Gas (South Australia) Bill 2008, Parliamentary Debates (SA),* Legislative Council, 30 April 2008.

[11] National Gas Law, s. 24(3).

20.   Incentive regulation is the use of rewards and penalties to induce a utility to achieve desired goals where the utility is afforded some discretion in achieving those goals.[12] The regulatory arrangements and associated rate of return framework constitute one form of regulation that has been developed to provide incentives to achieve economic efficiency.

21.   The Australian Energy Market Commission has established the allowed rate of return objective in the National Gas Rules.[13]

> 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.

22.   In this context, the Australian Energy Market Commission has stated that the allowed rate of return objective is intended to be consistent with the national electricity objective, the national gas objective and the revenue and pricing principles.[14]

> The Commission has taken the opportunity in this final rule determination to explain how the new rules are to be interpreted. Most importantly, the new rules allow the regulator (and the appeal body) to focus on whether the overall rate of return meets the allowed rate of return objective, which is intended to be consistent with the [national electricity objective], the [national gas objective] and the [revenue and pricing principles].

23.   The allowed rate of return objective must be interpreted in a manner consistent with the national gas objective. The National Gas Law takes precedence over the National Gas Rules.

2.2   The National Gas Rule 87

24.   National Gas Rule 87 (NGR 87) includes sub-rules that refer to matters the regulator is to 'have regard to' when determining the allowed rate of return, including: [15]

> **NGR 87(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."
>
> **NGR 87(7):** "In estimating the return on equity under subrule (6), regard must be had to the prevailing conditions in the market for equity funds."

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[12]   Lewis, T., and Garmon, C., *Fundamentals of Incentive Regulation,* PURC/World Bank International Training Program of Utility Regulation and Strategy, June 1997.

[13]   National Gas Rules 87(3).

[14]   Australian Energy Market Commission, *Rule Determination: Price and Revenue Regulation of Gas Services (GRC0011)*, 29 November 2012.

[15]   National Gas Rules 87.

> **NGR 87(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."

25.   In addition, NGR 87 sets out additional requirements for the allowed rate of return, including that:[16]

- 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)).[17]

- It results in a return on debt for a regulatory year that 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)).

26.   It 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)).

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[16]   The points are paraphrased – see the National Gas Rules for exact language.

[17]   The specification of a vanilla WACC implies that tax liabilities must be estimated separately to the rate of return. On this basis, the requirement is for a 'post-tax' approach.

2.3   Implications for the regulator

27.   The anchor for any regulatory decision will be the regulatory approach that best delivers the requirements of the National Gas Law, National Gas Rules, national gas objective, revenue and pricing principles, and allowed rate of return objective. This requirement may be summarised in terms of a primary function and constraints.

  a.   The primary function is to achieve an allowed rate of return for a service provider "commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk in respect of the provision of reference services".[18] Related objectives include achieving the allowed rate of return:

    i)   for each of the regulatory years[19]

    ii)   incorporating effective incentives to promote efficient investment[20]

    iii)   in the long term interests of consumers.[21]

  b.   One constraint is that uncertainty about the future, information asymmetries and circularity problems complicate the task of determining the rate of return. On this basis, the regulator needs to estimate a cost of debt and cost of equity that give the efficient service provider 'reasonable opportunity' to recover at least the efficient costs it incurs over the regulatory period.[22]

  c.   A further constraint is a requirement to minimise transaction costs for the service provider and regulator, all else equal.

28.   The current regulatory approach assumes that the efficient firm that meets the above objectives provides the 'benchmark'. The 'benchmark efficient firm' informs the cost building blocks for each regulatory decision.

29.   An implication of point a) in paragraph 27 is that the rate of return must remunerate the efficient financing costs of the service provider over the lives of the assets, in terms of net present value.[23]

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[18] National Gas Rules 87(3) – the allowed rate of return objective.

[19] National Gas Rules 87(4).

[20] National Gas Law, s. 24(3) – a revenue and pricing principle – states that the "a service provider should be provided with effective incentives to promote economic efficiency with respect to reference services". Note that the AEMC has stated that "The Commission has taken the opportunity in this final rule determination to explain how the new rules are to be interpreted. Most importantly, the new rules allow the regulator (and the appeal body) to focus on whether the overall rate of return meets the allowed rate of return objective, which is intended to be consistent with the [national electricity objective], the [national gas objective] and the [revenue and pricing principles]." (Australian Energy Market Commission 2012, *Rule Determination: National Electricity Amendment Rule 2012*, www.aemc.gov.au, 29 November, p. 23.)

[21] As per the national gas objective.

[22] National Gas Law, s. 24(2) – a revenue and pricing principle – states that the "service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs".

[23] This is consistent with the 'NPV=0', or 'present value' condition. For more detail on the present value principle, refer to Chapter 4 - Overall rate of return.

30. The implication of the efficiency element of point a) is that the benchmark firm is assumed to be on, or near, the efficiency frontier, consistent with the performance and cost structure of an efficient service provider. The efficient firm would be part of the portfolio of efficient assets held by an investor.

   - The benchmark firm's efficient cost of finance will reflect the prevailing conditions in capital markets for the cost of debt and equity, taking risk into account. The resulting discipline on its cost structure is entirely consistent with that faced by firms in effectively competitive markets, where competitive forces constrain returns to no more than the efficient cost of capital.

   - An implication of adopting the benchmark efficient firm is that the actual decisions of the service provider may differ (and often will differ) from the benchmark firm. However, under incentive regulation the regulator does not compensate the regulated service provider for its actual decisions, but compensates it as if it were operating efficiently. If the service provider is not actually operating efficiently relative to the benchmark, then that is a matter for the service provider's management and shareholders.

   - The benchmark cannot be purely hypothetical. The benchmark should be based on the actual costs and risks faced by an efficient service provider.

   - The benchmark approach provides incentives for the regulated business. If the regulated business is able to exceed the benchmark performance, it is able to retain any increased profits during the regulatory period. If the regulated firm fails to achieve the benchmark, then it bears the losses.

31. The efficient firm would provide reference services in a way that meets consumers' preferences with regard to price, quality, reliability, safety, and security, thereby meeting the requirement of a)(iii) (long-term interests of consumers).

32. An implication of the subsidiary objective of point a)(i) in paragraph 27 (regulatory years) is that the allowed rate of return objective looks ahead to the actual regulatory years of the access arrangement period.

33. An implication of the subsidiary objective of point a)(ii) (effective incentives) is that best practice regulation will generally set an estimated return ex ante, and then allow the firm to capture a portion of any subsequent out-performance or be penalised for under-performance.

34. An implication of point a)(i) (regulatory years) and point b) (uncertainty) is that the regulator sets the rate of return based on the most 'reasonable' predictors of the cost of debt and the cost of equity for the future regulatory years.[24]

35. An implication of point c) (transaction costs) is that regulators are reluctant to revisit the returns to the firm too frequently, particularly where this significantly increases transaction costs for both the regulator and the firm, or where it reduces the power of any incentives associated with an ex ante approach. Current practice is to set the regulated return for a five-year period.

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[24] National Gas Law, s. 24(2) – a revenue and pricing principle – states that "a service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs...".

2.4   Introduction of a binding rate of return

36.   At present, the rate of return guidelines are not binding on either the ERA or the pipeline service provider.   The Council of Australian Governments' Energy Council has developed a framework for binding rate of return guidelines.   The Statutes Amendment (National Energy Laws) (Binding Rate of Return Instrument) Act 2018 has been proclaimed in South Australia.

37.   If the Western Australian Government chooses to adopt these changes, then these guidelines will become a mandatory instrument.

2.4.1   New legislation

38.   The new binding rate of return legislation has implications for the application of current gas rules.

39.   These include that when the mandatory instrument is given effect in Western Australia, the allowed rate of return objective will fall away.

40.   The new binding rate of return legislation will require that a regulator have regard to the following factors to make the rate of return instrument:

   a.   the national gas objective

   b.   the revenue and pricing principles

   c.   the following matters as provided to the ERA:

      i.   advice or recommendations given by a consumer reference group

      ii.   submissions on the making of the draft rate of return instrument

      iii.   advice or recommendations given by experts

      iv.   the report given by the independent panel under section 30L

   d.   other information the ERA considers appropriate.

41.   A binding rate of return instrument would set out how the rate of return would be automatically applied in each regulatory determination, without the exercise of any discretion.   However, in developing a binding instrument there is scope for regulatory discretion in establishing the approach and estimates for rate of return parameters.

42.   Under the new binding rate of return legislation a new instrument must be published on the fourth anniversary of the day the reviewed instrument was published.   The ERA will use the active binding instrument available at that time for any access arrangements as they arise.

2.4.2   Importance of National Gas Objectives

43.   Under the current rules, the ERA sets the allowed rate of return to achieve the national gas objective and the allowed rate of return objective.   To set the allowed rate of return, the ERA must also have regard to the revenue and pricing principles.

44.   The national gas objective governs the regulatory determinations and has primacy, including over the allowed rate of return objective.

45.   The allowed rate of return objective is a rate of return commensurate with efficient financing costs and the risks involved in providing energy network services.

46.   The ERA has drafted these guidelines to apply equally to the current framework and the proposed binding rate of return framework, if implemented.

47.   The ERA considers this is appropriate as:

•   The national gas objective is the overarching objective for the national gas regulatory framework.

•   A focus on the national gas objective and the revenue and pricing principles will still use the key concepts required to promote the allowed rate of return objective.

•   The draft binding rate of return legislation will change the rules framework for estimating the rate of return (including the removal of the allowed rate of return objective), however, the national gas objective will remain unchanged.

•   The ERA would have the discretion to implement relevant concepts that may currently exist under the National Gas Rules and apply them in the implementation of a binding instrument.

2.4.3   New consultation requirements

48.   The new legislation to introduce the binding rate of return instrument introduces new consultation requirements for regulators.

49.   The ERA was exempt from the requirement to seek advice from a consumer reference group when preparing its first rate of return instrument and was not required to seek advice from experts.

50.   However, the ERA was to commission and have regard to a report given by an Independent Panel when preparing the instrument.

51.   The objective of the Independent Panel is to assist the ERA make the best possible final guideline by providing an independent perspective on the development of the draft guideline.

3. Overall rate of return

52. The rate of return, based on a Weighted Average Cost of Capital (WACC), provides a service provider with a return on the capital it has invested in its business.

53. The National Gas Rules require the ERA to adopt a 'nominal vanilla' WACC to develop the rate of return for the benchmark efficient entity.[25]

54. A vanilla WACC does not include any adjustment for tax impacts, such as the effect of imputation credits on the rate of return. The impact of tax on the returns must be accounted for separately, as an explicit deduction from the relevant cash flows. A vanilla WACC is therefore a 'post-tax' framework.

55. The nominal vanilla WACC provides for a simple weighted average of the nominal post-tax return on equity and the nominal return on debt.

56. This chapter sets out the approach the ERA will adopt for future regulatory decisions.

3.1 Approach

3.1.1 A nominal post-tax model

57. The ERA will apply an explicit nominal post-tax modelling approach.

58. The AER's Post-Tax Revenue Model, or a similar model, will provide a basis for access arrangement determinations. The Post-Tax Revenue Model enables the ERA to use a nominal vanilla rate of return.

59. The Post-Tax Revenue Model deals with tax explicitly through operating cash flows, consistent with the use of a nominal vanilla rate of return.[26]

3.1.2 Components of the rate of return

60. The ERA will adopt a WACC for a benchmark efficient entity in its simplest 'vanilla' form, expressed as:

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[25] National Gas Rules 87(4).

[26] Tax cash flows in the revenue model recognise the effects of statutory tax rates, the deductibility of interest expenses and the existence of imputation credits.

$$WACC_{vanilla} = E(r_e)\frac{E}{V} + E(r_d)\frac{D}{V}$$

equation 1

where

$E(r_e)$ is the expected return on equity

$E(r_d)$ is the expected return on debt

E/V is the proportion of equity in total financing (comprising equity and debt)

D/V is the proportion of debt in total financing.

61.   The ERA supports the use of the nominal vanilla WACC as it is simple, widely understood, commonly used by regulators and allows the separate calculation of tax effects.

3.1.3   The term of the rate of return

62.   The term of the estimates for the rate of return will be, as far as possible, consistent with the term of the regulatory period.

63.   Accordingly, as the regulatory period for the ERA's gas pipeline decisions is five years, the term of its estimates for the rate of return will generally be five years.

3.1.4   Requirement to meet the allowed rate of return objective

64.   The ERA will evaluate its estimate of the allowed rate of return having regard to the requirements of the allowed rate of return objective and the National Gas Rules more broadly. In particular, the ERA will consider whether its allowed rate of return estimate is reasonable for a benchmark efficient entity with a similar degree of risk as the service provider in the provision of reference services.[27]

65.   As discussed in Chapter 2, the introduction of a binding rate of return instrument, if implemented, may remove the allowed rate of return objective. The ERA considers that the national gas objective and the revenue and pricing principles will still use the key concepts required to promote the allowed rate of return objective.

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[27]   When the mandatory instrument is given effect in Western Australia the allowed rate of return objective will fall away. The allowed rate of return objective currently must be interpreted in a manner consistent with the national gas objective and the revenue and pricing principles. After the removal of the allowed rate of return objective, the ERA will continue to set the rate of return in a consistent manner with the national gas objective and the revenue and pricing principles.

4. The benchmark efficient entity

66. Regulators use a benchmark efficient entity to inform the WACC parameters set for a regulated entity. This is consistent with incentive regulation and ensures that a regulator does not compensate a regulated service provider for its actual costs, but compensates it as if it were operating efficiently.

67. In determining a benchmark efficient entity a regulator needs to account for the risks of providing the regulated services.

68. The allowed rate of return objective, as set out in National Gas Rule 87(3), introduces the concept of a 'benchmark efficient entity'.

> 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*).

69. The wording of the allowed rate of return objective requires the rate of return to be based on:

- the efficient financing costs of

- a benchmark efficient entity, with

- a similar degree of risk as the service provider in the provision of reference services.

70. This chapter outlines how the ERA will approach each of these elements.

4.1 Approach

4.1.1 Efficient financing costs

71. Financial markets provide observations that can be used to estimate the efficient financing costs of the benchmark efficient entity.

72. The ERA prefers observations based on market outcomes to other types of information on the premise that markets provide useful information that sufficiently reflects efficient outcomes.

73. The ERA considers that the risk for the assets observed should stem from the economy in which the benchmark efficient entity is situated.

4.1.2 The benchmark efficient entity

74. The ERA defines the benchmark efficient entity as:

> An efficient 'pure-play' 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. [28]

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[28] This definition has changed from the previous Rate of Return Guidelines which used the term 'An efficient 'pure-play' regulated gas network'. This definition still allows the ERA to use either regulated or non-regulated businesses for our benchmark sample, which was specifically endorsed by the Federal Court. See Federal

4.1.3   Similar risk in the provision of reference services

75.   The ERA will base its estimates of efficient financing costs on the results from a sample of comparator firms with efficient financing costs that are judged to be similar to a single benchmark efficient entity for the provision of gas pipeline and network services in Australia. This means that comparator firms need not operate in the transmission and/or distribution of gas, but must have operations that are comparable. At the outset of the guidelines, the sample is established and used to inform the value of firm-specific WACC parameters which remain fixed until the next rate of return guideline review.[29]

Court of Australia, *Australian Energy Regulator v Australian Competition Tribunal (No 2) [2017] FCAFC 79 and Australian Energy Regulator v Australian Competition Tribunal (No 3) [2017] FCAFC 80*, 24 May 2017, [536] for more details.

[29]   The term 'firm' here refers to the benchmark efficient firm. Firm specific parameters are those that are specific to the benchmark efficient firm. These include gearing, equity beta, credit rating, debt risk premium and hedging costs. In contrast, market wide parameters are those that are observed across the economy's markets more broadly. These include the nominal risk free rate of return, inflation, interest rate swap rate, gamma and the market risk premium.

5.   Gearing

76.   Gearing is the proportion of a business's assets assumed to be financed by debt and equity. Gearing is defined as the ratio of the value of debt to total capital (that is, including debt and equity) and so is generally expressed as follows:

$$Gearing = \frac{Debt}{Debt + Equity}$$ equation 2

77.   This ratio is used to weight the costs of debt and equity when the regulated WACC is determined.

78.   Under the National Gas Rules, the allowed rate of return for a regulatory year should be a weighted average of the return on equity for the access arrangement period in which that year occurs and the return on debt for that year.[30]

79.   In addition to being used to weight the expected returns on debt and equity to determine the regulated rate of return, the level of gearing of a benchmark efficient business is also used:

- To re-lever asset betas for the purposes of analysing the level of systematic risk across businesses in the estimate of equity beta.

- As a factor in determining an appropriate credit rating for deriving the debt risk premium.

- To determine interest and tax expenses in a post-tax revenue model.

5.1   Approach

80.   The target gearing is the relevant gearing level in the cost of capital. The ERA considers that target gearing should be determined from observations of the gearing level of firms in the benchmark sample of Australian utility businesses.

81.   The average gearing of the benchmark sample determines the benchmark efficient level of gearing.

82.   The ERA observed trends in average gearing across various definitions of debt and equity and examined the drivers of the results. The ERA's recent analysis, using the updated data to 2017, indicates a benchmark gearing level of 55 per cent debt.

83.   A gearing level of 55 per cent will be fixed until the next review of the guidelines.

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[30] National Gas Rules 87(4).

6. Return on debt

84. Under the National Gas Rules, the ERA is required to estimate the return on debt in a way that contributes to the achievement of the allowed rate of return objective. As detailed in the National Gas Rules section 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.

85. Subject to that overarching requirement, the method adopted to estimate the return on debt may, without limitation, be designed to result in a return on debt that reflects:[31]

- The return that would be required by debt investors in a benchmark efficient entity if they raised debt at the time, or shortly before the time, that the regulator's decision on the access arrangement for that period is made.

- The average return that would have been required by debt investors in a benchmark efficient entity if they raised debt over an historical period prior to the commencement of a regulatory year in the access arrangement period.

  or

- Some combination of the above returns.

86. This chapter sets out the approach the ERA will adopt to estimate the return on debt.

6.1 Approach

87. The estimate of the return on debt is based on a risk premium over and above the risk free rate, combined with an additional margin for administrative and hedging costs:

Return on debt = risk free rate + debt risk premium + debt raising costs
 + hedging costs

equation 3

88. The risk free rate is the rate of return of a hypothetical investment with no risk of financial loss, over a given period of time.

89. The debt risk premium is the margin above the risk free rate of return required to compensate holders of debt securities for the risk in providing debt finance. The debt risk premium is compensation for investors who tolerate the extra risk, compared to that of a risk free asset.

90. Debt raising and hedging costs are direct costs incurred by businesses in raising and hedging debt.

91. The return on debt estimate is based on the hybrid trailing average approach. This method:

- Adopts a five-year bank bill swap rate, set on the day.

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[31] National Gas Rules 87(10).

- Uses a 10-year trailing average for the debt risk premium, which is updated annually so that each year a new year's debt risk premium is estimated and the oldest estimate in the 10-year series is removed.

92.   The on-the-day estimate of the risk free rate will be based on the observed yield of a five-year term bank bill swap rate, averaged over a 20-day period just prior to the regulatory period (see *Chapter 7 – Risk free rate of return*). The 20-day period will be nominated by the service provider in advance of the ERA's final decision. The five-year term reflects the NPV=0 principle that the term of debt should match the length of the regulatory period, which is five years.

93.   The on-the-day debt risk premium will be derived from the yield of an observed sample of bonds, with a term of 10 years, issued by comparator firms with similar credit ratings as the benchmark efficient entity (see *Chapter 8 – Benchmark credit rating* and *Chapter 9 – Debt risk premium*). The ERA calculates the debt risk premium based on a 10-year hybrid trailing average, which will be updated annually. The ERA considers that this approach best approximates the NPV=0 principle while also recognising refinancing risk and the staggered nature of debt portfolios.

94.   An annual allowance will be provided for debt raising and hedging costs (see *Chapter 13 – Debt and equity raising costs*). The annual allowances for these elements will be set once, at the start of the regulatory period.

95.   The ERA considers that this return on debt approach best approximates the NPV=0 principle while also recognising interest rate risk, refinancing risk and the staggered nature of debt portfolios.

6.1.1   Initial revenue path

96.   The return on debt estimated for the first year of an access arrangement will contribute to the setting of the initial revenue path for the remaining years of the regulatory period (that is, for years two to five).

6.1.2   Annual update of the return on debt

97.   The ERA will revise the return on debt each year to incorporate an annual update of the estimate of the debt risk premium.

98.   Each year, the ERA will estimate the latest on-the-day value of the debt risk premium over the specified averaging period. It will then be incorporated in the 10-year trailing average, replacing the estimate made 10 years prior.

6.1.2.1   Implementing the annual update

99.   The ERA will implement the annual update by setting tariffs for regulatory years two to five by including an automatic adjustment to the initial revenue path in each year.

100. The automatic adjustment will account for the change in revenue in each year that arises from the difference between the return on debt under the initial revenue path and that under the annually updated return on debt.

101. The difference in the return on debt will reflect the change in the debt risk premium. The other components of the return on debt – the risk free rate and the allowances for debt raising costs and hedging costs – will apply unchanged for each regulatory year in the regulatory period.

102. First, the cash flow allowance for the return on debt in any regulatory year t may be defined as:

$$RoD_t = (DRP_t + R_f + Drc + Hc). \frac{D}{(D+E)}. RAB_{Op,t}$$ equation 4

where

RoD_t is the return on debt in year t

DRP_t is the initial debt risk premium

R_f is nominal risk free rate

Drc is the debt raising cost

Hc is the hedging cost

$\frac{D}{(D+E)}$ is the gearing

$RAB_{Op,t}$ is the opening regulated asset base at the beginning of year t

t ranges from year 1 to 5.

103. The 'initial revenue path' will be calculated in line with the above formula, using the estimated DRP_t for year 1 (that is, DRP_1).

104. Second, the formula for calculating the subsequent annual adjustment to the initial revenue path for a change in the estimate of the debt risk premium will be as follows:

$$\Delta RoD_t = \frac{D}{(D+E)} (DRP_t \times RAB_{Op,t} - DRP_1 \times RAB_{Op,1}) \qquad \text{equation 5}$$

where

ΔRoD_t is the change in the allowance for the return on debt in year t

$\dfrac{D}{(D+E)}$ is the gearing

DRP_1 is the initial debt risk premium estimated at the start of the regulated period

$RAB_{Op,1}$ is the opening Regulated Asset Base at the start of the regulated period

DRP_t is the debt risk premium estimated at the start of period t

$RAB_{Op,t}$ is the opening Regulated Asset Base at the beginning of year t

t is the regulatory year, ranging from year 2 to 5.

105. Under this formula, all return on debt amounts remain unchanged from those provided in the initial revenue path in the final access arrangement decision, except for the annual allowance ΔRoD_t, which reflects the change in the debt risk premium in the regulatory years two to five.

106. Revenue and prices to apply in the relevant regulatory year will be adjusted along with the updated return on debt, as part of the annual tariff update, through the automatic update mechanism.

107. As only the estimate of the debt risk premium is updated annually, the approach constitutes a partial update of the return on debt and the rate of return. This partial update is the approach that best meets the requirements of the National Gas Law, the national gas objective, the revenue and pricing principles, the National Gas Rules and the allowed rate of return objective, since it takes both efficiency and the desire of users for stability in gas pipeline tariffs into account.

7. Risk free rate of return

108. The risk free rate is the return an investor would expect when investing in an asset with no risk.

109. The risk free rate is the rate of return an investor receives from holding an asset with a guaranteed payment stream (that is, where there is no risk of default). Since there is no likelihood of default, the return on risk free assets compensates investors for the time value of money.

110. The risk free rate of return can be estimated as either a nominal or real risk free rate. The nominal risk free rate includes compensation to investors for the reduction in purchasing power caused by inflation. The real risk free rate of return would prevail if the expected inflation rate was zero during an investment period. The National Gas Rules requires the ERA to use a nominal vanilla rate of return in regulatory decisions,[32] so in this section, the term 'risk free rate' refers to the nominal risk free rate.

111. This chapter outlines the ERA's approach to determining the risk free rate used to calculate the rate of the return.

7.1 Approach

112. The ERA will use a five-year term to maturity to estimate the risk free rate of return for the return on equity and for the return on debt.

113. The ERA will set the risk free rate of return at the start of a regulatory access arrangement period and will be fixed for the length of that period.

114. Commonwealth Government Security bonds are the best proxy for risk free assets in Australia.

115. The ERA will use observed yields from these Commonwealth Government Security bonds – as reported daily by the RBA – to estimate the risk free rate of return for the purpose of estimating the return on equity.

116. It is not common to observe a Commonwealth Government Security bond with remaining term to maturity that exactly matches that of the regulatory period.[33] Therefore, for the return on equity, the ERA will use a linear interpolation of the observed yields of Commonwealth Government Security bonds to estimate the risk free rate.

117. For the return on debt, the ERA will use estimates of the prevailing interest rate swaps of appropriate terms for estimating the return on debt. The swap rate is referred to as the 'base rate' in the return on debt calculation. It incorporates a spread to the rate on Commonwealth Government Security bonds and is available at specified terms from data providers such as Bloomberg.

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[32]   National Gas Rules 87(4).

[33]   In the linear interpolation approach, two bonds are selected with terms to maturity that fall on either side of the date on which the term of the regulatory period ends The dates on these bonds are referred to as the 'straddle' dates. Linear interpolation estimates the yields on the regulatory period term by assuming a linear increase in yields between the straddle dates on the two bonds observed.

118.   An 'averaging period' will be selected to set the rate of return parameters that are calculated using market data (being the risk free rate used to estimate the return on equity, and the base rate to be used in the estimate of the return on debt for the coming five-year period). The averaging period will:

- have a duration of 20 consecutive trading days

- be as close as possible to the expected access arrangement final decision for regulatory period

- be nominated prior to any of its dates taking place.

119.   In the event that an averaging period is not nominated within 30 business days following an access arrangement draft decision, the ERA will use a default averaging period of the 20 consecutive trading days one month prior to the access arrangement final decision for the regulatory period.

8. Benchmark credit rating

120.   The benchmark credit rating is an input required to estimate the debt risk premium.

121.   The credit rating is defined as the forward-looking opinion provided by a ratings agency of an entity's credit risk. Credit ratings provide a broad classification of a firm's probability of defaulting on its debt obligations. As a consequence, credit ratings represent the risk present in holding a debt instrument.

122.   As a general rule, the debt risk premium is higher when the credit rating is lower, and vice versa. This is because lenders require increased compensation before they commit funds to a debt issuer with a lower credit rating. A lower credit rating can be associated with a higher risk of default, which leads to a higher debt risk premium.

8.1 Approach

123.   Credit ratings provide a broadly uniform measure of default risk. That is, firms with the same credit rating at a particular point in time should have similar levels of default risk.

124.   This characterisation of risk eliminates the need to rely on listed firms, as is the case for equity beta, because it is not measured relative to an index based on a domestic stock exchange. For this reason both listed and unlisted firms can be used where a credit rating is available.

125.   The ERA uses the median value approach to determine the credit ratings of the benchmark efficient entity.

126.   The median value approach involves taking the median credit rating of a sample of comparator businesses and using this value as the credit rating for the benchmark efficient credit rating. These can be either listed or unlisted or government-owned. This approach is relatively robust to the presence of outliers in the comparator business sample. The approach is somewhat superficial because it does not analyse the drivers of credit ratings in much detail and just focuses on the prevalence of the final ratings. This approach suggests a credit rating around BBB+.

127.   Other regulators' decisions are referred to as a cross-check. They support a credit rating of BBB+.

128.   On the basis of the analysis and cross-checks the ERA determines a benchmark credit rating of BBB+ to be appropriate for application in the cost of debt estimations.

129.   This credit rating is fixed until the next review of the rate of return guidelines.

9. Debt risk premium

130. The debt risk premium is the return above the risk free rate that lenders require to compensate them for the risk of providing debt funding to a benchmark business. The debt risk premium compensates holders of debt securities for the possibility of default by the issuer.

131. This chapter outlines the ERA's approach to estimating the debt risk premium.

9.1 Approach

132. Estimating the debt risk premium involves the following steps:

- Step 1: Determining the benchmark sample - Identifying a sample of relevant corporate bonds that reflect the credit rating of the benchmark efficient entity.

- Step 2: Collecting data and converting yields to Australian dollar equivalents - Converting the bond yields from the sample into hedged Australian dollar equivalent yields inclusive of Australian swap rates.

- Step 3: Averaging yields over the averaging period – Calculating an average AUD equivalent bond yield for each bond across the averaging period.

- Step 4: Estimating curves - Estimating yield curves on this data by applying the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques.

- Step 5: Estimating cost of debt - Calculating the simple average of their three yield curves' 10-year cost of debt to arrive at a market estimate of the 10-year cost of debt.

- Step 6: Calculating the debt risk premium - Calculating the debt risk premium by subtracting the 10-year interest rate swap rate from the 10-year cost of debt.

133. These steps determine the debt risk premium at a point in time, being the date of calculation. The ERA refers to this method as the 'revised bond yield approach'.

134. To determine the debt risk premium used to calculate the gas rate of return, the ERA constructs a 10-year trailing average debt risk premium. This will consist of a debt risk premium for the current year and a debt risk premium for each of the nine prior years. The 10-year trailing average debt risk premium must be updated each year.

135. The following sections provide more detail on the ERA's methods for identifying the benchmark sample, converting bond yields into hedged Australian dollar equivalent yields, estimating yield curves and constructing the 10-year trailing average.

136. An allowance for debt risk premium estimation costs will be reviewed in the ERA's assessment of efficient operating expenditure for a regulated business' access arrangement and does not form part of the rate of return. The regulated business should propose an efficient level of annual debt risk premium estimation costs as part of its access arrangement proposal.

9.1.1 Identifying the benchmark sample

137. The ERA's revised bond yield approach uses international and domestic bonds – identified by Bloomberg as having Australia as their country of risk – to estimate the cost of debt each year.

138. The ERA will apply the following characteristics to identify international and domestic corporate bonds to be included in the benchmark sample:[34]

    - The credit rating of each bond must match that of the benchmark efficient entity, as rated by S&P (*Chapter 8 – Benchmark credit rating* discusses the credit rating of the benchmark efficient entity).

    - Time to maturity must be two years or longer.

    - Issued bonds must have the country of risk specified as Australia,[35] and must be denominated in either AUD, USD, Euros or GBP (all compliant bonds are included, except those issued by the financial sector).[36]

    - The benchmark sample will include both fixed bonds[37] and floating bonds.[38]

    - The benchmark sample will include both bullet and callable/puttable redemptions.[39]

    - Bonds will have at least 50 per cent of observations for the averaging period (that is, 10 yield observations over the required averaging period of 20 trading days are required).

    - The bonds are not called perpetual, a duplicate, or inflation-linked.

139. The averaging period for the debt data series for any given year will be:

    - specified before the start of the regulatory period

    - as close as practical to the start of the relevant regulatory year

    - confidential.

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[34] ERA, *Discussion Paper – Measuring the Debt Risk Premium: A Bond Yield Approach*, December 2010, p. 11.

[35] Country of risk is based on Bloomberg's method 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.

[36] As classified by Bloomberg Industry Classification System level 1.

[37] This is a long term bond that pays a fixed rate of interest (a coupon rate) over its life.

[38] 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.

[39] A bullet bond is a bond that is not able to be redeemed prior to maturity and whose entire principal value is paid all at once at maturity. A callable (puttable) 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 (puttable) 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).

140.   The averaging period is to be confidential so as not to adversely affect a regulated entity's ability to obtain finance.

141.   In the event that an averaging period for the debt data series is not nominated before the start of the regulatory period, the ERA will use a default debt averaging period of the 20 consecutive trading days ending two months prior to each regulatory year.

9.1.2   Collecting data and converting bond yields to Australian dollar equivalent yields

142.   The ERA will estimate the 'spread to swap' for each bond. The relevant basis swap rate is the interest rate swap – of equivalent tenor to the yield to maturity of each bond in the extended benchmark sample – in the denominated currency of each bond. Subtracting this swap rate from the bond yield isolates the credit spread, giving the 'spread to swap' in the denominated currency.

143.   The ERA will then convert this denominated currency credit to Australian dollar terms by accounting for hedging costs.[40]

9.1.3   Averaging yields over the averaging period

144.   The ERA will average the AUD equivalent bond yield for each bond across the averaging period.

9.1.4   Estimating yield curves

145.   The ERA will apply three curve-fitting techniques to the bond yield data to estimate the cost of debt. These are the Gaussian Kernel method, the Nelson-Siegel method and the Nelson-Siegel-Svensson method.

9.1.5   Estimating the debt risk premium

146.   The ERA will then average the results of these three methods to arrive at a market estimate of the 10-year cost of debt.

9.1.6   Constructing the 10-year trailing average

147.   The estimate of the debt risk premium for each year will be a simple trailing average, as discussed in *Chapter 6 – Return on debt*.

148.   The ERA analysis for the 2013 guidelines indicated that the term at issuance for a benchmark efficient entity is about 10 years.[41] Consequently, the trailing average is constructed over a 10-year period, to ensure consistency with the average term of debt issued by the benchmark efficient entity and its staggered debt portfolio.

149.   The ERA began calculating annual debt risk premiums in April 2015, and will use these as inputs when constructing the 10-year trailing average.

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[40]   The ERA accounts for the cross-currency basis swap and the interest rate swap, as per the RBA's method, but not the conversion factor. The cross-currency basis swap is generally the most significant hedging cost. See: RBA, 'New Measures of Australian Corporate Credit Spreads', *Bulletin*, December quarter 2013, p. 25.

[41]   ERA, *Appendices to the Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 39.

150. For years prior to 2015, the ERA will adopt a third party source for debt risk premiums, being the RBA's historical credit spreads for 10-year non-financial corporate bonds.

151. The trailing average debt risk premium over the most recent 10 years will be a simple average of each year's debt risk premium (that is, the calculation will weight each year's debt risk premium at 10 per cent).

152. The 10-year trailing average debt risk premium will be updated each year by adding in the most recent estimate of the debt risk premium and dropping the estimate from 10 years ago.

153. The automatic formula for the simple, equally-weighted 10-year trailing average is:

$$TA\ DRP_0 = \frac{\sum_{t=0}^{-9} DRP_t}{10}$$

equation 6

where

$TA\ DRP_0$ is the equally weighted trailing average of the debt risk premium to apply in the following year as the annual update of the estimate used in the current year

DRP_t is the debt risk premium estimated for each of the 10 regulatory years t = 0, -1, -2…. , -9.

10. Return on equity

154. The return on equity is the return that investors require from a firm to compensate them for the risk they take by investing their capital.

155. There are no readily observable proxies for the expected return on equity. While estimates of the cost of debt can be obtained by observing debt instruments, financial markets do not provide a directly observable proxy for the cost of equity, for either individual firms or for the market as a whole.

156. Estimating a forward-looking return on equity – sufficient to enable regulated firms to recoup their prevailing equity financing costs – requires the use of models. Generally, these models seek to explain the required return on equity through a relationship with some portfolio of risk factors, or else in terms of the present value of the expected stream of future cash flows.

157. The model most used by Australian regulators for quantifying the return on equity and associated risk has been the Sharpe Lintner Capital Asset Pricing Model (CAPM).

158. This form of CAPM directly estimates the required return on the equity share of an asset as a linear function of the risk free rate and a component reflecting the risk premium that investors would require over the risk free rate.

159. National Gas Rule 87(7) states that regulators must have regard to the prevailing conditions in the market for equity funds when estimating the return on equity.

160. At the same time, under National Gas Rule 87(5), regulators must have regard to relevant estimation methods, financial models, market data, and other evidence.

161. An overarching requirement under the National Gas Rule 87(3) is to achieve the allowed rate of return objective.

162. In this chapter the ERA sets out its approach to estimating the return on equity.

10.1 Approach

163. To date, Australian regulators have used the Sharpe Lintner CAPM to quantify the return on equity and associated risk.

164. The ERA will determine a single point estimate for the return on equity using the Sharpe Lintner CAPM:

$$R_i = R_f + \beta_i \left(R_m - R_f \right)$$

equation 7

where:

R_i is the required rate of return on equity for the asset, firm or industry in question

R_f is the risk free rate

β_i is the equity beta that describes how a particular portfolio i will follow the market which is defined as $\beta_i = \text{cov}\left(R_i, R_m\right)/\text{var}\left(R_m\right)$

$\left(R_m - R_f\right)$ is the market risk premium.

165. To estimate the return on equity the ERA will separately estimate:

- the risk free rate

- the equity beta

- the market risk premium.

11. Market risk premium

166. The ERA uses the Sharpe Lintner CAPM to estimate the return on equity (as explained in *Chapter 10 – Return on equity*). The market risk premium is a parameter of the Sharpe Lintner CAPM.

167. The market risk premium is the expected rate of return over and above the risk free rate that investors require to invest in a fully-diversified portfolio. Ex ante, investors always require a rate of return above the risk free rate to invest and so the expected market risk premium is always positive. Ex post, the realised return to the market portfolio may be negative; that is the nature of risk. In establishing the cost of capital it is the ex ante market premium that is relevant.

168. The market risk premium compensates an investor for the systematic risk of investing in a fully diversified portfolio. Systematic risk is risk that cannot be diversified away by investors because it affects all firms in the market.[42] Therefore, the market risk premium represents an investor's required expected return, over and above the risk free rate of return, on a fully diversified portfolio of assets. This is a forward-looking concept.

169. The market risk premium is calculated as follows:

$$MRP = R_M - R_F$$ equation 8

where:

R_M is the expected market return on equity observed in the Australian stock market

R_F is the 10-year risk free rate of return.

170. While estimates of the cost of debt can be obtained by observing debt instruments, the financial markets do not provide a directly observable proxy for the cost of equity for either individual firms or the market as a whole. The market risk premium cannot be directly observed because it depends on investors' expectations at the time of investment. In order to set the return on equity, the market risk premium needs to be estimated for a future time period. The ERA's forward looking market risk premium is estimated over a five-year period, consistent with the term of the regulatory period.

171. In estimating the expected market risk premium it is common to use equity indices (for example, the Australian Securities Exchange 200 Index) of listed companies as a proxy for the market portfolio and sovereign debt (for example, Australian Treasury bonds) as a proxy for the risk-free asset. The widespread use of these proxies is testament to the proposition that they are effective proxies. Given this resolution, the question then becomes which approach is best to estimate the expected market risk premium.

172. This chapter discusses how the market risk premium is to be estimated.

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[42] The foundation of the Sharpe Lintner CAPM is the proposition that adding an asset to a portfolio reduces risk via the diversification effect but not beyond the risks that the assets in a portfolio share in common, that is, their systematic risk. At the limit, when one has invested in all available assets in the market portfolio, there is only systematic risk left. An important assumption of the CAPM is that assets are priced as though it is only their system risk that is relevant to investors.

11.1 Approach

173. The ERA's estimation of the market risk premium has in the past involved a level of regulatory discretion.

174. For the purposes of setting the guidelines and future binding instrument, the ERA considered how best to set a market risk premium under the current regulatory framework and, if implemented, under the proposed binding rate of return framework.

11.1.1 Historic market risk premium

175. The ERA places more reliance on the historic market premium to estimate the market risk premium, relative to the dividend growth model.

176. The historic market premium is the average realised annual return that stocks have earned in excess of the five-year government bond rate. This historic market premium can be directly measured.

177. While not forward-looking, the historic approach has been used to estimate the forward-looking market risk premium as past outcomes contribute to investors' forward expectations.

178. The main historic market premium approach is that established by Ibbotson. This approach has been widely accepted.

179. The ERA's method to calculate the historic market premium is summarised below.

- Arithmetic and geometric averages of the historic market premium observations are calculated using the BHM and NERA datasets.

- Six overlapping time periods (1883-2017, 1937-2017, 1958-2017, 1980-2017 and 1988-2017) are used for averaging periods, to reflect different economic conditions.

- A simple average of the lowest arithmetic and highest geometric means of the produced historic market premium matrix is then used to estimate the historic market risk premium.

11.1.2 Dividend growth model

180. The ERA places less reliance on the dividend growth model to estimate the market risk premium, relative to the historic market premium.

181. The dividend growth model method examines the forecast future dividends of businesses and estimates the return on equity that makes these dividends consistent with the market valuation of those businesses.

182. The ERA will use the two-stage dividend growth model to estimate the market risk premium. The ERA's dividend growth model estimate will use a growth rate from Lally of 4.6 per cent.

11.1.3 Conditioning variables

183. The ERA uses conditioning variables to determine a final point estimate, including:

- the default spreads

- the five-year interest rate swap spread

- dividend yields

- a stock market volatility index.

184. To assess current market conditions, the ERA considers how the current value of each conditioning variable compares to its historic average.

11.1.4 Under current regulatory framework

185. Under the current regulatory framework, the ERA will determine an estimate of the market risk premium through the use of the historic market premium, the dividend growth model and conditioning variables. This will involve a level of regulatory discretion.

186. The ERA will estimate the market risk premium at each determination.

187. Under this approach:

- The ERA will place more reliance on the historic market premium, relative to the dividend growth model. The historic market premium is a simple and well-accepted method for calculating the market risk premium using historical data. Historical averages of the market premium are widely used by financial practitioners and regulators in Australia. The ERA considers historical averages provide the best source of evidence available to estimate the market risk premium.

- The ERA will place less reliance on the dividend growth model, relative to the historic market premium. While the dividend growth model has the benefit of taking the current economic outlook into account, it is unreliable on its own. The dividend growth model suffers from some weaknesses including the form of the model, its input assumptions, its sensitivity to assumptions and its upward bias.

- The ERA will determine a final point estimate of the market risk premium by using its regulatory judgement, including conditioning variables.

188. In determining a point estimate for the market risk premium these factors are exhaustive of all that will be considered.

189. The ERA will round the final point estimate of the market risk premium to one decimal figure.

11.1.5   Under binding regulatory framework

190.   The ERA has considered how best to determine the market risk premium under a binding rate of return framework.

191.   In the event that a binding rate of return framework is introduced, the ERA's method to set the market risk premium will be based on the same approach as proposed under the current regulatory framework, detailed above.

- The ERA will place more reliance on the historic market premium, relative to the dividend growth model.

- The ERA will place less reliance on the dividend growth model, relative to the historic market premium.

- The ERA will determine a final point estimate of the market risk premium by using its regulatory judgement, including conditioning variables.

192.   However, the market risk premium will be calculated once and remain fixed over the period of the binding instrument. The market risk premium will not be recalculated at each determination. Fixing the market risk premium will remove regulatory discretion over the period.

193.   At this time, the ERA estimates a market risk premium of 6.0 per cent.

194.   Under a binding rate of return framework, the ERA will use a 6.0 per cent market risk premium until the next rate of return guideline review.

12.   Equity beta

195.   Equity beta is the 'slope' parameter β_i in the Sharpe Lintner CAPM.   The slope parameter β_i correlates the return on the specific asset, in excess of the risk free rate of return, to the rise and fall of the return on the market portfolio.

$$R_i = R_f + \beta_i \left(R_m - R_f \right)$$
equation 9

where:

R_i is the required rate of return on equity for the asset, firm or industry in question

R_f is the risk free rate

β_i is the equity beta that describes how a particular portfolio i will follow the market which is defined as $\beta_i = \text{cov}\left(R_i, R_m \right) / \text{var}\left(R_m \right)$

$\left(R_m - R_f \right)$ is the market risk premium.

196.   The risk of an asset is typically thought of as the variance in asset returns. This variance is a measure of the total risk of an asset. Total risk consists of systematic and non-systematic risk. Systematic risk is that part of total risk in a firm's returns that stems from the economy and markets more broadly. Systematic risk cannot be easily eliminated through diversification. Non-systematic risk is the risk stemming from unique attributes of the firm, which may be eliminated by an investor through diversification. For this reason only, systematic risk is compensated in the return on equity.

197.   The equity beta is a parameter that measures the systematic risk of a security or a portfolio in comparison to the market as a whole.

198.   Two risk factors are generally considered to impact the value of equity beta for a particular firm:

- The type of business, and associated capital assets, that the firm operates measured by asset or 'un-levered' beta.

- The amount of financial leverage (gearing) employed by the firm which levers or 'amplifies' the asset beta to arrive at equity beta.

12.1 Approach

199.   The ERA relies on the methods set out in Henry's advice to the Australian Competition and Consumer Commission in 2009 to define the equity beta estimation approach.[43] Henry's study was updated in 2014, but remained essentially unchanged.[44]

200.   Henry's analysis uses various time periods over which the data for equity beta estimation is observed. This includes the longest available period, the post-tech boom excluding the global financial crisis and the last five years.[45]

201.   For the length of the data period, there is a trade-off between relevance of the data and statistical robustness. Longer periods can include behaviour in the data that is no longer relevant due to changing economic and market conditions. However, shorter periods may produce estimates that are less statistically robust.

202.   For example, structural breaks can occur where a 'new normal' persists. In these instances data observation periods as short as one year may be preferable because they are reflective of future conditions. However, it is difficult to know this, before the fact. It is possible that deviations from the past may be short term and in the future the data may exhibit reversion to a long term average. In these instances the longest observed time period may be more suitable.

203.   The ERA considers that a five-year period balances these trade-offs whilst being consistent with the regulatory reset period.

204.   The ERA's recent analysis using the updated dataset indicates that an equity beta value of 0.7 was an appropriate estimate.

205.   The ERA will make no adjustment for low beta bias or Black CAPM.

206.   For the final guidelines the ERA will use an equity beta of 0.7.

207.   This equity beta value will be fixed over the period of the guidelines.

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[43]   Henry, O., *Estimation Beta: Advice Submitted to the Australian Competition and Consumer Commission*, 2009.

[44]   Henry, O., *Estimating beta: An update*, April 2014.

[45]   Henry, O., *Estimating beta: An update*, April 2014, p. 4.

13. Debt and equity raising costs

208. Debt and equity raising costs and debt hedging costs are the administrative costs and other charges incurred by businesses when obtaining and hedging finance.

209. This chapter outlines the ERA's approach to determining debt and equity raising costs used to calculate the rate of return.

13.1 Approach

13.1.1 Debt raising costs

210. Regulators across Australia have typically included an allowance to account for debt-raising costs in their regulatory decisions.

211. These debt-raising costs should only include the direct cost components recommended by the Allen Consulting Group in its 2004 report to the Australian Competition and Consumer Commission.[46] The recommendations in this report have been generally accepted by Australian regulators since its publication.

212. These direct costs will be recompensed in proportion to the average annual issuance, and will cover:

- gross underwriting fees

- legal and roadshow fees

- company credit rating fees

- issue credit rating fees

- registry fees

- paying fees.

213. Indirect costs should not be included in the estimate of debt-raising costs and will not be compensated.

214. An estimate of 0.100 per cent per annum (exclusive of hedging costs, which are discussed separately below) is currently the most accurate estimate of debt-raising costs for the benchmark efficient entity.

215. The debt raising cost allowance will be added to the return on debt.

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[46] The Allen Consulting Group, *Debt and Equity Raising Transaction Costs: Final Report*, December 2004.

13.1.2   Debt hedging costs

216.   An annual swap allowance of 0.114 per cent will be provided to firms to compensate for the cost of conducting hedging for exposure to movements in the risk free rate.

217.   The hedging cost allowance will be added to the return on debt.

13.1.3   Equity raising costs

218.   The ERA will provide an allowance for equity raising transaction costs in the capex building block, and so these costs do not form part of the rate of return.

14. Inflation

219. Inflation is the rate of change in the general level of prices of goods and services.

220. Forecast inflation can be used to translate the nominal post-tax WACC to a real post-tax WACC.

221. A nominal rate of return incorporates the real rate of return, compounded with a rate that reflects expectations of inflation. In line with the requirements of the National Gas Rules, the ERA will use a nominal vanilla rate of return for its decisions.[47]

222. The size of the inflation component will have an impact on the nominal prices set for gas distribution and transmission networks. To ensure pricing meets the objectives of the National Gas Law and the National Gas Rules, the ERA must establish a method for estimating the inflation rate that will prevail over the five years of the relevant access arrangement.

223. The resulting estimate of the expected inflation rate will be an input to the nominal modelling of the rate of return, as well as of other components of revenue. In particular, the expected rate of inflation will be required:

- For the roll forward of the regulatory asset base and for indexing purposes to determine annual depreciation allowances.[48]

- To back out the expected inflation underpinning the nominal building block allowances in the tariff variation mechanism, to allow accounting for subsequent actual inflation.

224. The expected rate of inflation will also allow stakeholders to observe the real rates of change in tariffs and in the real rate of return, which is itself an important contributor to the real changes in tariffs.

225. This chapter outlines the ERA's approach to determining the expected rate of inflation.

14.1 Approach

226. The ERA will estimate the expected inflation rate using the Treasury bond implied inflation approach.

227. This approach uses the Fisher equation[49] and the observed yields of:

- Five-year Commonwealth Government Securities, which reflect a market-based estimate of the nominal risk free rate.

- Five-year indexed Treasury bonds, which reflect a market-based estimate of a real risk free rate.

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[47] National Gas Rules 87(4).

[48] This is a requirement to achieve 'economic depreciation' rates in a nominal model. See, for example, the Australian Energy Regulator's Post Tax Revenue Model (Australian Energy Regulator, *Amendment: Electricity transmission network service providers: Post tax revenue model*, 2010).

[49] The formal Fisher equation is: $1 + i = (1 + r)(1 + \pi^e)$

where: i is the nominal interest rate, r is the real interest rate and π^e is the expected inflation rate.

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228.   The ERA will estimate the expected inflation rate consistent with the estimate of the risk free rate by adopting an averaging period of 20 trading days. The averaging period must be nominated in advance and must be close to, and prior to, an access arrangement determination.

229.   The approach uses linear interpolation to derive the daily point estimates of both the nominal five-year risk free rate and the real five-year risk free rate, for use in the Fisher equation.[50] The term of the resulting average expected inflation rate is five years, consistent with the length of the access arrangement period.

230.   In this approach, estimates of both the nominal and real risk free rates of return are directly observed from the financial markets, so reflect the market expectation for inflation.

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[50]   It is not common to observe a CGS bond with an expiry date that exactly matches that of the regulatory period end. To overcome this, two bonds are selected that fall on either side of the end day of the regulatory period. The dates on these bonds are referred to as the 'straddle' dates. Linear interpolation estimates the yields on the regulatory period end date by assuming a linear increase in yields between the straddle dates on the two bonds observed.

15. Value of imputation credits (gamma)

231.　The National Gas Rules require the ERA to set out its approach to estimating the value of imputation credits (gamma), a parameter in the post-tax revenue model.

232.　The imputation tax system prevents corporate profits from being taxed twice. Prior to the introduction of imputation on 1 July 1987, company profits were taxed once at the corporate level and again at the dividend recipient level (for example, as personal income tax). Under the Australian imputation tax system, franking credits are distributed to investors at the time dividends are paid and provide an offset to those investors' taxation liabilities.

233.　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.

234.　This chapter outlines the ERA's approach to determining gamma.

15.1 Approach

235.　The ERA determines gamma through the Monkhouse formula as the product of the distribution rate and utilisation rate. The distribution rate and utilisation rate are separately estimated.

236.　The distribution rate represents the proportion of imputation credits generated by a benchmark efficient entity that is expected to be distributed to investors. The ERA considers that the distribution rate is a firm-specific rather than a market-wide parameter.

237.　To estimate the distribution rate, the ERA relies on 0.9 for the distribution rate from financial reports of the 50 largest ASX-listed firms.[51]

238.　The ERA considers that the distribution rate is at least 0.9. As detailed by Lally, the three energy network businesses for which data is available produce a higher distribution rate of one. Addressing the problems of limited available data and ability for firm manipulation, the ERA considers the use of the 50 largest ASX listed firms as the best proxy for the distribution rate for the benchmark efficient entity. Lally also found that the distribution rate may be slightly higher with the removal of foreign operations.[52]

239.　The utilisation rate is the weighted average over the utilisation rates of individual investors, with investors able to fully use the credits having a rate of one and those unable to use them having a rate of zero. The ERA considers that the utilisation rate is a market-wide rather than a firm wide parameter.

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[51]　Lally, M., *Estimating the Distribution Rate for Imputation Credits for the Top 50 ASX Companies*, October 2018, p. 4.

[52] Lally, M., *The Estimation of Gamma: Review of Recent Evidence*, December 2018.

240.   To estimate the utilisation rate, the ERA relies on the equity ownership approach to determine the percentage of domestic investors in the Australian equity market. The utilisation rate is estimated for all Australian equity from the national accounts of the ABS. The ERA considers that a utilisation rate of 0.60 is appropriate.

241.   The ERA estimates gamma as the product of the distribution rate and the utilisation rate to provide a gamma of 0.5, which is rounded to one decimal place.

242.   This gamma value will be fixed over the period of the guidelines.

Appendix 1 Abbreviations

Acronym	Full text
ABS	Australian Bureau of Statistics
ACT	Australian Competition Tribunal
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ATCO	ATCO Gas Australia
ATO	Australian Tax Office
BHM	Brailsford, Handley and Maheswaran
bppa	Basis points per annum
DBP	Dampier Bunbury Pipeline (and DBNGP (WA) Transmission Pty Ltd)
DRP	Debt Risk Premium
ERA	Economic Regulation Authority
ENA	Energy Networks Association
EUAA	Energy Users Association of Australia
GGT	Goldfields Gas Transmission
IPART	Independent Pricing and Regulatory Tribunal (of NSW)
MRP	Market risk premium
WAMEU	Western Australian Major Energy Users Inc
NER	National Electricity Rules
NERA	NERA Economic Consulting
NEL	National Electricity Law
NEM	National Electricity Market
NGL	National Gas Law
NGO	National Gas Objective
NGR	National Gas Rules
NSW T Corp	New South Wales Treasury Corporation
QTC	Queensland Treasury Corporation
RAB	Regulatory Asset Base
RBA	Reserve Bank of Australia
RPP	Revenue and Pricing Principles (Section 24 of the NGL)
SFG	Strategic Finance Group Consulting
WACC	Weighted average cost of capital