Economic Regulation Authority

2022 draft gas rate of return instrument

17 June 2022

Economic Regulation Authority

Level 4, Albert Facey House

469 Wellington Street, Perth WA 6000

Telephone   08 6557 7900

Email   info@erawa.com.au

Website   www.erawa.com.au

This document can also be made available in alternative formats on request.

National Relay Service TTY: 13 36 77

About this instrument and review

The Economic Regulation Authority is undertaking a review of the current gas rate of return instrument.

The expected rate of return on capital provides a business with funds to service the interest on its loans and give a return to shareholders.

The gas instrument is required under the National Gas Law (NGL) as implemented in Western Australia by the *National Gas Access (WA) Act 2009*. The gas instrument sets out the methods the ERA will use to estimate the allowed rate of return and value of imputation credits for gas transmission and distribution service providers. These regulated gas pipelines include the Dampier to Bunbury Natural Gas Pipeline, the Goldfields Gas Pipeline and the Mid-West and South-West Gas Distribution Systems.

The ERA published its current gas instrument on 18 December 2018.

The ERA is required to complete a review of the gas instrument every four years and its next gas instrument is required to be published by 18 December 2022.

The NGL requires the ERA to publish a draft gas instrument and explanatory information for the draft instrument before publishing a final gas instrument.

This document is the 2022 gas rate of return draft instrument, which sets out the ERA's current positions on the method for calculating the allowed rate of return and its components. The ERA has concurrently published an explanatory statement for this draft instrument which sets out the ERA's reasoning for those positions.

The ERA is seeking stakeholder feedback on its proposed positions in the draft instrument.

The ERA will consider these submissions in the development of its 2022 final gas instrument, which is expected to be published in December 2022.

Invitation to make submissions

Submissions are due by 4:00 pm WST, Friday, 2 September 2022

The ERA invites comment on this draft instrument and the accompanying *Explanatory statement for the 2022 gas rate of return draft instrument*. The ERA encourages all interested parties to provide comment on the matters discussed in these papers and any other issues or concerns not already raised in either paper.

We would prefer to receive your comments via our online submission form https://www.erawa.com.au/consultation

You can also send comments through:

Email: publicsubmissions@erawa.com.au
Post: Level 4, Albert Facey House, 469 Wellington Street, Perth WA 6000

Please note that submissions provided electronically do not need to be provided separately in hard copy.

All submissions will be made available on our website unless arrangements are made in advance between the author and the ERA. This is because it is preferable that all submissions be publicly available to facilitate an informed and transparent consultative process. Parties wishing to submit confidential information are requested to contact us at info@erawa.com.au.

For further information please contact

General Enquiries

Jason Dignard
Ph: 08 6557 7917
info@erawa.com.au

Media Enquiries

Danielle Asarpota
Ph: 08 6557 79 | Mob: 0428 859 826
media@erawa.com.au

Contents

1. Introduction

1. The ERA 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. As part of the ERA's regulatory responsibility to determine revenues for gas network service providers, the ERA must set a rate of return to be applied on regulated assets. Investors expect to receive a return above their investment to cover financing costs. The expected rate of return provides a business with funds to service the interest on its loans and give a return to shareholders.

3. The NGL requires the ERA to produce a gas rate of return instrument.

4. The ERA published its current instrument on 18 December 2018 (referred to throughout this document as the 2018 gas instrument).

5. The NGL requires the ERA to review each instrument within four years of the last gas instrument:

    30P Review and replacement of instrument

    (1) The [ERA] must -

        (a) review each rate of return instrument; and

        (b) make a new rate of return instrument under this Division to replace the reviewed instrument.

    (2) The [ERA] must replace the reviewed instrument by publishing the new instrument on its website on the day that is –

        (a) the fourth anniversary of the day the reviewed instrument was published; or

        (b) if the day mentioned in paragraph (a) is not a business day-the first business day after that day.

6. The ERA must review the 2018 gas instrument and publish the 2022 gas instrument by 18 December 2022.

7. The gas instrument reviews provide an opportunity to undertake a comprehensive review of approaches for determining the allowed rate of return on capital used for determining revenue for reference services provided on the gas pipelines regulated by the ERA.

8. The ERA encourages all interested parties to provide submissions on the 2022 draft gas instrument and the explanatory statement.

9. The ERA will consider the submissions received regarding the 2022 draft gas instrument and the explanatory statement in formulating the 2022 final gas instrument.

---

[1] 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.

1.1 The requirement

10. The NGL requires the ERA to publish a draft gas instrument and explanatory statement for the draft gas instrument before publishing a final gas instrument.[2]

11. This document, the *2022 Gas Rate of Return Draft Instrument* (referred to throughout this document as the 2022 draft gas instrument) sets out the ERA's current position on determining the allowed rate of return on capital.

12. The *Explanatory Statement for the 2022 Gas Rate of Return Draft Instrument* provides the ERA's reasoning supporting the positions set out in the 2022 draft gas instrument. The ERA's reasoning considers a range of evidence including academic literature, market data and developments, submissions during the review, expert views and other relevant information.

13. Section 30E of the NGL sets out the required content of a rate of return instrument:

    30E Content of rate of return instrument

    (1) If a rate of return instrument states the value of imputation credits, the instrument must state a single value to apply in relation to all covered pipeline service providers.

    (2) If a rate of return instrument states a way to calculate the rate of return on capital or the value of imputation credits, the instrument must—

      (a) provide for the same methodology to apply in relation to all covered pipeline service providers in calculating the rate or value; and

      (b) provide for the methodology to apply automatically without the exercise of any discretion by the [ERA]

        Example for paragraph (b)—

        The instrument cannot include different methodologies or a band of values from which the [ERA] could choose in applying the instrument.

    (3) Subject to subsections (1) and (2), the instrument may include other matters the [ERA] considers appropriate.

        Example—

        Matters to help a covered pipeline service provider calculate a rate of return or the value of imputation credits.

14. When finalised, the gas instrument is a binding instrument on the ERA and gas network service providers. The binding gas instrument will set out how the rate of return is automatically applied in each regulatory determination, without the exercise of any discretion.

---

[2]   NGL, chapter 2, part 1, subdivision 2, cl. 30J and 30L.

1.2   Application of gas instrument

15.   Rule 30Q of the NGL sets out the application of a rate of return instrument:

30Q Application of instrument

(1) A rate of return instrument-

(a) Applies for the purposes of an [ERA] economic regulatory decision made after the commencement of the instrument; and

(b) Does not affect an [ERA] economic regulatory decision made before the commencement of the instrument.

(2) To remove any doubt, it is declared that the application of the instrument under this Law, including, for example, in making a full access arrangement decision, is an [ERA] economic regulatory function or power.

16.   The 2022 final gas instrument is required for the next round of gas access arrangements:

- The Mid-West and South-West Gas Distribution Systems proposal assessment commences in September 2023 (access period commencement date is 1 January 2025).

- The Goldfields Gas Pipeline proposal assessment commences in January 2024 (access period commencement date is 1 January 2025).

- The Dampier to Bunbury Natural Gas Pipeline proposal assessment commences in January 2025 (access period commencement date is 1 January 2026).

17.   Tthe specific values for estimating the rate of return arising from the application of the 2022 final gas instrument (once published) will be determined at each subsequent access arrangement review.

2. The rate of return framework

18. The rate of return on a service provider's capital base provides a return on the capital invested in the business.

19. The form of the rate of return sets out how the ERA will estimate the rate of return.

20. The National Gas Law states that the rate of return must include a weighted average of an allowed return on equity and an allowed return on debt:

   30D [ERA] to make rate of return instrument

   (3) The [ERA] may make an instrument only if satisfied the instrument will, or is most likely to, contribute to the achievement of the national gas objective to the greatest degree.

   (4) Subject to subsection (3), the way to calculate a rate of return on capital must include a weighted average of an allowed return on equity and an allowed return on debt.

21. The national gas framework sets out the revenue building blocks, which includes an allowance for taxes.[3]

2.1 2022 draft approach

22. The ERA's position for the 2022 draft gas instrument is that the rate of return will take the form of a nominal vanilla WACC.

23. The form of the weighted average cost of capital will be as set out in Equation 1.

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

Equation 1

where:

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

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

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

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

---

3   National Gas Rules version 59, 87(A).

3.   Averaging period process

24.   Regulated gas network service providers are required to periodically submit access arrangements to the ERA for approval - typically every five years.

25.   To establish the method for estimating the rate of return, the ERA must observe the market returns on proxy assets that are used to estimate the following parameters:

- the risk free rate, which is an input into calculating the return on equity

- the base rate, which is an input into calculating the return on debt

- the debt risk premium, which is an input into calculating the return on debt

- the expected inflation forecast.

26.   During the access arrangement process, gas network service providers must propose averaging periods within a nomination window.

- Averaging periods are used when calculating the provider's returns on equity (the risk free component) and returns on debt (the base rate and debt risk premium components).

- The nomination window set out in the gas instrument is the period from which a gas network service provider can propose its specific averaging period.

3.1   2022 draft approach

27.   For the 2022 draft gas instrument, gas network service providers will nominate the averaging periods subject to the requirements below.

28.   For clarity, the averaging process separately details:

- The market rates that are fixed at the start of the regulatory period. The rates include the risk free rate for the return on equity, the interest rate swap for the return on debt and the expected inflation.

- The debt risk premium that is updated annually through the tariff variation mechanism.

3.1.1   Market rates for WACC parameters

29.   The averaging period process for the market rates that will be fixed for the period of an access arrangement will be as follows:

- A gas network service provider will advise the ERA of their nominated averaging period for market rates for WACC parameters.

- An averaging period must be nominated within 30 business days following the release of an access arrangement draft decision.

- The averaging periods must be nominated prior to any of their dates taking place.

- The averaging period will have a duration of 20 consecutive trading days. [4]

---

[4]   Trading days are defined as days that Australian Commonwealth Government Security mid-rate data is available in the Reserve Bank of Australia's F16 statistical table.

- The averaging period must fall within a window at least two months, but no longer than six months, prior to the start date for the regulatory period.

- If 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 ending two months prior to the start of the regulatory period.

- The expected inflation forecast will use the same averaging period as is used for market rates of WACC parameters.

- The averaging periods for these market rates will remain confidential until the period has passed and will then be disclosed in the final decision.

3.1.2 Annual debt risk premium

30.   The averaging period process for the annual debt risk premium update will be as follows:

- A gas network service provider will advise the ERA of their nominated debt risk premium averaging periods.

- An averaging period will be nominated for each debt risk premium for all years of an access arrangement's regulatory period.

- The first debt risk premium averaging period for an access arrangement must be nominated within 30 business days following an access arrangement draft decision.

- The remaining debt risk premium averaging periods must be nominated prior to the ERA's final decision for the regulatory period.

- The debt risk premium averaging periods must be nominated prior to any of their dates taking place.

- The averaging period will have a duration of 20 consecutive trading days. [5]

- The debt risk premium averaging periods for each of the years will not need to be identical.

- The averaging period must fall within a window of at least three months, but no longer than seven months, before the relevant regulatory year.

- In the event that a debt risk premium averaging period is not nominated on time, the ERA will use a default debt risk premium averaging period of the 20 consecutive trading days three months prior to the commencement of each regulatory year.

- The annual debt risk premium averaging periods will remain confidential so as not to adversely affect a regulated entity's ability to obtain finance.

---

[5]   Trading days are defined as days that Australian Commonwealth Government Security mid-rate data is available in the Reserve Bank of Australia's F16 statistical table.

4. Gearing

31. Gearing is the proportion of a business' assets financed by debt and equity. Gearing is defined as the ratio of the value of debt to total capital (that is, the sum of debt and equity) and is generally expressed as follows:

$$\text{Gearing} = \frac{\text{Debt}}{\text{Debt} + \text{Equity}}$$

Equation 2

32. The National Gas Law states that the approach for calculating a rate of return on capital must include a weighted average of an allowed return on equity and an allowed return on debt.

   30D [ERA] to make rate of return instrument

   …

   (3)   The [ERA] may make an instrument only if satisfied the instrument will, or is most likely to, contribute to the achievement of the national gas objective to the greatest degree.

   (4)   Subject to subsection (3), the way to calculate a rate of return on capital must include a weighted average of an allowed return on equity and an allowed return on debt.

33. The ERA uses the gearing ratio to weight the costs of debt and equity when the regulated WACC is determined.

34. In addition to being used to weight the expected returns on debt and equity, the gearing ratio is used:

   • To re-lever asset betas for the purposes of estimating the equity beta of regulated firms.

   • 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.

4.1   2022 draft approach

35. The ERA considers that the gearing will be determined from observations of the gearing levels of firms in a benchmark sample of Australian energy networks. The gearing levels of Australian energy networks will most closely reflect the regulatory and commercial risks involved in providing regulated services.

36. The ERA's analysis supports a benchmark gearing level of 55 per cent debt.

37. A gearing level of 55 per cent will be fixed until the next review of the gas instrument.

5.   Return on debt

38.   The WACC includes a component for the return on debt. The return on debt is the return that debt holders require from a firm to compensate them for the risk they take in providing debt financing to the company.

5.1   Method for estimating the return on debt

5.1.1   2022 draft approach

39.   The estimate of the return on debt will comprise a risk premium above the risk free rate, plus an additional margin for administrative and hedging costs:

$$Return\ on\ debt = Risk\ free\ rate\ +\ Debt\ risk\ premium\ + Debt\ raising\ costs\ + Hedging\ costs$$

Equation 3

40.   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.

41.   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.

42.   Debt raising and hedging costs are the administrative costs and other charges incurred by businesses in raising and hedging finance.

43.   The return on debt estimate is based on the hybrid trailing average approach. Under the hybrid trailing average approach for debt:

- The benchmark entity enters into the assumed benchmark efficient debt strategy, assumed to be a portfolio of 10-year fixed-rate debt with 10 per cent refinanced each year.

- The benchmark entity uses derivative arrangements to adjust rates from the efficient debt portfolio to lock in five-year interest rate swaps rates, set on the day at the start of the regulatory period.

- The 10-year trailing average debt risk premium is updated annually.

44.   The on-the-day estimate of the risk free rate will be based on the observed yield of a five-year interest rate swap rate, averaged over a 20-day period just prior to the regulatory period. The nomination of the 20-day period is discussed in Chapter 3.

45.   The on-the-day debt risk premium will be derived from the yield of an observed sample of bonds issued by comparator firms with similar credit ratings as the benchmark efficient entity (see Chapter 5.5). The ERA calculates the debt risk premium based on a 10-year trailing average, which will be updated annually.

46.   The nomination of averaging periods for the interest rate swap rate and debt risk premium is discussed in of Chapter 3.

47. An annual allowance will be provided for debt raising and hedging costs (see Chapter 7).

5.1.1.1 Initial revenue path

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

5.1.1.2 Annual update of the return on debt

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

50. 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.

5.1.1.3 Implementing the annual update

51. 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.

52. 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.

53. 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.

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

$$RoD_t = \left(DRP_t + R_f + Drc + Hc\right) \times \frac{D}{(D+E)} \times RAB_{Op,t}$$

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.

55. 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).

56. 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:

$$\Delta RoD_t = \frac{D}{(D + E)} \left(DRP_t \times RAB_{Op,t} - DRP_1 \times RAB_{Op,1} \right)$$

Equation 5

where

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

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

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

$RAB_{Op,1}$ is the opening regulated asset base at the start of the regulatory 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.

57. 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.

58. 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.

59. 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 and the National Gas Rules, since it takes both efficiency and the desire of users for stability in gas pipeline tariffs into account.

5.2   Debt risk free rate

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

61.   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.

5.2.1   2022 draft approach

62.   Consistent with the hybrid trailing average approach, the ERA will use the prevailing five-year interest rate swaps for the risk free rate in the return on debt.

63.   The ERA will set the interest rate swap rate at the start of a regulatory access arrangement period. The estimate will be fixed for the length of the regulatory access arrangement period.

64.   For estimating the risk free rate in the return on debt, the ERA will use the five-year swap mid-rate, as published on Bloomberg (Last Price), over the relevant averaging period.

65.   The nomination of the averaging period for the interest rate swap rate is outlined in Chapter 3.

5.3   Term of debt

66.   To estimate a return on debt, a regulator needs to set a benchmark debt term.

5.3.1   2022 draft approach

67.   For the purposes of the 2022 draft gas instrument, the ERA will apply a benchmark efficient debt strategy as a portfolio of 10-year fixed-rate debt with 10 per cent refinanced each year.

5.4   Benchmark credit rating

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

69.   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. Therefore, credit ratings represent the risk present in holding a debt instrument.

70.   Credit ratings provide a broadly uniform measure of default risk. Firms with the same credit rating at a particular point in time should have similar levels of default risk.

71.   Generally, the debt risk premium is higher when the credit rating is lower, and vice versa. A lower credit rating can be associated with a higher risk of default and lenders generally require higher compensation (a higher debt risk premium) for higher levels of risk.

72.   For this reason, both listed and unlisted firms can be used where a credit rating is available.

5.4.1   2022 draft approach

73.   The ERA considers that the benchmark credit rating should be determined from observations of the gearing levels of firms in a benchmark sample of Australian energy networks. The gearing levels of Australian energy networks will most closely reflect the regulatory and commercial risks involved in providing regulated services.

74.   The ERA's analysis supports a benchmark credit rating of BBB+.

75.   A credit rating of BBB+ will be fixed until the next review of the gas instrument.

5.5   Debt risk premium

76.   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.

5.5.1   2022 draft approach

77.   The revised bond yield approach will be used to determine the debt risk premium for the 2022 draft gas instrument.

78.   Consistent with the hybrid trailing average debt approach and a benchmark efficient debt strategy, the ERA uses a 10-year term to estimate the debt risk premium.

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

- Step 1: Determining the benchmark sample - Identifying a sample of relevant domestic and international 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 the cost of debt - Calculating the simple average of the three yield curves' 10-year costs 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.

80.   These steps determine the debt risk premium at a point in time, being the date of calculation.

81. To determine the debt risk premium used to calculate the gas rate of return, the ERA will construct a 10-year trailing average debt risk premium. This consists of a debt risk premium for the current year and a debt risk premium for each of the nine prior years. The ERA will update the 10-year trailing average debt risk premium each year.

5.5.1.1 Determining the benchmark sample

82. 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 return on debt each year.

83. The ERA will apply the following characteristics to identify international domestic corporate bonds to be included in the benchmark sample:

- The credit rating of each bond must match that of the benchmark efficient entity, as rated by S&P.

- Time to maturity must be two years or longer.

- Issued bonds must have the country of risk specified as Australia, and must be denominated in either AUD, USD, Euros or GBP (all compliant bonds are included, except those issued by the financial sector). [6]

- The benchmark sample will include both fixed bonds and floating bonds. [7,8]

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

- 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.

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

84. 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.

85. The ERA will convert this denominated currency credit to Australian dollar terms by accounting for hedging costs.

---

[6] 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. These criteria allow for the largest sample of bonds that reflect an Australian risk premium.

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

[8] Floating bond is a bond whose interest payment fluctuates in step with the market interest rates. 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.

5.5.1.3   Estimating yield curves

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

5.5.1.4   Estimating the cost of debt

87.   The ERA will average the results of these three methods to arrive at a market estimate of the 10-year return on debt.

5.5.1.5   Calculating the debt risk premium

88.   The estimate of the debt risk premium for each year will be a simple 10-year trailing average.

89.   The ERA began calculating annual debt risk premia in April 2015 and used these premia as inputs when constructing a 10-year trailing average.

90.   For calendar years prior to 2015, the ERA used a third-party source for debt risk premiums, based on the Reserve Bank of Australia's historical credit spreads for 10-year non-financial corporate bonds.

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

92.   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.

93.   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; and

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

6. Return on equity

94. 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.

95. 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.

96. Estimating a forward-looking return on equity – sufficient to enable regulated firms to recoup their prevailing equity financing costs – requires the use of models.

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

6.1 Return on equity model

6.1.1 2022 draft approach

98. The ERA will use the Sharpe-Lintner CAPM for estimating the return on equity and will determine a single point estimate.

99. The formula for the Sharpe-Lintner CAPM will be applied as shown in Equation 7:

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

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 $\beta_i = cov(R_i, R_m)/var(R_m)$

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

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

- the risk free rate
- the market risk premium
- the equity beta.

101. The ERA will use a term for equity of 10 years.

6.2   Equity risk free rate

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

103.   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.

104.   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 ERA uses a nominal vanilla rate of return under the national gas framework and therefore a nominal risk free rate.

6.2.1   2022 draft approach

105.   The ERA will use a 10-year Commonwealth Government bond for the risk free rate for the return on equity.

106.   The ERA will use this yield to set the risk free rate for equity at the start of the regulatory access arrangement period. This rate will be fixed for the duration of the regulatory period.

107.   The ERA will estimate the risk free rate for equity by:

•   Using observed yields from 10-year Commonwealth Government bonds.

•   Using linear interpolation of observed yields of Commonwealth Government Security bonds.

108.   The averaging period for the risk free rate will be set according to Chapter 3.

6.3   Market risk premium

109.   The market risk premium is a parameter of the Sharpe-Lintner CAPM.

110.   The market risk premium is the expected rate of return in excess of 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 in a risky asset, therefore the expected market risk premium is always positive. *Ex post*, the realised return to the market portfolio may be negative. To establish the cost of capital, the *ex ante* market premium is relevant.

111.   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.[9] This is a forward-looking concept.

---

[9]   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,

112. The market risk premium is calculated as follows:

$$MRP = R_M - R_F$$

<div align="right">**Equation 8**</div>

where:

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

R_F is the risk free rate of return.

6.3.1   2022 draft approach

113. The ERA's draft approach for the 2022 gas instrument will use a market risk premium of 6.2 per cent.

114. The market risk premium will remain fixed for the term of the gas instrument.

6.4   Equity beta

115. Risk is the degree of uncertainty about an event, for example the uncertainty around an investment's expected returns. This is a forward-looking concept. The risk-return trade off in finance theory provides that a risk averse investor will want a higher expected return when faced with higher risk.

116. The risk of an asset is typically thought of as the variance in asset returns. 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 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 by the return on equity.

117. 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.

118. Equity beta is the slope parameter β_i in the Sharpe Lintner CAPM. The slope parameter β_i correlates a specific asset's return in excess of the risk free rate of return, to movements in the return on the market portfolio:

$$R_i = R_f + \beta_i (R_M - R_f)$$

<div align="right">**Equation 9**</div>

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 $\beta_i = cov(R_i, R_M)/var(R_M)$

---

there is only systematic risk left. An important assumption of the CAPM is that assets are priced as though it is only their systematic risk that is relevant to investors.

$(R_M - R_f)$ is the market risk premium.

119. Two risk factors are generally considered to estimate 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.

6.4.1 2022 draft approach

120. The ERA's draft approach for the 2022 gas instrument will use an equity beta of 0.7.

121. The equity beta will remain fixed for the term of the gas instrument.

7. Debt and equity raising costs

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

123. Regulators across Australia have typically included allowances to account for the costs of raising finance in their regulatory decisions. Regulators take different approaches to the recovery of these financing costs through either:

- the rate of return

- operating expenditure

  or

- the capitalisation of these costs.

124. Australian regulators use benchmark estimates to determine debt-raising costs. To do so, regulators attempt to derive an estimate of the cost of obtaining finance that reflects the costs that would be incurred by a well-managed efficient benchmark business operating in a competitive market.

7.1 2022 draft approach

7.1.1 Debt raising costs

125. The ERA's draft approach for the 2022 gas instrument will apply debt raising costs for the benchmark efficient entity of 0.165 per cent per annum.

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

127. The debt raising cost will remain fixed for the period of the instrument.

7.1.2 Debt hedging costs

128. An annual swap allowance of 0.123 per cent will be provided to firms to compensate for the cost of conducting hedging for exposure to movements in the risk free rate.

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

130. The debt hedging cost will remain fixed for the period of the instrument.

7.1.3 Equity raising costs

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

8.   Inflation

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

133.   To invest, debt and equity investors will require compensation for inflation.

134.   A nominal rate of return incorporates the real rate of return, compounded with a rate that reflects expectations of inflation.

135.   The treatment of inflation and the setting of the rate of return are foundational in setting regulated revenues. The National Gas Rules require the ERA to determine a method that is likely to result in the best estimates of expected inflation:

> 75B(2)(b) the method that the [ERA] determines is likely to result in the best estimates of expected inflation

136.   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.

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

137.   Gas network service providers receive:

- An *ex ante* real return on assets set at the time of regulatory determination. To determine a real return, the expected forward-looking inflation underpinning nominal returns is removed.

- Compensation for movement in inflation because the regulatory asset base is indexed to actual inflation. Actual inflation is used to ensure that regulatory assets remain fixed in real terms.

138.   The forecast of 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 are important contributors to the real changes in tariffs.

8.1   2022 draft approach

139.   The ERA will apply the Treasury bond implied inflation approach for estimating expected inflation. This will be applied as follows:

- Using the yields on five-year Treasury bonds.

- Estimating the expected inflation rate consistent with the estimate of the risk free rate.

- Using 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.[10]

- The nomination of the averaging period for inflation is outlined in Chapter 3.

---

[10]   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.

9. Value of imputation credits (gamma)

140. The imputation tax system prevents corporate profits from being taxed twice. Under the Australian imputation tax system, franking credits are distributed to investors at the time that dividends are paid and provide an offset to those investors' taxation liabilities.

141. The gamma parameter accounts for the reduction in the effective corporate taxation that is generated by the distribution of franking credits to investors. Generally, investors who can use 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.

142. The ERA factors the value of imputation credits into its regulatory determination allowances via adjustments to the taxation building block and market risk premium.

9.1 2022 draft approach

143. The ERA determines gamma based on the utilisation approach using the Monkhouse formula as the product of the distribution rate and the utilisation rate.

144. The 2022 draft gas instrument applies a gamma of 0.5.

145. Gamma will remain fixed for the life of the gas instrument.