



Economic Regulation Authority

Final decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27

Attachment 5: Return on regulated asset base

31 March 2023

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.

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Contents

Note	1
1. Return on regulated asset base	2
2. Access Code requirements	3
3. Western Power’s initial proposed rate of return	4
4. ERA’s draft decision	6
5. Western Power’s response to the draft decision	7
6. Public submissions in response to the draft decision	9
7. ERA’s considerations	10
8. Gearing	12
8.1 Western Power’s proposal	12
8.2 ERA draft decision	12
8.3 Western Power’s revised proposal	12
8.4 Public submissions	12
8.5 ERA final decision	13
9. Return on debt	15
9.1 Western Power’s proposal	15
9.2 ERA’s draft decision	16
9.3 Western Power’s revised proposal	17
9.4 Public submissions	17
9.5 ERA final decision	17
9.5.1 Method for estimating the return on debt	17
9.5.2 Return on debt components	23
9.5.3 Debt risk free rate	24
9.5.4 Term for debt	25
9.5.5 Benchmark credit rating	26
9.5.6 Debt risk premium	27
10. Debt raising and hedging costs	30
10.1 Western Power’s proposal	30
10.2 ERA’s draft decision	30
10.3 Western Power’s revised proposal	30
10.4 Public submissions	30
10.5 ERA final decision	31
10.5.1 Debt raising costs	31
10.5.2 Debt hedging costs	33
11. Return on equity	34
11.1 Western Power’s proposal	34
11.2 Return on equity asset pricing model	35
11.2.1 ERA’s draft decision	35

11.2.2	Western Power's revised proposal	35
11.2.3	Public submissions	36
11.2.4	ERA final decision	36
11.3	Term for equity	37
11.3.1	ERA's draft decision	37
11.3.2	Western Power's revised proposal	37
11.3.3	Consultation.....	37
11.3.4	ERA final decision	37
11.4	Equity risk free rate.....	47
11.4.1	ERA's draft decision	47
11.4.2	Western Power's revised proposal	47
11.4.3	Public submissions	48
11.4.4	ERA's final decision.....	48
11.5	Market risk premium	50
11.5.1	ERA's draft decision	51
11.5.2	Western Power's revised proposal.....	51
11.5.3	Public submissions	51
11.5.4	ERA's final decision.....	51
11.6	Equity beta.....	54
11.6.1	ERA's draft decision	54
11.6.2	Western Power's revised proposal.....	55
11.6.3	Public submissions	55
11.6.4	ERA's final decision.....	56
12.	Inflation	68
12.1	Western Power's proposal	68
12.2	ERA's draft decision	68
12.3	Western Power's revised proposal.....	69
12.4	Public submissions	69
12.5	ERA's final decision.....	69
13.	Value of imputation credits (gamma).....	71
13.1	Western Power's proposal	71
13.2	ERA's draft decision	71
13.3	Western Power's revised proposal.....	71
13.4	Public submissions	71
13.5	ERA's final decision.....	71
14.	Final decision on rate of return	74

Note

This attachment forms part of the ERA's final decision on proposed revisions to the access arrangement for the Western Power Network for the fifth access arrangement period (AA5). It should be read with all other parts of the final decision.

The final decision includes the following attachments:

Final decision on proposed revisions to the access arrangement for the Western Power network 2022/23 – 2026/27 – Decision Overview

Attachment 1 – Price control and total revenue requirement

Attachment 2 – Regulated asset base

Attachment 3A – AA4 capital expenditure

Attachment 3B – AA5 capital expenditure

Attachment 4 – Depreciation

Attachment 5 – Return on regulated asset base (this document)

Attachment 6 – Operating expenditure

Attachment 7 – Other components of target revenue

Attachment 8 – Services

Attachment 9 – Service standard benchmarks and adjustment mechanism

Attachment 10 – Expenditure incentives and other adjustment mechanisms

Attachment 11 – Network tariffs

Attachment 12 – Policies and contracts

1. Return on regulated asset base

This attachment sets out the Economic Regulation Authority's (ERA) considerations on the return on the regulated asset base and final decision for Western Power's fifth access arrangement (AA5).

2. Access Code requirements

Section 2.1 of the *Electricity Networks Access Code 2004* (Access Code) sets out the Code Objective, which is to promote efficient investment in, and efficient operation and use of, services of networks in Western Australia for the long-term interests of consumers in relation to:

- Price, quality, safety, reliability and security of supply of electricity.
- The safety, reliability and security of covered networks.
- The environmental consequences of energy supply and consumption, including reducing greenhouse gas emissions, considering land use and biodiversity impacts and encouraging energy efficiency and demand management.

Section 6.4 of the Access Code requires that the price control in an access arrangement must (among other things) enable the service provider to earn sufficient revenue to cover its forward-looking and efficient costs of providing covered services, including a return on investment commensurate with the commercial risks involved.

The rate of return provides a service provider with the funding to pay interest on any loans and give a return on equity to investors. The rate of return is expressed as a weighted average cost of capital (WACC).

Section 6.64 of the Access Code requires that an access arrangement sets out the WACC for a covered network, which must be in accordance with any determination made by the ERA pursuant to section 6.65 in effect or, if no determination is in effect, calculated consistent with the methodology in section 6.66.

Under section 6.65 of the Access Code, the ERA may publish a determination of the preferred methodology for calculating the WACC in access arrangements.

As no determination is in effect, the WACC for Western Power in AA5 must be estimated in a manner consistent with section 6.66 of the Access Code.

Section 6.66 of the Access Code requires that a WACC calculation:

- Must represent an effective means of achieving the Code Objective and the objectives in section 6.4.
- Must be based on an accepted financial model such as the Capital Asset Pricing Model (CAPM).

3. Western Power's initial proposed rate of return

Western Power initially proposed an average nominal post-tax WACC of 4.73 per cent for the AA5 period, compared with 5.87 per cent approved in AA4.

Western Power's proposed WACC for AA5 was developed in 2021 in a low interest rate environment and these market conditions resulted in a WACC that was forecast to be lower than during AA4. The reduction in returns from the low interest rate environment contemplated by Western Power was partially offset by increases resulting from Western Power's proposed changes to the approach used to calculate the WACC.

Western Power used placeholder values as of 30 June 2021 in its initial proposal to calculate the average nominal post-tax WACC of 4.73 per cent. These placeholder values were intended to be replaced with the most current values at the time of the ERA's final decision.

In its initial proposal, Western Power:

- Broadly maintained the approach used for AA4 to determine most WACC parameters for AA5. Western Power proposed to apply a rate of return method broadly consistent with the methodology in the ERA's 2018 Rate of Return Guidelines.^{1,2}
- Proposed the following changes from the approach applied in AA4 and the ERA's 2018 Rate of Return Guidelines:
 - An alternative approach to estimate the cost of debt.
 - An increase in the term of the risk free rate to 10 years, up from a term of five years.

Table 2Table 1 details the individual rate of return components initially proposed by Western Power for AA5 compared to the existing rate of return components approved in the ERA's final decision for AA4.

¹ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 230.

² The National Gas Law requires the ERA to produce rate of return instrument that sets out the methods the ERA will use to estimate the allowed rate of return on debt and equity and value of imputation credits for gas transmission and distribution service providers.

Table 1: Western Power's initially proposed rate of return estimate

Component	AA4 actual	Western Power AA5 initial proposal
<i>Averaging period</i>	29 March 2018	30 June 2021
Return on debt (%)		
5-year interest rate swap (effective yield)	2.59	n/a
Debt risk premium (10 year average)	2.487	n/a
Debt issuing cost	0.100	0.100
Debt hedging cost	0.114	n/a
Return on debt (10 year bond yield)	n/a	3.80*
<i>Nominal return on debt</i>	5.29	3.90*
Return on equity		
Nominal risk free rate (%)	2.37	1.53
Market risk premium (%)	6.0	6.0
Equity beta	0.7	0.7
<i>Nominal return on equity (%)</i>	6.57	5.73
Other parameters		
Debt proportion (%)	55	55
Inflation rate (%)	1.84	2.03
Corporate tax rate (%)	30	30
Franking credits	50	50
Nominal after-tax WACC (%)	5.87	4.73*
Real after-tax WACC (%)	3.95	2.64

Source: ERA analysis; Western Power, Revised Proposed Access Arrangement Information: Attachment 1.1 -- Revised AA5 Regulatory Revenue Model, 15 November 2022.

* Five year average over the AA5 period.

4. ERA's draft decision

The ERA published its AA5 draft decision on 9 September 2022.

In the draft decision, the ERA did not approve Western Power's initial proposal in relation to the nominal after-tax rate of return.

In its draft decision, the ERA determined that a nominal after-tax rate of return of 7.10 per cent met the requirements of the Access Code. The reasons for this determination are detailed in the following sections.

As a high level summary, the ERA accepted and considered that the following parameters of Western Power's proposed rate of return satisfied the requirements set out in section 6.4 of the Access Code and the Code Objective:

- credit rating
- gearing ratio
- term of debt
- term for equity
- equity beta
- forecast inflation
- value of imputation credits (gamma).

The ERA changed the following parameters of Western Power's proposed rate of return to ensure that it is based on current data:

- the market risk premium
- debt raising and hedging costs.

The ERA considered Western Power's proposal to change the term for equity from five years to 10 years. The ERA accepted Western Power's proposed 10 year term for equity. This change aligned the assumed term for equity with common investor practice, where investors in long-lived assets consider cash flows over a long time horizon exceeding the access arrangement period. The ERA considered a 10 year term for equity still allows for efficient rates of return, is consistent with private market practice and the change supports the delivery of efficient forward-looking rates.

The ERA considered Western Power's proposed change to the cost of debt approach to a 10 year trailing average approach. The ERA did not approve Western Power's proposed approach to calculating the cost of debt and required the hybrid trailing average approach to estimate the cost of debt for the AA5 period for the following reasons:

- Western Power did not justify its proposed move to a 10 year trailing average approach to debt.
- The hybrid trailing average approach better aligned with Western Power's debt management, given that Western Power does not solely issue fixed rate bonds and has approximately a third of its debt portfolio as floating rate borrowings.
- Maintaining the hybrid trailing average approach would promote regulatory certainty within the regulatory period and better meet the requirements of Chapter 6 of the Access Code and the Code Objective.

5. Western Power's response to the draft decision

On 15 November 2022, Western Power submitted a revised proposal in response to the ERA's AA5 draft decision. Western Power accepted the ERA's required amendments to the rate of return and put forward a revised proposal. Western Power included an average WACC of 7.10 per cent in its revised proposal in line with the ERA's methodology included in the AA5 draft decision. Western Power noted the ERA's preference to align with the 2022 gas rate of return instrument.³

Table 2 details the individual rate of return components in Western Power's revised proposal for AA5, which were consistent with the ERA's draft decision for AA5.

Table 2: Western Power's rate of return estimate

Component	Western Power AA5 revised proposal
<i>Averaging period</i>	30 June 2022
Return on debt (%)	
5-year interest rate swap (effective yield)	4.070
Debt risk premium (10 year average)	1.883
Debt issuing cost	0.165
Debt hedging cost	0.123
<i>Nominal return on debt</i>	6.241
Return on equity	
Nominal risk free rate (%)	3.82
Market risk premium (%)	6.2
Equity beta	0.7
<i>Nominal return on equity (%)</i>	8.16
Other parameters	
Debt proportion (%)	55
Inflation rate (%)	2.96
Corporate tax rate (%)	30
Franking credits	50
Nominal after-tax WACC (%)	7.10
Real after-tax WACC (%)	4.03

Source: ERA analysis; Western Power, Revised Proposed Access Arrangement Information: Attachment 1.1-- Revised AA5 Regulatory Revenue Model, 15 November 2022.

³ Western Power, Revised AA5 proposal: Response to the ERA's draft decision, 15 November 2022, p. 5.

The ERA noted that market conditions have changed significantly since 2021 when Western Power developed its initial AA5 proposal based on its rate of return estimates as at 30 June 2021 as a placeholder. Western Power's AA5 revised proposal updated values and estimated its rate of return as at 30 June 2022 as an updated placeholder.

As agreed with Western Power in advance of the period, the ERA's estimates of the WACC parameters reflects a final averaging period as at 30 November 2022.

The following sections detail the ERA's consideration of each of the rate of return parameters and the ERA's final decision on the return on the regulated asset base for AA5.

6. Public submissions in response to the draft decision

The ERA invited stakeholder submissions on the ERA's draft decision and on Western Power's revised proposal.

Ten submissions were received in response to the ERA's AA5 draft decision and Western Power's revised proposal. Two submissions commented on the rate of return, from:

- Synergy
- WA Expert Consumer Panel.

The two submissions provided high-level comments on WACC.

Synergy submitted that any introduction of statistical bias to the equity beta estimate would not be in the long-term interest of consumers and would not satisfy the Electricity Networks Access Code objective. Synergy recommended that the ERA:⁴

- Not include any international firms as comparators in a capital asset pricing model (CAPM) framework designed to estimate the equity beta of an Australian benchmark energy firm, as doing so would result in a statistically biased equity beta estimate of 0.7.
- Adopt the statistically unbiased equity beta estimate of 0.55 for the benchmark firm, as derived from the Australian sample data.

The WA Expert Consumer Panel submitted that the ERA's draft decision provided a fair return on investment that has mechanically applied the rate of return calculations, rather than trying to artificially reduce revenue outcomes. The WA Expert Consumer Panel considered that this approach led to trust in the regulatory framework.⁵

In addition, the WA Expert Consumer Panel:⁶

- Noted that the current framework required deeper consideration on whether its current approach to setting the cost of equity led to potential price shocks.
- Questioned that as the cost of equity is set for five years based on current market conditions, whether there is a mechanism to allow for an annual update to the cost of equity so that there was less chance of volatility in the estimates.

⁴ Synergy, *Submission to the Economic Regulation Authority: ERA Draft Decision: Estimation of beta for Western Power's fifth Access Arrangement*, 29 November 2022, p. 2.

⁵ WA Expert Consumer Panel, *Submission to the ERA's Draft Decision and Western Power's revised fifth access arrangement submission: Attachment B*, 16 December 2022, p. 3.

⁶ WA Expert Consumer Panel, *Submission to the ERA's Draft Decision and Western Power's revised fifth access arrangement submission: Attachment B*, 16 December 2022, p. 6.

7. ERA's considerations

The ERA adopts a standard rate of return approach for its heavily regulated energy networks, which means that general WACC approaches and parameters are the same across energy networks.

The National Gas Law requires the ERA to produce a rate of return instrument that sets out the methods the ERA will use to estimate the allowed rate of return on debt and equity and value of imputation credits for gas transmission and distribution service providers. The current version of the rate of return instrument is the 2022 Final Gas Rate of Return Instrument, published on 16 December 2022. In developing this final instrument, the ERA has considered a range of information, including stakeholder submissions, academic literature, market data and developments and stakeholder feedback.⁷

The ERA considers that:

- The Access Code and National Gas Rules are similar, which means the rate of return method contained in the rate of return guidelines can be applied to network service providers in electricity and gas.
- Network service providers in the gas and electricity industries are subject to a similar degree of risk, which means that the same benchmark efficient entity can be used.

By adopting a standard rate of return method for regulated energy networks, the ERA's consideration of WACC approaches and parameters are largely similar across regulated gas pipelines and covered electricity networks.

Therefore, the ERA's final decision for Western Power's access arrangement is consistent with the ERA's 2022 Final Gas Rate of Return Instrument.

The ERA notes that Western Power accepted the ERA's draft decision on the rate of return for the access arrangement and broadly applied the 2022 Final Gas Rate of Return Instrument as the basis for its method of estimating the rate of return for the AA5 period.

As a high level summary, the ERA accepts and considers that the following parameters of Western Power's revised proposed rate of return satisfy the requirements set out in section 6.4 of the Access Code and the Code Objective:

- credit rating
- gearing ratio
- term of debt
- term for equity
- equity beta
- debt raising and hedging costs
- value of imputation credits (gamma).

⁷ ERA, *2022 final gas rate of return instrument*, 16 December 2022.

The ERA has made changes to the following parameters of Western Power's revised proposed rate of return to ensure that it is based on current data and aligned with the 2022 final gas rate of return instrument:

- five-year interest rate swap rate
- 10-year nominal risk free rate
- debt risk premium
- the market risk premium
- forecast inflation.

The following sections detail the ERA's consideration of each of the rate of return parameters and the ERA's final decision on the return on regulated asset base for AA5.

8. Gearing

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 1

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

In addition to weighting the expected returns on debt and equity, the gearing ratio is used:

- To re-lever asset betas to estimate the equity beta of regulated firms.
- As a factor in determining an appropriate credit rating to derive the debt risk premium.
- To determine interest and tax expenses in a post-tax revenue model.

This section outlines the ERA's final decision and reasoning for gearing.

8.1 Western Power's proposal

Western Power proposed a gearing of 55 per cent, consistent with the gearing ratio for Western Power applied in AA4 and the ERA's 2018 Rate of Return Guidelines.⁸

8.2 ERA draft decision

The ERA accepted Western Power's proposed gearing ratio of 55 per cent.⁹

8.3 Western Power's revised proposal

Western Power's revised proposal did not change the 55 per cent gearing level.¹⁰

8.4 Public submissions

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comments on gearing.

⁸ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 236.

⁹ ERA, *Draft decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27 – Attachment 5: Return on regulated asset base*, 9 September 2022, p. 12.

¹⁰ Western Power, *Revised Proposed Access Arrangement Information: Attachment 1.1 – Revised AA5 Regulatory Revenue Model*, 15 November 2022.

8.5 ERA final decision

The ERA accepts Western Power's proposed gearing ratio of 55 per cent.

The ERA considers that the gearing 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, in the ERA's opinion, most closely reflect the regulatory and commercial risks involved in Western Power providing regulated services.

The gearing method involves observing gearing over the last five year period.¹¹ The ERA does not forecast directional movements of debt relative to equity that may occur. For example, the ERA does not consider factors such as market capitalisation forecasts and debt issuance constraints.

To calculate the gearing ratio, the ERA uses the following assumptions:

- Using comparator firms in its benchmark sample of firms.
- Using a market-based gearing level to reflect efficient financing.
- Gearing is observed over a 10 year period.
- Gearing estimates are observed on an annual basis from financial statements and market data.
- The market value of equity is equal to a firm's market capitalisation, which is equal to the share price multiplied by volume of shares issued.
- As the availability of market value of debt is limited, the book value of debt is used as a proxy. The book value of debt is calculated from current and non-current borrowings from financial statements.
- Debt is taken at a gross level. That is, no deduction is made for cash or marketable securities. Gross debt is used as it is not possible to determine whether cash equivalents are used to repay debt or pay dividend.¹² In addition, an efficient network business would have some cash as part of its optimal asset mix.
- Debt is adjusted to incorporate a firm's investments in associates and those associates' debt, which may not be reported on the firm's balance sheet. Associates' debt is added to parent debt in line with proportional ownership. For example, Spark Infrastructure is adjusted for its investments in South Australia Power Networks, Victoria Power Networks and TransGrid.
- Hybrid securities which have equity characteristics are removed from debt.

The ERA has updated its gearing ratio estimate using more recent data.

Table 3 details the ERA's gearing ratio estimate for benchmark entities based on observable data from comparable firms.

¹¹ ERA, *Explanatory Statement for the 2022 final gas rate of return instrument*, December 2022, p. 53.

¹² Dr Lally, M., *Review of the AER's views on gearing and gamma*, May 2018, p. 4.

Table 3: ERA market value gearing ratio estimates (%)

Year	APA Group (APA)	AusNet Services (AST)	DUET Group (DUE)	Spark Infrastructure Group (SKI)	Average
2012	47	59	72	59	59
2013	46	57	71	62	59
2014	45	58	64	55	55
2015	50	59	62	56	57
2016	49	57	51	54	52
2017	49	52	N/A	52	51
2018	46	56	N/A	57	53
2019	45	55	N/A	60	53
2020	45	59	N/A	60	55
2021	49	57	N/A	60	55
Five year average	47	56	N/A	58	53
10 year average	47	57	64	57	55

Source: Annual reports, Bloomberg, ERA Analysis.

The ERA's analysis estimates that the five year average gearing ratio for the energy network sample is 53 per cent, or 55 per cent over a 10 year average.

The ERA notes that three of the sample firms have been delisted, including AusNet Services and Spark Infrastructure in 2022. However, the ERA considers that past market information still provides a useful reference.

If the analysis is extended to include the last observable five years for DUET, where DUET's five year average gearing is 64 per cent, the five year average of the sample will increase to 56 per cent.

The Australian Energy Regulator's (AER) analysis has shown that gearing ratio levels based on market values are 52 per cent over a five year average or 55 per cent over a 10 year average.¹³

For this final decision, the ERA uses a gearing ratio of 55 per cent when rounding to the closest five percentage points to determine the rate of return.

¹³ AER, *Draft Rate of Return Instrument Explanatory Statement*, June 2022, p. 75.

9. Return on debt

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.

This section outlines the ERA's reasoning and final decision on the return on debt parameter of the rate of return.

9.1 Western Power's proposal

Western Power initially proposed a departure from the approach used in AA4 to estimate the return on debt and the approach for estimating the return on debt contained in the 2018 Rate of Return Guidelines.

The approach used in AA4 to estimate the return on debt was a hybrid trailing average approach. Under the hybrid trailing average approach:

- The benchmark entity enters into the assumed benchmark efficient debt strategy. This strategy is assumed to be a staggered portfolio of 10 year fixed-rate BBB+ debt with 10 per cent being refinanced each year.
- The benchmark entity uses derivative arrangements to adjust the efficient debt portfolio and lock in a risk free rate over the access arrangement period.
- A 10 year trailing average debt risk premium is updated annually through the tariff variation mechanism.

Western Power had proposed using a 10 year trailing average debt approach to estimate the return on debt for AA5 that has removed the need to fix the risk free rate. Under Western Power's proposed approach:¹⁴

- Consistent with the approach in the 2018 Rate of Return Guidelines, the benchmark entity enters into the assumed benchmark efficient debt strategy. This strategy is assumed to be a staggered portfolio of 10 year fixed-rate BBB+ debt with 10 per cent refinanced each year.
- A 10 year trailing average total debt cost is updated annually through the tariff variation mechanism.

Western Power submitted that the proposed 10 year trailing average debt approach to estimating the return on debt was efficient. In its advice to Western Power, Frontier Economics considered that the return on debt should be set using the full trailing average approach.¹⁵

- Western Power stated that "the current approach to the allowed return on debt reflects a financing strategy that a business would be unlikely to consider adopting, other than to replicate the allowance provided to it under the current approach."¹⁶

¹⁴ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, pp. 234-235.

¹⁵ Frontier Economics, *Considerations for the regulatory rate of return allowance – Report for Western Power*, 20 December 2021, pp. 33-34.

¹⁶ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 234.

- The 10 year trailing average debt approach is now used by all other Australian regulators. These regulators do not consider that the NPV=0 principle prevents them from adopting the full trailing average approach.¹⁷
- Western Power stated that the proposed full trailing average approach best reflects its own (prudent and efficient) approach to managing its debt portfolio.¹⁸

Western Power did not propose any transitional arrangements for the move from the current hybrid trailing average approach to its proposed approach.

In proposing changes to the return on debt approach, Western Power noted that in the low-rate environment any trailing average approach would likely start the AA5 period relatively 'high' and decrease over the period. From a revenue and price outcome perspective, Western Power considered that this would mean that initial projections of revenue and price outcomes would be overstated and each annual update to the WACC (and hence revenue and price) would likely be a downward adjustment.¹⁹

Western Power proposed to maintain a term of debt of 10 years consistent with AA4 and the 2018 Rate of Return Guidelines.²⁰

Western Power proposed to maintain a benchmark credit rating of BBB+, consistent with AA4 and the ERA's 2018 Rate of Return Guidelines.²¹

Western Power did not propose any debt risk free rate or debt risk premium estimates, as this is not required under its proposed approach for estimating the return on debt.

9.2 ERA's draft decision

The ERA implemented the hybrid trailing average approach for its debt approach in its AA5 draft decision.²²

Under the hybrid trailing average approach:²³

- The benchmark entity enters into the assumed benchmark efficient debt strategy. In this case, the strategy was 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 swap rates, set on the day at the start of the regulatory period.

¹⁷ Frontier Economics, *Considerations for the regulatory rate of return allowance – Report for Western Power*, 20 December 2021, p. 27.

¹⁸ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 235.

¹⁹ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 235.

²⁰ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 234.

²¹ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 235.

²² ERA, *Draft decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27 – Attachment 5: Return on regulated asset base*, 9 September 2022, p. 22.

²³ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, 16 December 2022, p. 56.

- A 10-year trailing average debt risk premium is used as the credit risk of debt issuances cannot be hedged.
- A 10-year trailing average debt risk premium is updated annually through the tariff variation mechanism, which accommodates annual changes in the credit risk of new debt issuances.

The ERA considered that a hybrid trailing average approach best approximated the NPV=0 principle while also recognising interest rate risk, refinancing risk and the staggered nature of debt portfolios.

The return on debt is estimated based on a risk premium above the risk free rate, plus an additional margin for administrative and hedging costs.

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.

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.

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

9.3 Western Power's revised proposal

Western Power accepted the return on debt approach detailed in the ERA's draft decision. Western Power did not provide further comments on the return on debt in its revised proposal.²⁴

Western Power accepted the term of debt and benchmark credit rating detailed in the ERA's draft decision.

9.4 Public submissions

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comment on the return on debt.

9.5 ERA final decision

9.5.1 Method for estimating the return on debt

The ERA has considered the method for estimating the return on debt for Western Power's AA5. The ERA does not approve Western Power's initially proposed method for estimating the return on debt and maintains the hybrid trailing average approach to estimate the return on debt as this promotes regulatory certainty within the regulatory period and better meets the requirements of the Access Code.

²⁴ Western Power, *Access Arrangement Information - Attachment 1.1 – Revised AA5 Regulatory Revenue Model*, 15 November 2022.

The ERA recognises that significant changes to debt markets have occurred since 2021 and this will mean that debt costs will be higher than those included in Western Power's initial AA5 proposal. The size of the increases in debt costs, and how they are recovered over time, is affected by the method used to estimate the return on debt.

The ERA has considered the following approaches on the return on debt:

- A full trailing average for the total cost of debt, with annual updating (as initially proposed by Western Power).
- The hybrid trailing average approach for estimating the debt risk premium, with annual updating (the approach used in AA4 and current ERA approach as contained in the 2022 Rate of Return Instrument).

Consistent with the price control objectives in section 6.4 of the Access Code, the ERA considers that the service provider should be provided with a reasonable opportunity to recover at least the efficient costs that the service provider incurs. The ERA considers that the NPV=0 principle also helps ensure that investors are compensated at a level that encourages efficient investment, so that the present value of the future stream of expected cash flows of a firm is equal to the regulated asset base.

To consider the different approaches of estimating return on debt it is necessary to also consider how the financial risks of debt financing are addressed including:

- Interest rate risk – the risk of differences arising between the allowed return on debt costs and the actual cost of debt. Interest rate risk can be managed using interest rate swap contracts.
- Refinancing risk – the risk of rolling over debt and the cost of debt at the time of issuing new debt. Refinancing risk can be managed by having multiple sources of debt, issuing longer term debt and staggering debt over different periods.

The ERA's consideration of the two different methods of estimating the return on debt are detailed below.

9.5.1.1 Full trailing average approach

A full trailing average approach measures the return on debt as a trailing average of the total cost of debt. Generally, this approach applies a 10 year term of debt and a simple weight of 10 per cent for each year of the trailing average. This assumes that all debt is contracted for 10 years and 10 per cent of the total debt portfolio is refinanced each year. Under this approach, all debt is issued at a fixed rate.

The strengths of a full trailing average approach include:

- It recognises that most capital is sunk.
- It reflects a general infrastructure asset approach, where long-term fixed debt is issued and is regularly refinanced.
- It is effective in addressing refinancing risk. This assumes that the weights for the trailing average are reasonable estimates for what the benchmark entity employs and the assumed 10 year term of debt actually applies.
- It is more consistent with how regulated firms refinance their debt in practice.
- It achieves the NPV=0 principle, as it can be implementable so that debt costs are able to match the debt allowance included in regulated revenues.

- It reduces volatility of the cost of debt and the resulting volatility for regulated services. This is possible due to the smoothing effect of the 10 year trailing average.
- It can take account of extreme events that affect both the risk free rate and the debt risk premium. The smoothing effect spreads any volatile result over time.
- It minimises price volatility at the start of an access arrangement.
- It is simpler than the hybrid trailing average approach and has no requirement for incorporating hedging costs into the total debt portfolio.
- It is used by other regulators across Australia.

The weaknesses of a full trailing average approach include:

- It does not incorporate a forward looking efficient component, as a trailing average of the total cost of debt only reflects past debt costs.
- It may deliver higher costs of debt to regulated entities as firms may exploit the typical upward sloping yield curve to issue debt at lower cost. This is achieved by issuing debt at shorter maturities than the assumed 10 year tenor.
- Compared to other debt approaches, it leads to the greatest volatility of the cost of debt within an access arrangement period, including the greatest difference between forecast cost of debt and actual cost of debt in the last year of an access arrangement.
- It introduces complexity through annual updating.
- It does not reflect the variable nature of Western Power's debt portfolio.

9.5.1.2 *Hybrid trailing average approach*

The hybrid trailing average approach combines elements from the on-the-day and the full trailing average approaches. Under the hybrid trailing average approach for estimating the return on 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 same debt portfolio as the full trailing average approach).
- 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.

The strengths of the hybrid trailing average approach include:

- It recognises that most capital is sunk, while accounting for the regulatory period.
- It incorporates a forward-looking efficient component into estimating the return on debt.
- It minimises price volatility within an access arrangement period.
- It achieves the NPV=0 principle, as it can be implementable so that debt costs are able to match the debt allowance included in regulated revenues.
- It reduces the ability of firms to exploit the slope of the yield curve.
- It reduces refinancing risk. Refinancing risk provides justification for adopting some form of trailing average method.

- Compared to a full trailing average approach, it better minimises interest rate risk by linking revenues to a five year risk free rate, which is reset at the end of the access arrangement period.
- It avoids the effect of recovering low (or high) interest rates in the next regulatory period.
- It better reflects the variable nature of Western Power's debt portfolio.

The weaknesses of the hybrid trailing average approach include:

- It can increase variability between access arrangement periods.
- Compared to a full trailing average approach, it creates greater variability at the start of an access arrangement. It can produce high volatility in environments when there are large swings in interest rates.
- It is not applicable to an unregulated entity in a competitive environment.
- It introduces complexity through annual updating.
- It imposes additional hedging costs on top of a benchmark efficient debt strategy.

Since 2015, the ERA has applied the hybrid trailing average approach for estimating the return on debt for all Western Australia's regulated gas pipelines and Western Power through access arrangement determinations.²⁵

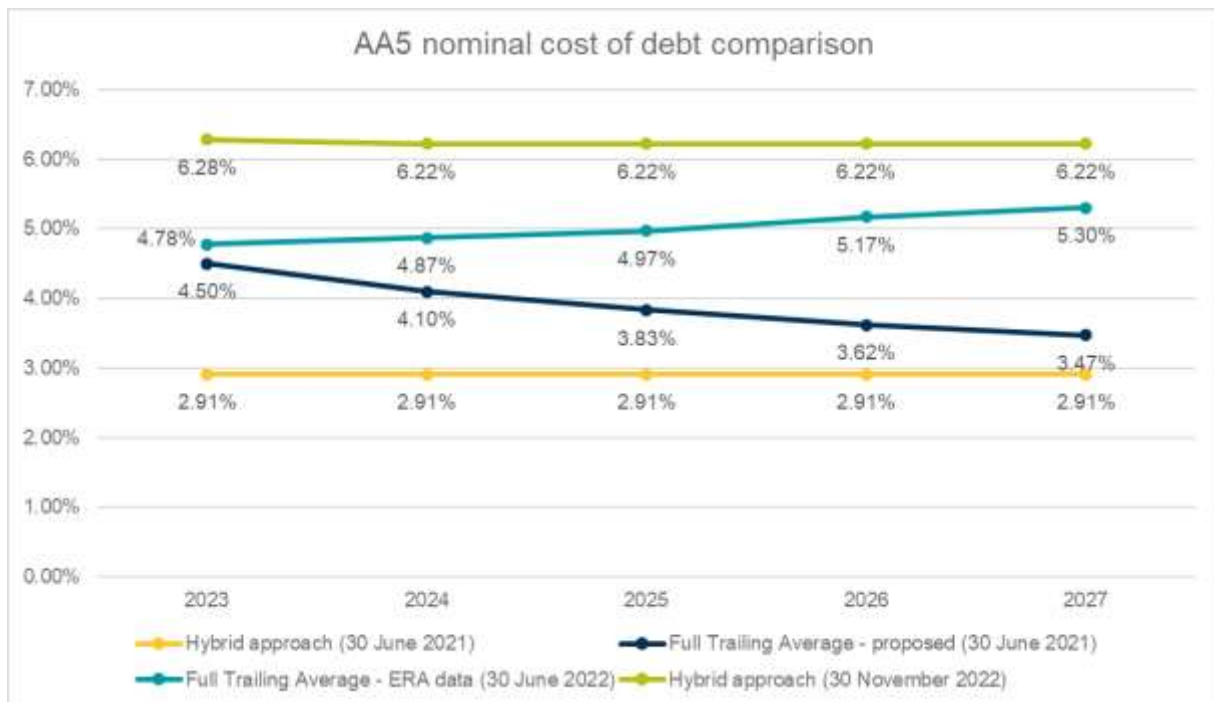
9.5.1.3 *Changes to market conditions*

The ERA notes that Western Power developed its AA5 proposal in a low interest rate environment. Western Power's proposal used June 2021 values as a placeholder. Based on conditions in June 2021, the hybrid trailing average approach produced lower debt costs than the full trailing average approach.

Market conditions have changed significantly since the AA5 proposal was developed.

Figure 1 illustrates the two cost of debt approaches and how conditions have changed since Western Power developed its AA5 proposal.

²⁵ ERA, *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network – Appendix 5 Return on Regulated Capital Base*, September 2018, p. 66.

Figure 1: AA5 nominal cost of debt comparison*

* Cost of debt estimates for the 20 trading day period.

Figure 1 shows that the cost of debt estimates under either return on debt method has increased significantly since 30 June 2021.

Given its variable and forward-looking risk free rate, the cost of debt estimates under the hybrid trailing average approach has increased most significantly compared to the full trailing average approach.

However, the full trailing average approach produces costs of debt that increases over time as the present higher debt costs are reflected in the 10 year trailing average.

The ERA notes that as the full trailing average approach gets updated annually to reflect all changes for actual debt costs, the debt amounts that are incorporated in revenues could change significantly over time from the estimate for period to 30 June 2022 (see the teal line from the Figure 1). This will result in increased price variability over time.

Under a full trailing average approach, current high debt costs will have an ongoing effect on the next regulatory period in Western Power's AA6.

Since the publication of the AA5 draft decision in September 2022, market conditions have changed moderately based on the 20 trading days to 30 November 2022.

9.5.1.4 Maintaining the hybrid trailing average approach

Western Power's AA5 proposal to change to a 10 year full trailing average debt approach contrasts with its AA4 proposal. Western Power had previously supported the hybrid trailing average approach to estimate the cost of debt based on the reasons below:²⁶

- There was broad consensus among regulators and network businesses that the trailing average and the hybrid trailing average approach reflected replicable and efficient debt management practices.
- The full trailing average approach reflected Western Power's debt portfolio more closely than the hybrid approach, but its application would significantly increase Western Power's revenue requirement over the AA4 period.

In addition, Western Power's AA4 proposal considered that the hybrid trailing average approach satisfied the Code Objective for the following reasons:²⁷

- It was replicable and allowed a network, where efficient to do so, to hedge the risk free rate at the start of the regulatory period.
- It reflected the fact the debt risk premium component cannot be hedged and must be based on a historical trailing average.
- It promoted economically efficient investment in and operation and use of the network in order to promote competition in upstream and downstream markets.
- It provided Western Power with an opportunity to recover efficient costs, including a return commensurate with the commercial risks involved.

Dr Martin Lally provided new advice on return on debt approaches as part of the review of the 2018 Rate of Return Guidelines.²⁸ Dr Lally's advice included the following:

- With respect to the cost of debt, the appropriate debt term is dependent on the form of the return on debt. The different forms for established firms include the trailing average and hybrid approaches, and for a new firm it could be something different that is more reflective of on-the-day rates. The NPV=0 principle requires that the allowed cost of debt matches that incurred by the benchmark efficient firm.²⁹
- Both the full trailing average approach and hybrid trailing average approach satisfy the NPV=0 principle, as both approaches allowed firms to align their borrowing arrangements with the regulatory allowance.³⁰
- With respect to the hybrid trailing average approach, the appropriate term for the allowed debt risk premium would be historical and equal to the term for which the benchmark efficient entity borrows, while the appropriate term for the allowed risk free rate within the cost of debt would be the future term of the regulatory period.³¹

²⁶ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fourth access arrangement period*, 2 October 2017, pp. 202-203.

²⁷ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fourth access arrangement period*, 2 October 2017, pp. 202-203.

²⁸ Dr Lally, M., *The appropriate term for the allowed cost of capital*, April 2021.

²⁹ Dr Lally, M., *The appropriate term for the allowed cost of capital*, April 2021, p. 53.

³⁰ Dr Lally, M., *The appropriate term for the allowed cost of capital*, April 2021, p. 53.

³¹ Dr Lally, M., *The appropriate term for the allowed cost of capital*, April 2021, p. 40.

The ERA considers that the hybrid trailing average approach is efficient and implementable, and has the benefit of incorporating forward-looking rates.

The hybrid trailing average approach does provide efficient signals as it incorporates an efficient forward-looking component into debt costs. While the ERA recognises the current market conditions have increased debt financing costs, recognising these costs in a forward-looking way provides efficient economic signals.

The ERA notes that under the hybrid trailing average approach, the variability of the forward-looking risk free rate has increased the cost of debt estimate at the start of the AA5 period. This compares to the cost of debt estimation under the full trailing average approach which increases over time as the higher debt costs are reflected in the 10 year trailing average, with 10 per cent of debt being refinanced each year.

As the full trailing average cost of debt gets updated annually to reflect changes for actual debt costs, this creates more volatility within an access arrangement period, particularly at the end of the period. As there is naturally a lag with the cost of debt estimated under the full trailing average approach, it may lead to a higher cost of debt compared to the hybrid trailing average approach, in the event that market conditions stabilise in the AA6 period.

The ERA considers that the hybrid trailing average approach is an efficient and implementable debt strategy for a long-term asset. The ERA considers that the use of derivative arrangements to adjust rates to lock in a five year bill swap at the start of the access arrangement period appropriately aligns the cost of debt in the regulatory context.

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

The ERA notes that while the hybrid trailing average approach may be more variable at the commencement of an access arrangement period, this reflects the movement of efficient forward-looking costs at that time.

The ERA considers maintaining the current hybrid trailing average approach to estimating the return on debt would promote regulatory certainty within the regulatory period and better meet the requirements in section 6.4 of the Access Code.

The ERA considers that regulatory certainty is not supported if a return on debt approach is selected contingent upon market conditions. Furthermore, it may not be in consumers' long-term interests for an entity to pick and choose the debt approach based on market conditions. In the long-term, changing debt approaches that depend on financial conditions would likely lead to under or over-compensation of the service provider and be inconsistent with the objective of an efficient rate of return over the life of the asset.

9.5.2 Return on debt components

The estimate of the return on debt under the hybrid trailing average approach will comprise a risk premium above the risk free rate, plus an additional margin for administrative and hedging costs:

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

Equation 2

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.

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.

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

The individual debt components are further discussed below.

9.5.3 Debt risk free rate

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

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.

9.5.3.1 ERA's draft position

The ERA used the prevailing five-year interest rate swap for the return on debt in its AA5 draft decision.³²

The interest rate swap rate is referred to as the base rate in the return on debt calculation. It incorporates a spread to the rate of Commonwealth Government Security bonds and is available at specified terms from data providers such as Bloomberg.

9.5.3.2 Public submissions

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comments on the debt risk free rate.

9.5.3.3 ERA's final position

Consistent with the hybrid trailing average approach, the ERA considers the prevailing five year interest rate swaps should be used to determine the risk free rate to estimate the return on debt.

The rationale for using a swap rate is that it is difficult to hedge government bonds and the swap rate is easier to hedge.

³² ERA, *Draft decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27 – Attachment 5: Return on regulated asset base*, 9 September 2022, p. 25.

For the purpose of determining the return on debt, the use of interbank swap rate is also more convenient for businesses and regulators. Use of the swap rate further simplifies the calculation of the debt risk premium.

Historically, the ERA has adopted a five year interest rate swap rate for its energy network regulatory determinations.^{33,34}

The ERA considers that the use of the interest rate swap rate:

- Provides a strong means to hedge and manage risk.
- Simplifies the calculation of the debt risk premium.
- Produces a closer match between the allowed cost of debt and the cost actually incurred by the firm.

The ERA considers that maintaining the use of the interest rate swap rate for the risk free rate to estimate the return on debt best achieves an efficient forward-looking rate of return in the long-term interests of consumers.

Consistent with the hybrid trailing average debt approach, the ERA considers the prevailing five year interest rate swaps for the risk free rate should be used in estimating the return on debt. The ERA will determine the interest rate swap rate at the start of a regulatory access arrangement period. The estimate will be fixed for the duration of the access arrangement period.

For estimating the risk free rate in the return on debt, the ERA considers the five year swap mid-rate, as published on Bloomberg (Last Price), over the relevant averaging period is the most appropriate measure.

For this final decision, the ERA has applied a risk free rate of 4.11 per cent for the 20-day averaging period to 30 November 2022 to determine the return on debt.

9.5.4 Term for debt

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

9.5.4.1 ERA's draft position

The ERA applied a benchmark efficient debt strategy as a portfolio of 10-year fixed-rate debt with 10 per cent refinanced each year.³⁵

9.5.4.2 Public submissions

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comments on the term for debt.

³³ ERA, *Final Rate of Return Guidelines (2018)*, December 2018, p. 20.

³⁴ ERA, *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network – Appendix 5 Return on Regulated Capital Base*, September 2018, p. 66.

³⁵ ERA, *Draft decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27 – Attachment 5: Return on regulated asset base*, 9 September 2022, p. 26.

9.5.4.3 *ERA's final position*

As part of the 2022 final gas rate of return instrument review, the ERA considers that a 10 year term for debt aligns with the term generally used by energy network businesses.³⁶

It is standard Australian regulatory practice to use a 10 year term for debt.^{37,38,39,40,41,42,43}

The ERA also reviewed Western Power's debt strategy and found that this aligned with a 10 year term for debt.

The ERA considers that Western Power's proposal to maintain the term of debt as 10 years is appropriate.

For this final decision, the ERA has applied a benchmark efficient debt strategy as a portfolio of 10-year fixed-rate debt with 10 per cent refinanced each year to determine the return on debt.

9.5.5 *Benchmark credit rating*

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

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.

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.

9.5.5.1 *ERA's draft position*

For the AA5 draft decision, the ERA applied a benchmark credit rating of BBB+ to determine the return on debt.⁴⁴

9.5.5.2 *Public submissions*

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comments on benchmark credit rating.

³⁶ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, 16 December 2022, pp. 74-77.

³⁷ ESCOSA, *SA Water Regulatory Determination 2016, Final Determination*, June 2016, p. 122.

³⁸ IPART, *Review of our WACC Method, Final Report*, February 2018, p. 25.

³⁹ ERA, *Final Rate of Return Guidelines (2018)*, December 2018, p. 17.

⁴⁰ ESC, *Western Water Determination 1 July 2020 – 30 June 2023*, 10 June 2020, p. 29.

⁴¹ AER, *Overall Rate of Return, Equity and Debt Omnibus: Final working paper*, December 2021, p. 87.

⁴² QCA, *Final Report: Rate of Return Review*, November 2021, p. 39.

⁴³ OTTER, *Investigation into TasWater's Prices and Services for the Period 1 July 2022 to 30 June 2026 Draft Report*, February 2022, p. 70.

⁴⁴ ERA, *Draft decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27 – Attachment 5: Return on regulated asset base*, 9 September 2022, p. 27.

9.5.5.3 *ERA's final position*

To estimate the efficient benchmark entity's credit rating, the ERA uses a median credit rating approach. Under this approach, a benchmark sample of comparator firms must be constructed.

As part of the 2022 final gas rate of return instrument review, the ERA reviewed the credit ratings of energy networks. The ERA also considered the other regulators' decisions. The 2022 final gas rate of return instrument found that a credit rating of BBB+ remained appropriate.⁴⁵

The ERA considers that Western Power's proposal to maintain a benchmark credit rating of BBB+ is appropriate.

For this final decision, the ERA has applied a benchmark credit rating of BBB+ to determine the return on debt.

9.5.6 *Debt risk premium*

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.

9.5.6.1 *ERA's draft decision*

In the AA5 draft decision, the ERA maintained the revised bond yield approach to determine the debt risk premium.

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

9.5.6.2 *Public submissions*

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comments on debt risk premium.

9.5.6.3 *ERA's final position*

For the final decision the ERA maintains the use of the revised bond yield approach to determine the debt risk premium.

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.

⁴⁵ ERA, *2022 final gas rate of return instrument*, 16 December 2022, p. 11.

- **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.

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

The ERA publishes debt risk premium process documents and accompanying tools for stakeholders on the revised bond yield approach. These documents and tools provide technical steps and details necessary for stakeholders to estimate the debt risk premium.⁴⁶

To determine the debt risk premium that should be used to calculate the return on debt, the ERA constructed 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 debt risk premium is then calculated for each year in the 10 year term, to work out an average value to be applied for AA5.

Table 4 details the ERA's estimated trailing average debt risk premium for this final decision.

Table 4: ERA final decision estimated trailing average debt risk premium for AA5

Year	Debt risk premium (%)
2014/15	2.634
2015/16	1.640
2016/17	2.352
2017/18	1.656
2018/19	1.241
2019/20	1.724
2020/21	1.497
2021/22	1.219
2022/23	2.103
2023/24	2.179
Trailing average debt risk premium	1.825

Source: ERA analysis; ERA, *Draft decision on proposed revisions to the Access Arrangement for the Western Power Network 2022/23 – 2026/27 – Attachment 5: Return on regulated asset base*, 9 September 2022, p. 29.

⁴⁶ Technical documents and tools to estimate the ERA's revised bond yield approach can be found on the [ERA's website](#).

The historical annual debt risk premium estimates that applied in AA4 in Table 4 are unchanged for AA5. The debt risk premium for the 2023/24 financial year was updated for the 20-day averaging period to 30 November 2022.

For this final decision, the ERA applies a debt risk premium of 1.883 per cent for 2022/23 (the first year of AA5). The ERA applies a debt risk premium estimate of 1.825 per cent for 2023/24 (the second year of AA5) based on the 20-day averaging period to 30 November 2022 (see Table 4). This is consistent with Western Power's proposed averaging period for the AA5 final decision.

10. Debt raising and hedging costs

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

Historically the ERA has allowed these costs to be included as part of the return on debt.

10.1 Western Power's proposal

Western Power proposed debt issuing costs of 10 basis points per annum, consistent with the costs applied in AA4 and the ERA's 2018 Rate of Return Guidelines.⁴⁷

The alternative debt approach in Western Power's proposal did not require debt hedging costs, and therefore Western Power did not propose an allowance for debt hedging costs.⁴⁸

10.2 ERA's draft decision

For the AA5 draft decision, the ERA applied updated estimates of:

- debt raising costs of 0.165 per cent per annum
- debt hedging costs of 0.123 per cent per annum.⁴⁹

10.3 Western Power's revised proposal

Western Power incorporated the ERA's AA5 draft decision on debt raising and hedging costs into its AA5 revised revenue model.⁵⁰

10.4 Public submissions

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comments on debt raising and hedging costs.

⁴⁷ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 235.

⁴⁸ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 235.

⁴⁹ ERA, *Draft decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27 – Attachment 5: Return on regulated asset base*, 9 September 2022, p. 30.

⁵⁰ Western Power, *Access Arrangement Information - Attachment 1.1 – Revised AA5 Regulatory Revenue Model*, 15 November 2022.

10.5 ERA final decision

10.5.1 Debt raising costs

Regulators across Australia have typically included allowances to account for the costs of obtaining finance (debt raising) 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.

Many Australian regulators use benchmark estimates to determine debt-raising costs to derive an estimate of the cost of obtaining finance that reflects the costs that would be incurred by a well-managed efficient benchmark entity operating in a competitive market.

The ERA considers that the recovery of debt-raising costs through the rate of return should only include the direct cost components recommended by the Allen Consulting Group in its 2004 report to the ACCC.⁵¹ The approach set out in this report has largely been adopted by Australian regulators.

The ERA considers that direct debt-raising costs can be recompensed in proportion to the average annual issuance, and cover:

- Gross underwriting fees: This includes management fees, selling fees, arranger fees and the cost of an underwriter for the debt.
- Legal and roadshow fees: This includes fees for legal documentation and fees involved in creating and marketing a prospectus.
- Company credit rating fees: A credit rating is generally required for the issue of a debt raising instrument. A company is charged annually by the credit rating agency for the services of providing a credit rating.
- Issue credit rating fees: A separate credit rating is obtained for each debt issue.
- Registry fees: The maintenance of the bond register.
- Paying fees: Payment of a coupon and principal to the security holder on behalf of the issuer.

The ERA does not consider indirect debt-raising costs should be included and considers that they cannot be compensated or recovered.

The ERA and other comparable Australian regulators have adopted estimates of debt raising costs ranging from 8.0 to 15.0 basis points per annum in previous regulatory decisions (see Table 5).

⁵¹ The Allen Consulting Group, *Debt and Equity Raising Transaction Costs: Final Report*, December 2004.

Table 5: Debt raising costs in Australian regulatory decisions

Regulator	Year	Allowance (bppa)
ESCOSA ⁵²	2016	12.5
IPART ⁵³	2018	12.5
ERA ⁵⁴	2018	10.0
AER ⁵⁵	2021	8.2
ESC ⁵⁶	2021	15.0
QCA ⁵⁷	2021	10.0
OTTER ^{58, 59}	2022	8.0

Source: ERA analysis

The ERA engaged Chairmont to review debt raising costs for a regulated benchmark energy network that operates efficiently as part of the ERA's review of the 2018 Rate of Return Guidelines.⁶⁰

Chairmont found that the allowance for debt raising costs should be increased from 0.100 per cent to 0.155 per cent per annum. Chairmont considered that an increase was needed to reflect higher offshore issuance costs and the inclusion of costs for a second credit rating and annual surveillance.⁶¹

In considering the advice from Chairmont, the ERA also considered an alternative method to calculate an underwriter/arranger fee, which had been proposed by CEG, an expert economic consultant.⁶²

In considering debt raising costs, the ERA recognised the merits and limitations of each of the methods used by Chairmont and CEG in estimating the debt raising costs. These include that:

- CEG used market data from Bloomberg to estimate the arranger fee, both in its previous report to South Australia Power Networks and recent report to ATCO.
- Chairmont undertook informal interviews with several financial market intermediaries and service providers to assist with determining the debt raising costs.

⁵² ESCOSA, *SA Water Regulatory Determination 2016, Final Determination*, June 2016, p. 122.

⁵³ IPART, *Review of our WACC Method, Final Report*, February 2018, p. 24.

⁵⁴ ERA, *2018 Final Rate of Return Guidelines*, December 2021, p. 35.

⁵⁵ AER, *Final Decision: Jemena Distribution Determination 2021-2026 Attachment 3 Rate of Return*, April 2021, p. 10.

⁵⁶ ESC, *2023 Water Price Review: Guidance paper*, 26 October 2021, p. 40.

⁵⁷ QCA, *Final Report – Rate of Return Review*, November 2021, p. 51.

⁵⁸ OTTER, *Investigation into TasWater's Prices and Services for the Period 1 July 2022 to 30 June 2026 Draft Report*, February 2022, p. 67.

⁵⁹ OTTER rate was informed by the AER's decisions on debt raising costs.

⁶⁰ Chairmont consulting, *Debt Raising and Hedging Costs*, 21 December 2021.

⁶¹ Chairmont consulting, *Debt Raising and Hedging Costs*, 21 December 2021, p. 2.

⁶² ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, 16 December 2022, pp. 197- 208.

In the 2022 final gas rate of return instrument, the ERA:⁶³

- Maintained that debt raising costs should be based on direct costs consistent with established regulatory practices.
- Considered that debt raising costs should be estimated using Chairmont's updated estimate of 0.155 per cent per annum and adjusted for a higher allowance for arranger fees.
- Considered that debt raising costs of 0.165 per cent per annum are appropriate.

For this final decision, the ERA has applied a debt raising cost allowance of 0.165 per cent per annum to determine the return on debt.

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

10.5.2 Debt hedging costs

Interest rate swaps are derivative contracts, which typically exchange – or swap – fixed-rate interest payments for floating-rate interest payments. They provide a means to hedge and manage risk, but also have a cost.

For this final decision, the ERA has applied the hybrid trailing average approach to estimate the cost of debt. Under this approach, 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 access arrangement period.

The ERA engaged Chairmont to review debt hedging costs for a regulated benchmark energy network that operates efficiently as part of the ERA's review of the 2022 rate of return instrument. Chairmont proposed an increase of the debt-hedging cost allowance from 0.114 per cent to 0.123 per cent per annum. The higher estimate of hedging costs includes the addition of an allowance for the costs involved in negotiating an International Swaps Dealers Agreement (ISDA) as part of one-off operational expenses.⁶⁴

In the 2022 final gas rate of return instrument, the ERA has applied an allowance of 0.123 per cent per annum for debt hedging costs.⁶⁵

For this final decision, the ERA has applied a debt hedging cost allowance of 0.123 per cent per annum to determine the return on debt.

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

⁶³ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, 16 December 2022, pp. 207- 208.

⁶⁴ Chairmont Consulting, *Debt Raising and Hedging Costs*, 21 December 2021, p. 2.

⁶⁵ ERA, *2022 final gas rate of return instrument*, 16 December 2022, p. 19.

11. Return on equity

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.

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.

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

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

This section outlines the ERA's reasoning and final decision for Western Power's return on equity.

11.1 Western Power's proposal

Western Power proposed a departure from the approach used in AA4 for calculating the return on equity and the approach for estimating the return on equity in the 2018 Rate of Return Guidelines.

Western Power's proposal broadly maintains the approach for estimating the return on equity in the 2018 Rate of Return Guidelines.

However, Western Power proposed that for AA5 the term for estimating the return on equity should be changed from five to 10 years.⁶⁶

In its advice to Western Power, Frontier Economics considered that a 10 year term for equity was supported for the following reasons:⁶⁷

- The use of a 10 year term reflects the standard practice adopted by market investors, valuation professionals and academics.
- The net present value (NPV)=0 principle requires that the regulatory allowance is set to match the return that investors require – which is based on a 10 year term for equity.
- All other Australian regulators use a 10 year term for equity, matching the regulatory approach with the approach adopted by market investors.

Western Power considered Frontier Economics' analysis and found that there was no compelling basis for maintaining a five year risk free rate.

⁶⁶ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 232.

⁶⁷ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 232.

Western Power also noted that the ERA's final decision on the Pilbara networks rate of return adopted a 10 year term for estimating the return on equity.⁶⁸

Therefore, Western Power proposed that the risk-free rate should be set on the basis of the yield on 10 year Commonwealth government bonds, as opposed to the AA4 approach of using a five year term for the risk-free rate.⁶⁹

Western Power engaged Frontier Economics to review the market risk premium but proposed no change.

Western Power proposed to maintain an equity beta of 0.7. The proposed equity beta was consistent with Western Power's AA4 and the ERA's 2018 Rate of Return Guidelines.⁷⁰

The following sections detail the ERA's final decision and considerations for the individual components for the return on equity.

11.2 Return on equity asset pricing model

The expected return on equity is unobserved and must be determined by reference to an asset pricing model that describes a relationship between risk and return. Australian regulators generally use the Sharpe-Lintner Capital Asset Pricing Model (CAPM) for the purposes of economic regulation to determine the return on equity.

11.2.1 ERA's draft decision

The ERA used the Sharpe-Lintner CAPM for estimating the return on equity and determined a single point estimate.

To estimate the return on equity the ERA separately estimated:

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

11.2.2 Western Power's revised proposal

Western Power has not provided further comments on return on equity model in its revised proposal and incorporated the ERA's AA5 draft decision into its AA5 revised revenue model.⁷¹

⁶⁸ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 232.

⁶⁹ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 232.

⁷⁰ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 232.

⁷¹ Western Power, *Access Arrangement Information - Attachment 1.1 – Revised AA5 Regulatory Revenue Model*, 15 November 2022.

11.2.3 Public submissions

There were no public submissions regarding the ERA's draft decision on the return on equity model.

11.2.4 ERA final decision

The ERA adopts the Sharpe-Lintner CAPM to estimate the return on equity. This model is commonly used by Australian regulators for quantifying the return on equity.

The ERA considers that the Sharpe-Lintner CAPM is:

- reflective of economic and finance principles and market information
- commonly used by regulators and market participants
- fit-for-purpose as it was developed for estimating the return on equity.

The ERA determines a single point estimate for the return on equity using the Sharpe-Lintner CAPM, applying the following formula:

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

Equation 3

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.

To estimate the return on equity the ERA separately estimates:

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

The ERA separately considers how best to estimate these individual return on equity parameters to ensure they support the best estimate of an efficient forward looking return on equity in the long term interests of consumers. The individual equity components are further discussed below.

11.3 Term for equity

When determining a cost of equity it is necessary to consider the term of the estimate of the cost of equity.

This section outlines the ERA's final decision for the term for equity.

11.3.1 *ERA's draft decision*

Western Power's AA4 adopted a return on equity calculated for a five-year term. At the time of determining return on equity for AA4 the ERA considered a five year term would best approximate the NPV=0 principle and thus provide the best estimate of the return on equity.

The ERA's draft decision for AA5 applied a 10-year term when estimating the return on equity. The term for equity was changed from a five year term for equity that was applied in AA4. This change was made to align the assumed term for equity with common investor practice, where investors in long-lived assets consider cash flows over a long time horizon exceeding the regulatory period. The ERA considered that a 10-year term for equity still allowed for efficient rates of return and was consistent with private market practice.

11.3.2 *Western Power's revised proposal*

Western Power accepted the ERA's draft decision on the term for equity.

11.3.3 *Consultation*

There were no public submissions regarding the ERA's draft decision on the term for equity.

11.3.4 *ERA final decision*

For AA4 a term for equity of five years was used. At the time of publishing the AA4 final decision, the ERA viewed that setting the term for equity equal to the length of the access arrangement period best satisfied the NPV=0 principle, which was considered important for providing economically efficient investment signals.⁷²

The term used for estimating the return on equity has been an ongoing matter of contention amongst regulators and regulated infrastructure providers. Different views exist, amongst stakeholders and between regulators, on the appropriate time horizon for estimating the return on equity.

The ERA has further considered the term for estimating the return on equity and the following approaches:

- A five year term based on the 'term matching approach', consistent with what applied in AA4 and the ERA's 2018 Rate of Return Guidelines.
- A long-term approach of 10 years, proposed by Western Power.

⁷² ERA, *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network – Appendix 5 – Rate of Return*, September 2018, p. 12.

The ERA has also undertaken a detailed review of the term for estimating the return on equity as part of its review of the 2018 Rate of Return Instrument. As part of the review the ERA has given further consideration to the term for equity in light of:⁷³

- The new regulatory work on the term for the return on equity.
- Submissions received in response to the ERA's explanatory statement for the 2022 Draft Rate of Return Instrument.
- The AER's concurrent evidence sessions.
- New advice from Dr Lally commissioned by the ERA in response to submissions received for the review of the 2018 Rate of Return Guidelines.

As part of the review of the 2018 Rate of Return Guidelines, the ERA considered that a change in its approach to the term for equity was warranted to ensure that the rate of return continues to deliver efficient forward-looking rates. In the 2022 Final Gas Rate of Return Instrument, the ERA determined that the term for equity was to change from five years to 10 years. This change aligned the assumed term for equity with common investor practice, where investors in long-lived assets consider cash flows over a long-time horizon exceeding the regulatory period. A 10 year term for equity still allows for efficient rates of return and is consistent with private market practice.

Consistent with the Access Code, the ERA considered that the service provider should be provided with a reasonable opportunity to recover at least the efficient costs that the service provider requires. For the final decision, the ERA accepted Western Power's proposed change to a 10 year term for equity to determine the rate of return.

The ERA's consideration of the term for equity for the final decision is detailed below.

11.3.4.1 *Regulatory work*

In 2020, the AER conducted a review of the regulatory treatment of inflation and decided to match its estimate of expected inflation to the length of the relevant regulatory period.⁷⁴ The AER had previously been using a 10 year term for expected inflation.

Given the change to the term of expected inflation, the AER considered that it should review the term used in determining the rate of return to check whether its current approach remained appropriate.⁷⁵

The AER engaged Dr Martin Lally as part of its review of the appropriate term for the rate of return.⁷⁶ Dr Lally's advice included the following:

- The valuation problem facing a regulator with a five year regulatory cycle is different from that of valuing an unregulated business.⁷⁷
- The terms for the return of equity, return on debt and expected inflation do not need to align and these terms can be determined separately by applying the NPV=0 principle.⁷⁸

⁷³ ERA, *Explanatory statement for the 2022 draft gas rate of return instrument*, June 2022, pp. 92-99.

⁷⁴ AER, *Final Position: Regulatory Treatment of Inflation*, December 2020, p. 35.

⁷⁵ AER, *Final Position: Regulatory Treatment of Inflation*, December 2020, p. 23.

⁷⁶ Dr Lally, M., *The appropriate term for the allowed cost of capital*, April 2021.

⁷⁷ Dr Lally, M., *The appropriate term for the allowed cost of capital*, April 2021, p. 21.

⁷⁸ Dr Lally, M., *The appropriate term for the allowed cost of capital*, April 2021, pp. 3-4.

- In respect of the cost of equity, the NPV=0 principle implies that the term must match the regulatory cycle. The valuation problem for a regulator is like that for a business terminating in five years' time, or a floating rate bond whose coupon rate is reset every five years.⁷⁹

In December 2021, the AER published an information paper that expressed an open position for the term for the return on equity as part of its concurrent evidence sessions in 2022.⁸⁰ In the paper, the AER:

- Adopted a preferred position that the terms for the return on equity, return on debt and expected inflation should be independently assessed. However, the AER noted that common principles underpin the choice of term in each case (in particular the NPV=0 principle) which may lead to the same term being applied.⁸¹
- Outlined that there are typically two choices for the term for the rate of return:
 - Match to the length of the regulatory periods (typically five years).
 - Match to the underlying asset lives (typically 10 years, reflecting long asset lives).

In November 2021 the Queensland Competition Authority (QCA) finalised its rate of return review. In this review the QCA considered that it was reasonable to use a term of 10 years for the return on equity. The QCA considered that this approach reflects the requirements of investors who, in relation to long-lived infrastructure assets, will deploy equity over the entire life of the asset, rather than over any given regulatory period.⁸²

The QCA noted that it had changed from its previous term-matching approach:⁸³

In the last decade, we have estimated the risk-free rate using an interpolated term-matched bond term. However, in our most recent reviews, we have reverted to using a 10-year bond term, as we considered that it would better provide for an overall return that was commensurate with the commercial and regulatory risks associated with investment for the life of the asset.

11.3.4.2 Concurrent evidence sessions

One of the AER's concurrent evidence sessions specifically considered the term for equity.⁸⁴ These concurrent evidence sessions assembled experts on the rate of return and its components. These experts were tasked with considering how best to estimate the rate of return.

There was a consensus view among the experts that NPV=0 was the correct principle for determining the term for equity.

⁷⁹ Dr Lally, M., *The appropriate term for the allowed cost of capital*, April 2021, p. 52.

⁸⁰ AER, *Rate of Return Information Paper and Call for Submissions*, December 2021, pp. 16-17.

⁸¹ See also AER, *Rate of Return – Term of the Rate of Return & Rate of Return and Cashflows in a Low Interest Rate Environment – Final Working Paper*, September 2021, pp. 43-44.

⁸² Queensland Competition Authority, *Final report – Rate of return review*, November 2021, pp. 83-84.

⁸³ Queensland Competition Authority, *Final report – Rate of return review*, November 2021, p. 83.

⁸⁴ AER, *Rate of Return Instrument Concurrent Evidence Session 2 of 4*, February 2022.

However, the experts' views on how best to achieve the NPV=0 condition for the return on equity diverged between two methods:

- The regulatory approach: The term for the return on equity should be set to the term of the regulatory period. Notably, this was the view advocated by Dr Lally. Dr Lally provided mathematical proofs as support for this view.⁸⁵
- The competitive approach: The term for the rate of return should be set to provide NPV=0 over the life of the regulated asset, which would entail using the discount rate based on the longest feasible discount rate (the 10 year rate). The reasoning for this approach is that equity investors receive their cashflows over multiple regulatory periods and therefore a longer term rate is needed. The experts who advocated this view considered it is more closely aligned with capital budgeting and investment practice and therefore provides more efficient investment incentives relative to other investment opportunities with similar risk.

Experts noted that any change to the term for the risk free rate would have some offsetting effect on the market risk premium. That is, a move from a five year to a 10 year risk free rate would reduce the market risk premium.

11.3.4.3 *Advice commissioned from Dr Lally*

In their submissions to the ERA as part of the review of the 2018 Rate of Return Guidelines, energy network businesses were critical of Dr Lally's approach and advice on the term for equity. Energy networks submitted that:^{86,87,88,89,90}

- Dr Lally's approach did not reflect the required returns of investors.
- There were deficiencies in Dr Lally's proof, in particular that investors assume that the market value of the network is equal to the regulated asset base at the end of regulatory periods and therefore investors do not need to consider longer term cashflows.
- Dr Lally's comparison between the valuation of regulatory cash flows and the valuation of a floating rate bond whose coupon rate is reset every five years was inaccurate.
- A rate set below what an investor reasonably expected would result in a negative NPV outcome.

The ERA commissioned Dr Lally to review the appropriate term for the allowed cost of equity and review the submissions received by the ERA.⁹¹

Dr Lally continued to support the use of a five year term for equity and considered that it ensures that the NPV=0 principle is satisfied. Dr Lally considered that this was supported by his mathematical proofs. Dr Lally considered that the NPV=0 principle was the primary consideration for choosing the term for the cost of equity.⁹²

⁸⁵ Dr Lally, M., *Notes for the Expert Sessions 10 February 2022: Term of the Rate of Return*, February 2022.

⁸⁶ Australian Gas Infrastructure Group, *Submission to Discussion Paper*, February 2022, pp. 11-15.

⁸⁷ ATCO, *Submission to Discussion Paper*, February 2022, pp. 5-11.

⁸⁸ Energy Networks Australia, *Submission to Discussion Paper*, February 2022, pp. 2-3.

⁸⁹ Goldfields Gas Transmission Pty Ltd, *Submission to Discussion Paper*, February 2022, pp. 4-10.

⁹⁰ Frontier Economics, *Considerations for the regulatory rate of return allowance*, December 2021, pp. 7-26.

⁹¹ Dr Lally, M., *The Appropriate Term for the Cost of Equity*, April 2022.

⁹² Dr Lally, M., *The Appropriate Term for the Cost of Equity*, pp. 4-16.

Dr Lally considered that:⁹³

- None of the critiques in the submissions received by the ERA contradicted his mathematical proof that term-matching satisfies the NPV=0 principle.
- No alternative proof was presented for a 10 year term for equity.

11.3.4.4 Further reports from submissions to the 2022 draft gas instrument

The ERA's previous position on setting a regulatory rate by term matching was informed by the research from Dr Lally that concluded that NPV=0 is met when the term of the risk free rate for equity was set to the regulatory period.

Dr Lally's proof has been subject to further debate and discussion by stakeholders and has recently culminated in the Professor Schmalensee (2022) report for Energy Networks Australia.

Professor Schmalensee is the author of Schmalensee (1989),⁹⁴ an academic paper that Dr Lally cites as support for term matching.

Energy Networks Australia requested that Professor Schmalensee provide an opinion on two issues which is summarised in Table 6:

Table 6: Schmalensee (2022) report for ENA

Question	Response
Do you agree with the characterisation of Schmalensee (1989) that appears in Lally (2021)?	<p>"In fact, Dr. Lally's characterization of Schmalensee (1989) is almost exactly backwards. Schmalensee (1989) shows that the NPV=0 principle will be satisfied for any choices of allowed rates of return as long as accounting rates of return in each period are constrained by price regulation to equal the corresponding allowed rates of return."</p> <p>"Schmalensee (1989) certainly does not "show" that the term of the allowed return must match the term of the regulatory cycle. Efficient regulation generally requires that the allowed rate of return must be consistent with the return required by investors – however they determine it."</p> <p>"Dr. Lally (2021) cites Schmalensee (1989) for the proposition that the NPV=0 condition is satisfied only if the regulator sets allowed rates of return in one particular way. Dr. Lally is simply wrong. Schmalensee (1989) shows that, properly computed, NPV=0 holds however the allowed rates of return are determined. Economic efficiency of course, requires that the allowed rate of return is always commensurate with the return that investors require."</p>
If an economic regulator seeks to reach "an unbiased estimate of the expected efficient return, consistent with the relevant risks involved in providing regulated network services" to be applied over a defined regulatory period, does Schmalensee (1989) have any implications for the way that return should be estimated?	<p>"Even after a rather careful review of Schmalensee (1989), I cannot understand how Dr. Lally arrived at his view of what that paper implies for real-world determination of regulated firms' allowed rates of return. Fundamentally, Schmalensee (1989) takes the regulator-determined allowed rates of return as exogenous; the proof of The Invariance Proposition does not depend in any way on how the allowed rates of return are determined."</p> <p>"Of course, it is universally understood that to avoid granting rents to regulated firms while still maintaining adequate investment incentives, the regulator should set allowed rates of return to match the rates that investors require. There is no serious discussion in Schmalensee (1989) about how that should be done: I was not then nor am I now an expert in applied corporate finance, and, in particular, I have no opinion on how the AER should determine the actual, market-based costs of capital of the firms it regulates."</p>

Source: Schmalensee, R, *Statement of Richard Schmalensee, Ph. D. To the Australian Energy Regulator, July 2022.*

⁹³ Dr Lally, M., *The Appropriate Term for the Cost of Equity*, April 2022, pp. 16-31.

⁹⁴ Schmalensee, R, An expository note on depreciation and profitability under rate-of-return regulation. *Journal of Regulatory Economics*, 1989, 1(3), pp. 293–298.

In addition, the Energy Networks Australia referred to a paper by the Queensland Treasury Corporation that questioned the accuracy of Dr Lally's resetting bond interpretation of regulatory cash flows:⁹⁵

- A large part of the argument for the term matching approach is that investors do not consider cash flows after the regulatory allowance re-sets, similar to a resetting bond. Therefore, investors only need to apply a discount rate consistent with the length of the regulatory period.
- The Queensland Treasury Corporation considered that the floating rate bond analysis was essential to the AER's term matching proposal because it avoids the assumption that investors receive an amount equal to the residual regulated asset base in cash at the end of the regulatory period. This assumption was one of the main reasons why the AER did not adopt term-matching in the 2018 rate of return instrument.
- The Queensland Treasury Corporation demonstrated that if regulated equity is viewed as a long term floating rate bond with five yearly coupon resets, the risk free rate in the allowed return on equity should be materially higher than the five year risk free yield.
- The Queensland Treasury Corporation considered that this is supported by:
 - A first principles analysis based on the incremental cost of locking in funds for longer periods of time while maintaining the same exposure to interest rate risk. That is, investors also consider the opportunity cost of locking in capital over the long term.
 - Its empirical analysis that built up a long term coupon resetting Commonwealth Government Security and estimated its resulting market yield.
 - Queensland Treasury Corporation considered that term-matching is not consistent with contemporary regulatory practice in Australia.

11.3.4.5 10 year term for equity

In making the final decision on the term for equity, the ERA considered the opposing stakeholder views in submissions received, the approach of other Australian regulators and the advice and opinion from experts.

The ERA considered that the term for equity depends on what rate a regulator is setting:

- A regulatory rate: A rate that provides required returns according to regulatory settings and principles, and recognises resets for every regulatory or access arrangement period. Application of such a rate reflects one view of efficient costs under a resetting regulatory framework.
- A competitive market rate: A rate that provides the expected returns of equity investors according to market conditions and practices for infrastructure assets, which is generally a long-term rate with a term exceeding the length of the regulatory or access arrangement period. Application of such a rate reflects one view that regulated assets have long lives and investors are concerned with cashflows over the life of the asset. This rate also uses the longest term generally available (10 years) for a proxy that investors would use to discount cashflows.

⁹⁵ Queensland Treasury Corporation, *Submission to Draft Rate of Return Instrument Explanatory Statement*, September 2022.

The ERA recognised that it has historically set a regulatory rate for the term for equity when determining the return on equity and this has supported its past practice of term matching to the five year access arrangement period.

The ERA's historic position has been supported by Dr Lally's theoretical proof that term matching for the cost of equity best meets the NPV=0 principle.

Dr Lally in his most recent advice to the ERA has continued to rely on his theoretical proof to support his position for a five year term for equity in response to issues raised by stakeholders. Dr Lally's theoretical proof:

- Applies standard finance practice of setting the term of the discount rate equal to the period of cashflows being considered.
- Assumes that at the end of the regulatory access period (in the ERA's case five years) the asset market value is equal to the value of the regulated asset base (RAB).
- Assumes, therefore, that there is no need to consider future cashflows beyond the regulatory period because of the resetting nature of the regulatory periods.
- Sets regulatory revenues based on a five year term and then discounting over that five year term produces NPV=0.
- Then details that setting regulatory revenues based on a 10 year term and then at the same time constraining the discount rate to five years achieves a positive NPV outcome.

The ERA considers that Schmalensee (2022) disagrees that the earlier Schmalensee (1989) can be characterised as providing support for the term matching approach and generally disagrees with both Lally (2021) and the AER's mathematical exploration in support of their draft rate of return decision on the term for equity.

After reviewing Schmalensee (1989), the ERA agrees with Professor Schmalensee that the *Invariance Principle* does not provide explicit support for term matching.⁹⁶ The Schmalensee (1989) paper is primarily concerned with setting regulatory depreciation under a rate of return framework.

Additionally, the ERA considers that Professor Schmalensee supports a competitive rate approach in determining the term for equity, where rates are set to match what investors require.

The ERA considers that investors take a longer term view of investments that is greater than a regulatory period as evidenced by:

- The holding period and asset life of infrastructure investments, especially when equity is deployed for the entire life of equity and not just for a regulatory period.
- The duration of equity as a perpetual instrument, especially when compared with debt.
- How cash returns are provided under the post-tax revenue model and the regulatory framework targeting a real return.
- The valuation of the residual value of network assets that are uncertain, but may only be equal to the RAB by coincidence.

⁹⁶ The Invariance Principle is the result from Schmalensee (1989) and Myers (1972) where NPV=0 is achieved for a regulated investment under any method of depreciation. These results are derived under certain assumptions such as perfect price regulation, where regulated rates are exogenously determined as the regulator will set regulated rates equal to the required rates.

- Shareholder and investor stakeholder submissions by Global Infrastructure Investor Association (GIIA) and Network Shareholders Group (NSG) that provide evidence on investor practices:
 - GIIA stated that its investors in long-term regulated infrastructure assets use longer term rates due to the “long-lived nature of energy infrastructure assets and standard commercial practice”.⁹⁷
 - NSG stated that equity investors value regulated businesses as the present value of cashflows over the long-term horizon. Equity investors do this because the regulatory framework sets out those cashflows over the life of the investment.⁹⁸
 - NSG rejected the notion that equity investors value their assets as five years of regulatory cashflows and the ending RAB. NSG submitted that there is no evidence that investors assume that the RAB is recovered at the end of the regulatory period. Further, NSG stated that all investors that they represent use a ten-year term when valuing their equity investments in regulated energy networks, with none using Dr Lally’s valuation approach.⁹⁹

For the reasons discussed in this section, the ERA considers that investors consider cashflows over the long-term and therefore investors reasonably expect a long-term return on equity.

The ERA has also considered the report provided by the Queensland Treasury Corporation, which provided analysis to examine a long-term resetting bond from a first principles and empirical basis. The ERA considers that investors might reasonably expect a premium, over and above a short term rate, to lock in their capital over the long-term.

The ERA has some concerns with the limitations of Dr Lally’s theoretical proof for the term for equity. The ERA has also noted concerns raised by stakeholders. In considering the term for equity the ERA recognised that investors’ expectations may not align with Dr Lally’s theoretical proof and the practical application of the proof breaks down.

- Dr Lally’s theorem cannot identify the expected rate of return that investors actually need. It identifies that NPV=0 is met when the allowed return incorporated into regulatory revenues is equal to the discount rate used by investors. However, this would support that an indeterminate number of allowed returns exist, from which the regulator must select the rate that it considers is the true discount rate used by investors.
 - For example, NPV=0 can be achieved by applying a high 10 per cent return on equity to regulatory revenues and then discounting by that same rate. Applying a low two per cent rate in the same manner also achieves NPV=0.
- Energy network investors hold these assets over multiple regulatory periods. Other regulators such as the Queensland Competition Authority have noted that a longer-term perspective more likely reflects the requirements of investors who in relation to these infrastructure assets “deploy equity over the entire life of the asset, rather than over any given regulatory period”.¹⁰⁰

⁹⁷ Global Infrastructure Investor Association, *Response to AER Final Omnibus Paper*, March 2022, pp. 2-3.

⁹⁸ Network Shareholders Group, *Response to the AER Rate of Return Information Paper and Omnibus Final Working Paper*, March 2022, p. 3.

⁹⁹ Network Shareholders Group, *Response to the AER Rate of Return Information Paper and Omnibus Final Working Paper*, March 2022, p. 7.

¹⁰⁰ Queensland Competition Authority, *Rate of return review: Final report*, November 2022, p. 83.

- Investors consider long-term cashflows when making decisions. Infrastructure assets in particular have higher duration. Comparing the stream of cashflows and their relative value over time, it is reasonable to believe that infrastructure assets (and equity more generally as an infinitely lived asset) have the majority of their present values contained in the future, not the present. This longer duration implies that when considering valuations or budgeting, investors are likely to utilise longer term discount rates to better match the timing of distant cashflows.
- Dr Lally relies on the assumption of investor expectations of certainty that assets' market value will equal the RAB at the end of the regulatory period. However, equity investors are unlikely to assume that the market value of the network is equal to the regulated asset base at the end of a regulatory period (or over multiple periods).
- Unlike bonds, residual value is not returned in cash at the end of the period, but comprises a value whose recovery remains at risk from future regulatory decisions and changes in the market (both technological changes and changes to customer preferences). The market value of equity in the business is not certain to equal the equity's share of the ending RAB value at the end of the regulatory period, but will instead reflect the present value (at that time) of all expected future cashflows.
- The allowed return on equity is not provided as a series of cashflows during the regulatory period. Part of the return is provided to equity holders during the current regulatory period and the remainder is provided over the remaining life of the assets (future regulatory periods). Thus, the value of the firm always depends on the long-run expected future cash flows. This means:
 - Over an access arrangement period equity investors receive equity returns in the form of cash (residual cashflows) and non-cash returns (RAB escalation). The nature of regulatory revenues, and a post-tax revenue model that targets real rates of return, mean that equity investors receive both cash and non-cash returns over a regulatory period.
 - Cash returns received by equity investors are the proceeds from the real WACC minus the nominal cost of debt. These cash returns deliver equity investors with residual returns which are lower than the real return on equity. Non-cash returns are received in the form of an escalation of the RAB. Equity investors then recover the increased RAB over multiple regulatory periods.
 - As equity investors do not sell the energy network at the end of each regulatory period, equity investors are only able to realise their expected returns over the long-run.

On the basis of the above analysis, for the final decision the ERA applies a term for equity of 10 years to set a competitive market rate of return that complies with the NPV=0 principle. The ERA considers that regulated assets have long lives and investors are concerned with cashflows over the life of the asset and not just with the regulatory period. Therefore, the ERA considers that investors consider long term cashflows across multiple regulatory periods and expect to receive returns consistent with this perspective.

As the ERA considers that investors expect a longer-term return on equity, a shorter-term will lead to negative NPV outcomes. Therefore, if investors do consider cashflows over the long-term (or even beyond the regulatory period) they will discount those cashflows with a long-term discount rate. This means:

- If regulated revenues are set with reference to a 10 year term for equity and equity investors discount cashflows with a 10 year term this ensures that NPV=0 is maintained.

- However, if regulated revenues are set with reference to a five year term of equity and equity investors require a 10 year term, this will produce negative NPV outcomes.

Accordingly, setting a short-term rate would not best meet the NPV=0 principle, nor would it support efficient signals for both network owners or consumers.

The ERA notes that other Australian and international regulators have set a long-term rate when setting the return on equity seeking to match common market approaches for long-lived assets.

Having assessed both approaches, the ERA considered that the weight of the evidence required that it change its approach to match common market practice for long-lived assets and support a longer term market rate when determining the return on equity.

The ERA considered that a 10 year term for equity provides the following advantages:

- It recognises that efficient and prudent infrastructure companies require a long-term rate to reflect the long-term cashflows of their networks.
- It is consistent with standard practice adopted by market investors, valuation professionals, academics and practitioner textbooks.
- It recognises the reality of regulatory cashflows and returns being realised by equity investors over the life of the asset.
- It does not disadvantage regulated assets which have to compete for funding with unregulated infrastructure with similar risk. Regulated infrastructure investments must compete for equity capital with similar unregulated investments, for which the required return is typically based on a 10 year term for equity.
- It meets the NPV=0 principle. If the goal is to match the regulatory allowance to the market cost of capital (i.e. the return that investors require) the term should be set to match the practices of investors. A 10 year term for equity supports efficient financing costs over multiple regulatory or access arrangement periods.
- The use of a 10 year term for equity is widely applied by Australian and international regulators. Regulators have generally accepted the argument that the term of equity should be a proxy for the life of the regulated asset. Given the long-term nature of infrastructure asset investment, regulators generally consider that a long-term rate better reflects the expectations of investors rather than a shorter term.

The ERA considers that the terms across equity, debt and inflation do not need to match and they should be separately set to best achieve an efficient weighted average return.

The ERA maintains that the terms for debt and inflation are separate issues which are discussed in the respective chapters of this final determination. The determination of terms for the separate components of the rate of return are unified by the consistent consideration of the NPV=0 principle.

- For equity, the ERA considers that regulated assets have long lives, equity holders receive cash returns over more than one regulatory period and investors are concerned with cashflows over the long term. Using the longest term generally available (10 years) reflects investors' efficient costs and efficient financing in a competitive market. A 10-year term for equity ensures that regulated revenues match the requirements of efficient investors and best approximates the NPV=0 principle.

- For debt, the ERA also considers its hybrid trailing average approach best approximates the NPV=0 principle while also recognising interest rate risk, refinancing risk and the staggered nature of debt portfolios. This recognises that energy networks enter into long-term debt arrangements to fund long-term assets, while also allowing for the use of derivatives to partially align with the regulatory cycle. This is an implementable strategy and thus ensures NPV=0.
- For inflation, the ERA considers that the term of expected inflation should be five years, consistent with the length of the access arrangement. This allows the revenue model to take the best estimate of the five year inflation forecast out (of the nominal WACC) and add back the actual inflation over the five year access period (through the indexation of the RAB). Aligning the inflation term to the regulatory cycle best approximates the NPV=0 principle.

The consideration of each rate of return component with the objective of achieving the NPV=0 principle indicates that the respective terms do not match. Hence, the ERA considers that matching the terms of equity, debt and inflation would result in a present value error that would not be in the long term interests of consumers.

In determining the best approach to estimate the term for equity, the ERA considered the general guiding principles to inform its regulatory judgement of the evidence before it. The ERA's approach has been determined considering relevant economic and finance principles and current market information; transparency and whether it can be implemented. The ERA considers that the use of a 10 year term for equity to estimate the return on equity is fit for the purpose of the final decision.

11.4 Equity risk free rate

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

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.

This section outlines the ERA's final decision for the equity risk free rate.

11.4.1 ERA's draft decision

The ERA considered that the equity risk free rate would be estimated with a 10 year term using Commonwealth Government Security bonds.

The ERA considered that 10 years was the most appropriate term for the equity risk free rate as it was the longest feasible term that can be reliably estimated from observed data. While Commonwealth Government Security bonds with maturities of greater than 10 years do exist, these bonds are not as liquid as the 10 year bond.

11.4.2 Western Power's revised proposal

Western Power accepted the ERA's draft decision on the equity risk free rate.

11.4.3 Public submissions

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comments on the equity risk free rate.

11.4.4 ERA's final decision

To determine the best estimate of the risk free rate for equity, the ERA has considered:

- The most appropriate term for the risk free rate.
- The most appropriate choice of proxy instrument.

Western Power has proposed a 10 year Commonwealth Government Security bond to estimate the equity risk free rate for AA5.

As discussed above, the ERA considers that the term for equity which would yield the best estimate of the efficient cost of equity is 10 years.

The ERA considers that 10 years is the most appropriate term for the equity risk free rate as it is the longest feasible term that can be reliably estimated from observed data. While Commonwealth Government Security bonds with maturities of greater than 10 years do exist, these bonds are not as liquid as the 10 year bond.

Regarding the most appropriate proxy instrument for the risk free rate for equity, the ERA considers that observed yields from Commonwealth Government Security bonds are the best proxy for risk free assets in Australia as they are:

- essentially free from default risk
- relatively liquid
- transparently and regularly reported.

Commonwealth Government Security bonds are also commonly used by other Australian regulators and market practitioners to determine the risk free rate.

The ERA notes that Commonwealth Government Securities yields have shown some volatility and have recently risen, as shown in Figure 2.

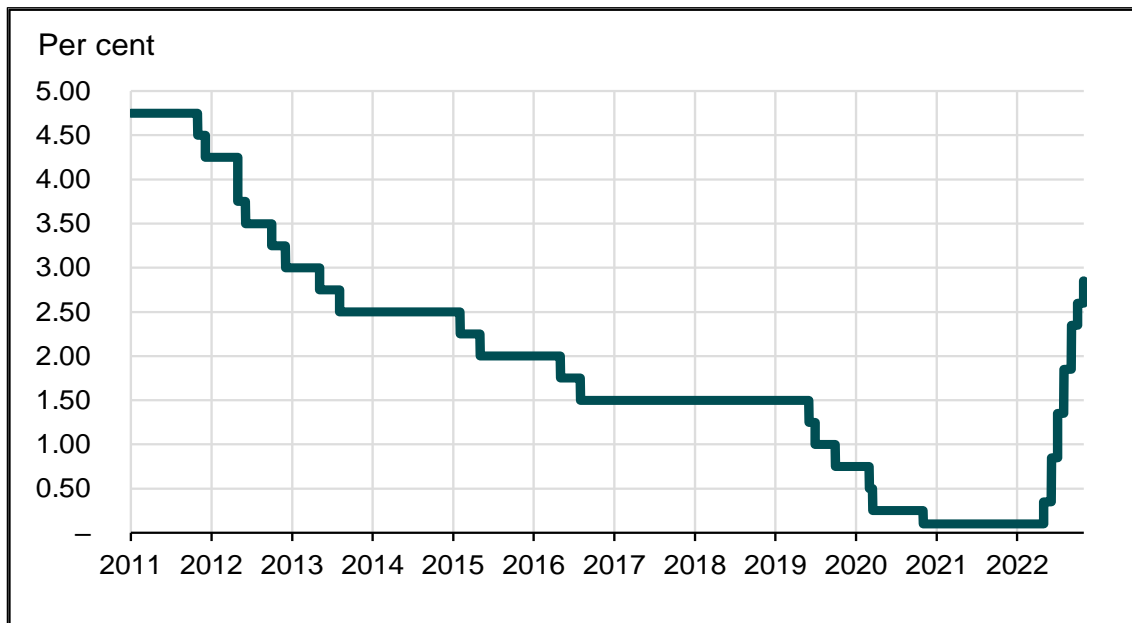
Figure 2 10 year Commonwealth Government Securities yields

Source: ERA analysis, based on Reserve Bank of Australia F2 statistical tables.

The near-term risk free rate has been volatile and uncertain as the economy recovers from the COVID-19 pandemic, and there is increasing uncertainty around central bank monetary policy given the emergence of inflation.

Inflationary expectations in the market have recently increased, with central banks conducting monetary policy operations to meet inflation targeting mandates. Other shocks such as the conflict in Ukraine have added to the uncertainty of the inflationary environment, along with contributing to global supply shortages which affects prices.

The RBA has been progressively increasing the cash rate since May 2022. These monetary policy changes are illustrated in Figure 3.

Figure 3: RBA cash rate target

Source: ERA analysis, based on Reserve Bank of Australia F1 statistical tables.

As the ERA sets the risk free rate based on a 10-year Commonwealth Government bond, this reflects the market's long term expectations and therefore is less affected by short volatility in inflation and interest rate changes. This will support a level of reduced volatility in the risk free rate.

For this final decision, the ERA accepts Western Power's proposal and has determined the risk free rate for equity by:

- Using observed yields from 10 year Commonwealth Government Security bonds.
- Using linear interpolation of observed yields of Commonwealth Government Security bonds.

The ERA will use this yield to set the risk free rate for equity at the start of the AA5 period. This rate will be fixed for the duration of AA5.

For this final decision the ERA estimates a risk free rate for the cost of equity of 3.73 per cent for the 20-day averaging period to the end of November 2022.

11.5 Market risk premium

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

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.

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.¹⁰¹ This is a forward-looking concept.

The market risk premium is calculated as follows:

$$MRP = R_M - R_F$$

Equation 4

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.

This section outlines the ERA's final decision for the market risk premium.

11.5.1 ERA's draft decision

For the draft decision, the ERA considered that it was appropriate to update the market risk premium and applied 6.2 per cent as its best estimate of the market risk premium to determine the rate of return.

The market risk premium was estimated from the historic market risk premium, the dividend growth model and conditioning variables. Additionally, as the ERA was using a 10-year term for equity, the risk free rate for the market risk premium was also determined using a 10-year term.

The market risk premium was to be fixed for the period of AA5.

11.5.2 Western Power's revised proposal

Western Power accepted the ERA's draft decision on the market risk premium.

11.5.3 Public submissions

No submissions to the ERA's draft decision and Western Power's revised proposal provided stakeholder comments on the market risk premium.

11.5.4 ERA's final decision

Western Power proposed a market risk premium of 6.0 per cent, consistent with AA4 and the ERA's 2018 Rate of Return Guidelines.¹⁰²

As a market-wide parameter, the ERA considers that the methodology for estimating the market risk premium will be the same for all regulated energy networks.

¹⁰¹ 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 systematic risk that is relevant to investors.

¹⁰² ERA, *Proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27 – Issues paper*, March 2022, p. 38.

In developing the 2022 Final Gas Rate of Return Instrument, the ERA considered the market risk premium. Through this process the ERA has proposed to simplify and refine its approach to calculating the market risk premium in the 2018 Rate of Return Guidelines and update the market risk premium based on current market information. The ERA applied a market risk premium of 6.1 per cent in the 2022 Final Gas Rate of Return Instrument.¹⁰³

The ERA noted that whilst Western Power commissioned a Frontier Economics report that advised on market risk premium matters, they were not adopted in Western Power's proposal. The ERA considered the matters raised by Frontier Economics in developing the Final 2022 Gas Rate of Return Instrument.

11.5.4.1 *Refined and updated market risk premium*

The ERA has considered a range of information including expert views, academic literature, market data, stakeholder submissions and other information to inform its review of the rate of return instrument and determine how best to estimate the rate of return, including the market risk premium.

As detailed in the 2022 Final Gas Rate of Return Instrument, the ERA's proposed approach to estimating the market risk premium broadly maintains the approach in the 2018 Rate of Return Guidelines and applied in AA4. The ERA has proposed to simplify and refine its current approach to calculating the market risk premium and updated the market risk premium based on current market information.¹⁰⁴

The ERA's proposed refinements in the 2022 Final Gas Rate of Return Instrument include:

Estimation of the historic market risk premium

- Only considering market risk premia post-1958 given the data quality issues and representativeness of returns of the 1883-1958 period.
- Including an additional subperiod (2000 onwards).
- Solely relying on the BHM dataset.
- Refining the use of the arithmetic and geometric means.

Estimation of the dividend growth model

- Averaging the dividend growth model estimates over six months.

In the 2022 Final Gas Rate of Return Instrument the ERA also determined that the market risk premium will be estimated consistent with a 10 year term for equity.

All things equal, compared with a five year term for equity approach, this generally results in lower estimates for both the historic and dividend growth model methods. This difference is due to the extent that a term premium exists for Commonwealth Government Securities. However, the ERA notes that the market risk premium will also be affected by developments in financial markets and economic conditions alongside the term for equity.

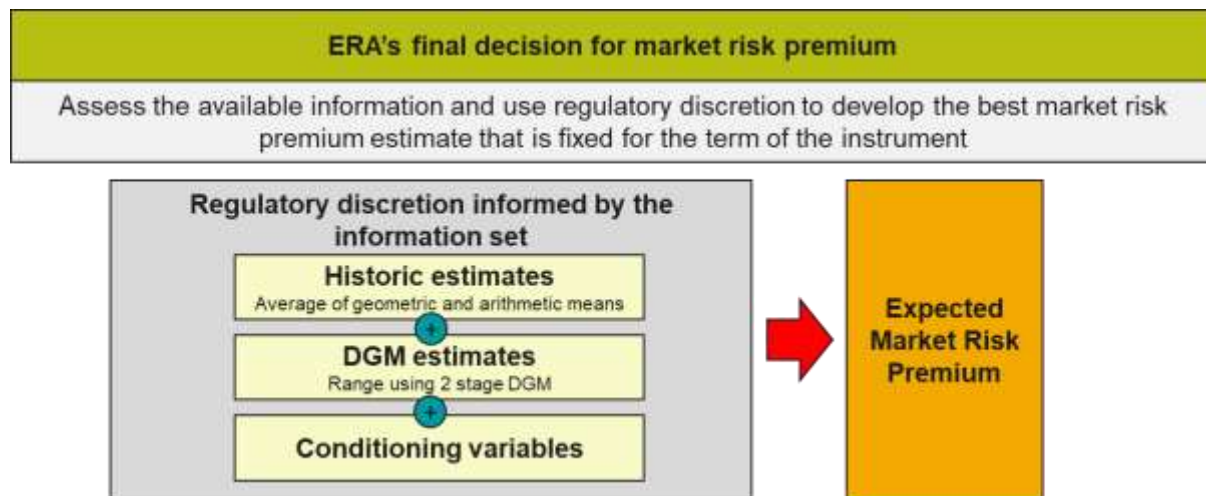
In determining a point estimate for the market risk premium the ERA in the 2022 Final Gas Rate of Return Instrument continues to consider historic estimates, dividend growth model estimates and conditioning variables.

¹⁰³ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 123-160.

¹⁰⁴ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 123-160.

The ERA's approach to determining a market risk premium in the 2022 Final Gas Rate of Return Instrument is summarised in Figure 4.

Figure 4: ERA's approach to determining a market risk premium point estimate



The ERA has maintained its preference for the historic market risk premium approach in the 2022 Final Gas Rate of Return Instrument as it accords with a plausible model of investor behaviour, where investor expectations are shaped by past information (realised returns) and current practices (adopted methods). The historic market risk premium estimate can be considered as an unconditional estimate that informs the determination of the expected market risk premium.

It is consistent Australian regulatory practice that historical returns are considered when estimating the expected market risk premium. This also appears to be a consistent investor, market and academic practice.

The dividend growth model receives less weight due to the ongoing concerns the ERA has about the proper implementation of the dividend growth model given the issues surrounding input assumptions, forecasts and variability of outputs. Until these matters are resolved the ERA will continue to put more weight on the historic market return estimates. The dividend growth model estimate can be considered to be a conditional estimate that helps inform the determination of the expected market risk premium.

The ERA also uses conditioning variables to assist in determining the point estimate of the expected market risk premium.

The historical market risk premium estimate (6.0 per cent) and the dividend growth model estimate (6.6 per cent) forms the information base for the exercise of the ERA's regulatory discretion. The ERA considers that the conditioning variables are currently at their historic averages and support a market risk premium at the midpoint of its range.

In the 2022 Final Gas Rate of Return Instrument, the ERA proposed a market risk premium of 6.1 per cent.

Further detail on the ERA's market risk premium can be found in the explanatory statement to the 2022 Final Gas Rate of Return Instrument.¹⁰⁵

¹⁰⁵ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 123-160.

For this final decision, the ERA does not accept Western Power's proposed market risk premium and applies a market risk premium of 6.1 per cent consistent with the 2022 Final Gas Rate of Return Instrument to determine the rate of return.

11.6 Equity beta

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.

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.

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.

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.

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.

This section outlines the ERA's final decision for the equity beta.

11.6.1 ERA's draft decision

Western Power proposed maintaining an equity beta of 0.7, consistent with the value applied in AA4 and the ERA's 2018 Rate of Return Guidelines.¹⁰⁶

The ERA reviewed the methodology for equity beta estimation for the 2022 Gas Rate of Return Instrument alongside the review of Western Power's AA5 as a common parameter for the determination of a rate of return for regulated energy networks.

For the draft decision on AA5 the ERA accepted Western Power's proposed equity beta of 0.7. The equity beta was to remain fixed for the term of AA5.

¹⁰⁶ ERA, *Proposed revisions to the access arrangement for the Western Power Network 2022/23 – 2026/27 – Issues paper*, March 2022, p. 38.

While the equity beta estimate was unchanged from AA4, the delisting of some of the remaining Australian energy networks and current market volatility meant that the ERA refined its approach to estimating equity beta for the 2022 Draft Gas Rate of Return Instrument and draft decision on AA5. The ERA considered both domestic and international comparator firms and different timeframes.

11.6.2 Western Power's revised proposal

Western Power accepted the ERA's draft decision of an equity beta of 0.7.

11.6.3 Public submissions

There was one public submission regarding the ERA's draft decision on equity beta.

Synergy disagreed with the inclusion of international comparators for equity beta and submitted that a point estimate of 0.55 be adopted based on the ERA's analysis of the domestic sample.¹⁰⁷

Synergy stated that the inclusion of international comparators for the calculation of equity beta would upwardly bias the estimate for an Australian benchmark firm.¹⁰⁸

Synergy stated that using international firms results in complex issues associated with different currency, bond rates, market risk premiums, expected returns and risk profiles.¹⁰⁹

Synergy submitted that the resulting equity beta estimates cannot be used on a 'like for like' basis and cannot be used as an accepted financial model as required under section 6.66(b) of the Access Code.¹¹⁰

Synergy provided analysis on whether the covariance between the Australian and US market indices were equal to one, concluding that the estimate for hedged returns was equal to 1.2.¹¹¹

Synergy agreed with the ERA's draft decision not to use an international CAPM framework.¹¹²

Synergy conducted some statistical analysis that compared the equity beta estimates from Australia against Canada, the UK and the US. Synergy concluded that there was statistical evidence of bias.¹¹³

¹⁰⁷ Synergy, *Submission to the Economic Regulation Authority - ERA Draft Decision: Estimation of beta for Western Power's fifth Access Arrangement*, November 2022, p. 2.

¹⁰⁸ Synergy, *Submission to the Economic Regulation Authority - ERA Draft Decision: Estimation of beta for Western Power's fifth Access Arrangement*, November 2022, p. 2.

¹⁰⁹ Synergy, *Submission to the Economic Regulation Authority - ERA Draft Decision: Estimation of beta for Western Power's fifth Access Arrangement*, November 2022, p. 4.

¹¹⁰ Synergy, *Submission to the Economic Regulation Authority - ERA Draft Decision: Estimation of beta for Western Power's fifth Access Arrangement*, November 2022, p. 4.

¹¹¹ Synergy, *Submission to the Economic Regulation Authority - ERA Draft Decision: Estimation of beta for Western Power's fifth Access Arrangement*, November 2022, p. 4.

¹¹² Synergy, *Submission to the Economic Regulation Authority - ERA Draft Decision: Estimation of beta for Western Power's fifth Access Arrangement*, November 2022, p. 5.

¹¹³ Synergy, *Submission to the Economic Regulation Authority - ERA Draft Decision: Estimation of beta for Western Power's fifth Access Arrangement*, November 2022, pp. 5-6.

11.6.4 ERA's final decision

In developing the 2022 Final Gas Rate of Return Instrument, the ERA has recently considered equity beta estimates.

The ERA maintained an equity beta estimate of 0.7 for the 2022 Final Gas Rate of Return Instrument. While the equity beta estimate is unchanged, the delisting of some of the remaining Australian energy networks and current market volatility meant that the ERA has had to refine its approach to estimating equity beta. The ERA will now consider both domestic and international comparator firms and different timeframes.¹¹⁴

For the final decision, the ERA considers it appropriate to accept Western Power's proposal to maintain an equity beta of 0.7 to determine the rate of return on equity.

11.6.4.1 Refined and updated equity beta estimate

The ERA's review of the 2018 Rate of Return Guidelines has been a multiple round review of how best to estimate the rate of return, including equity beta. Throughout the review, the ERA has considered a range of information including expert views, academic literature, market data, stakeholder submissions and other information.

The 2022 Final Gas Rate of Return Instrument does not propose a change to the equity beta estimate of 0.7. Further, the proposed approach to estimating the equity beta broadly maintains the approach in the 2018 Rate of Return Guidelines which was used for AA4. However, the ERA has proposed refinements in the approach to estimating equity beta to account for market developments and to simplify the methodology to aid reproducibility.¹¹⁵

In developing the 2022 Final Gas Rate of Return Instrument, the ERA recognised the equity beta estimates may be affected by the following market developments since 2018:¹¹⁶

- The ERA's AA4 benchmark sample included the DUET Group, Spark Infrastructure, AusNet Services and the APA Group. The sample of live Australian energy networks has reduced, with DUET already being delisted and Spark Infrastructure and AusNet Services being delisted in 2022.
- Since the AA4 final decision Australian markets have been affected by the COVID-19 pandemic and the conflict in the Ukraine. These market developments have affected the three remaining listed energy networks. As the equity beta measures the correlation of a firm to the broader market, both changes in the returns of a firm and the returns to the market can affect an estimate of beta.
- All firms in the Australian energy network sample have been the subject of takeover offers, or have been part of takeover bids. Besides reducing the number of live firms through delisting a company, an acquisition transaction may affect the informativeness of returns around the announcement window and towards close of transaction.

Given these market developments the ERA undertook consultation and sought expert views on how to develop a benchmark sample and best estimate equity beta in developing the 2022 Final Gas Rate of Return Instrument.

¹¹⁴ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, p. 188.

¹¹⁵ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 171-185.

¹¹⁶ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 182-185.

In the 2022 Final Gas Rate of Return Instrument, the ERA has proposed applying a similar equity beta estimation to the approach in the 2018 Rate of Return Guidelines and proposed adjustments for the:

- consideration of five and 10 year beta estimates
- consideration of international comparator firms.

Sample period

To estimate equity beta the ERA must select an estimation window. That is, the time horizon over which the returns of firms and the market are observed.

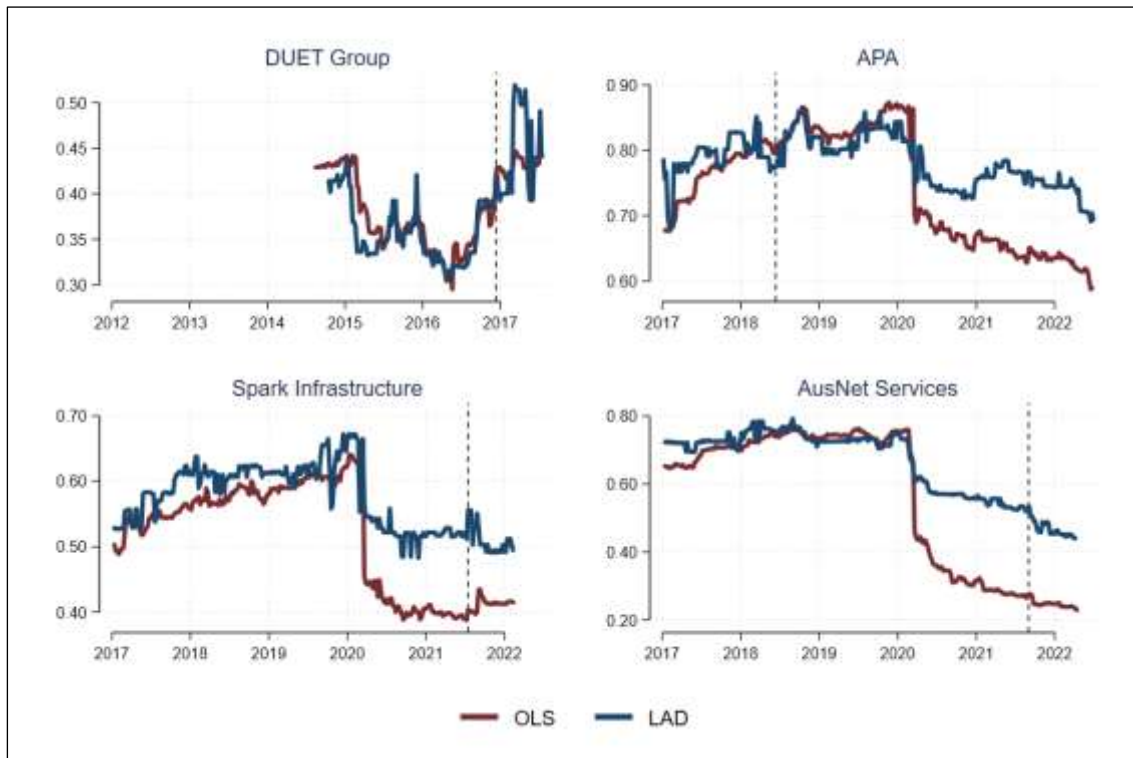
The length of the estimation window involves a trade-off between relevance of the data and statistical robustness:

- Longer periods can include behaviour in the data that is no longer relevant due to changing economic and market conditions.
- Shorter periods may produce estimates that are less statistically robust.

For AA4 the ERA considered that a five year period with weekly data balanced these trade-offs.

The ERA notes that the current five year window includes market shocks such as COVID-19 and the conflict in the Ukraine. The ERA also notes that the current five year window includes merger and acquisition (M&A) activity for domestic energy networks, both currently listed or recently delisted.

The ERA has analysed the potential impacts of the above events through evaluating five year rolling equity beta for each of the Australian energy networks provided in Figure 5.

Figure 5: Equity beta estimates for the Australian energy network sample

Source: Bloomberg, company disclosures, ERA analysis.

Note: Dotted lines refer to transaction announcement dates for the respective company. Presented betas are not adjusted to the ERA's benchmark gearing level.

The ERA has analysed equity beta stability for the domestic sample by examining rolling beta estimates. Realised equity betas have generally not been stable for the last decade, but the impact of the COVID-19 pandemic is obvious and has resulted in observed betas dropping significantly.

The ERA also considers that there is no identifiable systematic impact on equity beta from M&A activity that would justify the removal of firms from the domestic benchmark sample. The ERA notes that there are instances of stale trading towards transaction close for a delisting, where returns are zero per cent for target companies, which would likely attenuate the beta estimate. However, this is likely moderated by transaction premiums that are likely to increase measured equity beta.

To the extent that external factors such as COVID-19 pandemic and merger activity do not represent permanent changes to systematic risk and bias equity beta estimates, the consideration of a longer window can moderate the impact of these shocks. Therefore, the ERA will expand its considerations to include the 10 year window.

Accordingly, the ERA will estimate the domestic energy network sample with all available information for both five and ten year windows, but will exercise regulatory discretion.

Selection of the benchmark sample

The ERA has some concerns with the use of the current small sample, including that:

- A forward-looking equity beta requires live firms that can incorporate information into prices, where historical estimates cannot incorporate information due to being delisted.

- A sample that is largely reflective of one firm deviates from a benchmark approach to an actuals approach.
- A small sample may be overly affected by the idiosyncratic position of one firm and its changes over time.
- A sample largely reflective of one firm also may be statistically unreliable.

However, the ERA considers that a small domestic sample may still provide useful and reliable equity beta estimates given the nature of energy network service providers.

The ERA has considered how the benchmark sample needs to change due to current market developments.

This consideration included the potential incorporation of international comparators that are similar to electricity network service providers.

The ERA notes that international comparators are commonly used by other regulators to estimate equity beta:

- IPART uses a broad selection of stocks that includes international firms as it considered that it is likely to be “more objective, more likely to yield statistically reliable estimates, and more resistant to problems caused by companies dropping out of the sample over time.”¹¹⁷
- The QCA stated that there is not “a sufficient number of listed Australian firms for us to draw upon in order to determine reasonable betas” and any country-specific effects on beta estimates can “be limited by using a sample of relevant firms from a cross-section of countries where possible.”^{118, 119}

Regarding regulatory characteristics, the ERA looks to countries where energy networks operate under similar regulatory, legal and other institutional arrangements to those in Australia.

Regarding market factors, the ERA looks to countries with capital markets that are sufficiently deep, liquid, large and informationally efficient.

On this basis the ERA considers that Commonwealth countries such as the United Kingdom, Canada and New Zealand are close matches to Australia. The ERA considers that the United States of America is also comparable.

With input from stakeholders, the ERA has developed an international comparator sample of 58 firms. The ERA considers that these firms are sufficiently comparable to the benchmark firm to contribute to the development of a robust estimate of equity beta for the purpose of AA5.

The ERA considers that the international sample option has the following advantages:

- An extended sample size results in equity beta estimates that are more reliable and less sensitive to individual equity beta estimates of the Australian energy network sample.
- Using international samples is a more robust approach over time, given that there is currently only one listed Australian energy network.

¹¹⁷ IPART, *Review of our WACC method*, February 2018, p. 7.

¹¹⁸ QCA, *Final Report: Rate of Return Review*, November 2021, p. 71.

¹¹⁹ QCA, *Final Report: Rate of Return Review*, November 2021, p. 72.

- Other Australian regulators have been using international comparators for their equity beta estimation, largely driven by the difficulty in finding a sufficient number of comparable businesses to estimate equity beta using a purely domestic sample.

The ERA considers that market circumstances necessitate the examination of international energy networks in the benchmark sample. Filters are used to identify comparators with a similar degree of risk to the benchmark firm, to the closest extent possible given market realities.

The ERA's 2022 Final Gas Rate of Return Instrument also included a filter for international comparators such that only ones with material regulated activities would be included in the sample.

The ERA considered that this was appropriate to achieve a close match with the benchmark entity such that observed comparators would likely have a similar degree of risk with the benchmark entity.

The ERA considers that the observed equity beta of a firm is equal to the weighted average of segment equity betas. This condition comes from the concept that a firm is equivalent to a portfolio with underlying assets being different business segments. Accordingly, firms with a material degree of regulated activities will likely have an observed equity beta that largely consists of the beta from the regulated segment. Theoretically, market values are the appropriate weights but are not observable as business segments are not traded separately to the combined entity.

Whilst revenues could be considered as the basis of materiality, the ERA considers that revenue has limited relevance when there are other business segments present due to differential profitability. For example, a firm whose regulated activities may be a low percentage of total revenue may be a high percentage of profitability. The ERA considers that the market attaches value to profitability rather than revenue. Assets may suffer from similar problems as the market valuation of assets may not be the same as the book value.

Given these matters, the ERA considers that materiality should be considered on a holistic basis with reference to some defined factors. The ERA exercised regulatory judgement in considering the degree of material regulated activities instead of setting a quantitative threshold.

The ERA considered the following factors in its determination of materiality:

- Revenues
- Operating profits
- Assets.

The ERA considered Bloomberg data and company disclosures as the basis for the above factors.

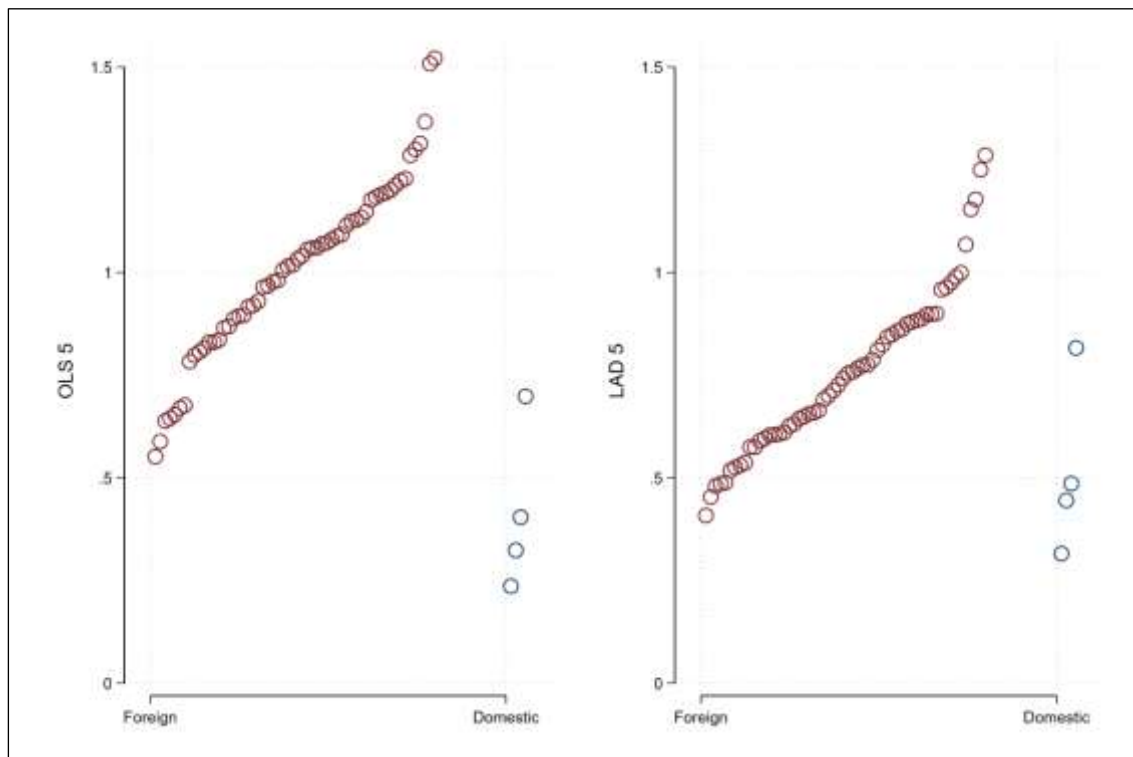
On balance, given the smaller and increasingly historical Australian domestic sample, the ERA has examined both domestic and international listed energy networks when estimating the equity beta for Australian energy networks.

Differences in equity beta between domestic and international firms

The ERA considers that differences in equity beta between domestic and foreign firms cannot be meaningfully answered in an empirical manner due to the number of observations that such analysis is being applied to.

The domestic energy sample consists of four firms, where equity beta is not observed but estimated with some error. Whilst it may be possible to apply statistical tests to evaluate differences between the domestic and foreign estimates, the ERA notes that this does not remedy the fact that this analysis is attempting a comparison between four Australian and 58 international estimates. This is illustrated by the distribution analysis in Figure 6.

Figure 6: Distribution of equity beta for five year OLS and LAD estimates



Source: Bloomberg, ERA analysis.

Accordingly, the ERA is not confident that the results of statistical tests are meaningful as they are likely to lack sufficient power.

Synergy raised issues regarding the usage of international comparators for equity beta and did not support their inclusion for AA5. Synergy provided theoretical and empirical evidence that they submitted demonstrated evidence of an upward bias if international comparators were included. The ERA has considered Synergy's submission and provides the following responses.

The ERA agrees that using international firms may result in a more complicated estimation process for equity beta but the ERA also considers that there are material risks involved in using a very small and largely historical set of domestic comparators, which are unlikely to result in the best estimate of expected equity beta for the benchmark entity.

The ERA considers that the usage of international comparators is capable of being characterised as an accepted financial model as equity beta is a relative (not absolute) measure and international comparators are used by other regulators and market practitioners:

- As equity beta is a relative measure of asset returns against the market, the calculation of international equity betas under a domestic CAPM methodology results in estimates that are internally consistent for each country. This is still the case despite the differences in market environments as it is the co-movement between asset and market returns within the same country which is the estimation outcome of the domestic CAPM regressions.
- Other Australian regulators such as Queensland Competition Authority¹²⁰ and the Independent Pricing and Regulatory Tribunal¹²¹ have been using international firms for equity beta estimation, along with the New Zealand Commerce Commission.¹²²
- Independent expert reports (IERs) for significant commercial transactions also refer to international comparators for equity beta. Recent examples include:
 - Spark Infrastructure’s IER by KPMG analysed international comparators from New Zealand, Italy, the UK, France, Canada and the United States.¹²³
 - AusNet Service’s IER by Grant Samuel analysed international comparators from New Zealand.¹²⁴
- While Dr Boyle did not agree with the use of international comparators for equity beta, this was not the consensus view of experts in the AER’s Concurrent Evidence Session. For example, Dinesh Kumareswaran,¹²⁵ Dr Lally¹²⁶ and Dr Hird,¹²⁷ supported that some weight be placed on international comparators, especially given the declining set of listed domestic firms.
- A review of international rate of return approaches by the Brattle Group where it examined eight regulators in six countries. Brattle found that international regulators tended to use international samples.¹²⁸

The comparators from non-Australian jurisdictions are likely to be different to domestic comparators on various dimensions on a theoretical and conceptual level. The ERA considers that selecting comparators from appropriate jurisdictions and using selection filters will sufficiently control for differences that may exist between domestic and international comparators.

However, qualitatively the conceptual arguments raised by the Synergy and the 2022 Gas Rate of Return Instrument’s CRG cannot be rejected. The ERA considers that this additionally requires the separate analysis of equity beta by country, where estimates cannot be pooled together. This also requires the use of regulatory discretion to consider the equity beta distributions when determining the equity beta point estimate.

Accordingly, the ERA does not use international equity beta estimates mechanically, or in a ‘like for like’ fashion as suggested by Synergy. The country pooling method allows the ERA to exercise its regulatory discretion to evaluate the distribution of equity beta estimates before arriving at a point estimate.

¹²⁰ QCA, *Rate of Return Review – Final Report*, November 2021, pp. 71-75.

¹²¹ IPART, *Estimating Equity Beta for the Weighted Average Cost of Capital – Final Report*, August 2020.

¹²² NZCC, *Input methodologies review decisions: Topic paper 4: Cost of capital issues*, December 2016, pp. 59-118, 219-233.

¹²³ KPMG, *Spark Infrastructure Independent Expert Report*, October 2021, pp. 103-104.

¹²⁴ AusNet Services, *Scheme Booklet*, December 2021, p. 219.

¹²⁵ AER, *Rate of Return Instruments Concurrent Evidence Session 1 of 4*, February 2022, pp. 49-54.

¹²⁶ AER, *Rate of Return Instruments Concurrent Evidence Session 1 of 4*, February 2022, p. 60.

¹²⁷ AER, *Rate of Return Instruments Concurrent Evidence Session 1 of 4*, February 2022, pp. 61-63.

¹²⁸ Brattle Group, *A Review of International Approaches to Regulated Rates of Return*, June 2020.

The ERA notes the analysis provided by Synergy regarding the covariance between Australian and US equity markets but does not consider it to be persuasive evidence of fundamental differences. Synergy provided evidence that the estimated coefficient is positive and greater than one, which is a result that is to be expected given the integration of world capital markets and existing academic evidence that demonstrates a relationship between US and Australian stock markets.¹²⁹ Additionally, a focus on correlations to measure integration may also not be appropriate according to academic research.¹³⁰

The ERA notes Synergy's construction of the advice provided by Partington and Satchell (2020), but the ERA considers that it does not use unadjusted equity betas for international comparators. The selection process, plus the use of a material regulated activities filter, along with the target leverage adjustments, results in an equity beta that cannot be characterised as being unadjusted.

The statistical evidence presented by Synergy is complicated by the fact that the equity betas are estimated with error as they are not observable and must be modelled. Accordingly, each point estimate will have an associated confidence interval that reflects the standard error of each estimate. The usage of a Welch t-test does not account for this feature of the data, which makes inferences difficult as it implies that each estimate is precisely measured when it is not.

This is compounded by the fact that the sample size is especially small for the Australian sample, and a t-test is not possible for New Zealand given that there is only one comparator in that country. Small sample sizes may result in underpowered statistical tests, along with making it difficult to rely upon the normality assumption required for a Welch t-test. Synergy has highlighted some of these issues when they acknowledged that t-tests were not possible for New Zealand, and that the sample sizes for Australia (N=4) and the UK (N=2) were very small. Given the nature of the data, the ERA does not believe that it is possible to make the statistical conclusions from the analysis that Synergy has submitted.

The ERA also notes that Synergy has presented its statistical analysis on the basis of a single-tailed test instead of using a two-sided test based on a null hypothesis of no differences. The ERA considers that conventional hypothesis testing is based on two-sided tests, where Synergy's testing requires a strong assumption that Australian equity betas can only be lower than international equity betas.

The ERA considers that the statistical results are not uniformly robust. Findings are only present for the OLS estimates, which given the presence of the recent COVID-19 shock may not be as reliable as LAD estimates given potential outliers and extreme observations. Given these mixed findings, the ERA is unable to conclude that there are statistical differences between domestic and international equity beta estimates.

Accordingly, the ERA maintains that market realities, both the reducing domestic sample and recent market volatility, justify the consideration of international energy networks in the benchmark sample. The differences that Synergy refers to are considerations that the ERA has had regard to when selecting international comparators. Additionally, the use of a material regulated activities filter further reduces the effect of differences that may exist between domestic and international estimates of equity beta. As the ERA does not pool or otherwise use international estimates in a mechanical fashion, the exercise of regulatory discretion is

¹²⁹ Durand, R, Limkriangkrai, M and Smith, G, In America's thrall: the effects of the US market and US security characteristics on Australian stock returns, *Accounting and Finance*, 46(4) 2006, pp. 577-604.

¹³⁰ Pukthuanthong, K and Roll, R, Global Market Integration: An Alternative Measure and Its Application, *Journal of Financial Economics*, 94(2) 2009, pp. 214-232.

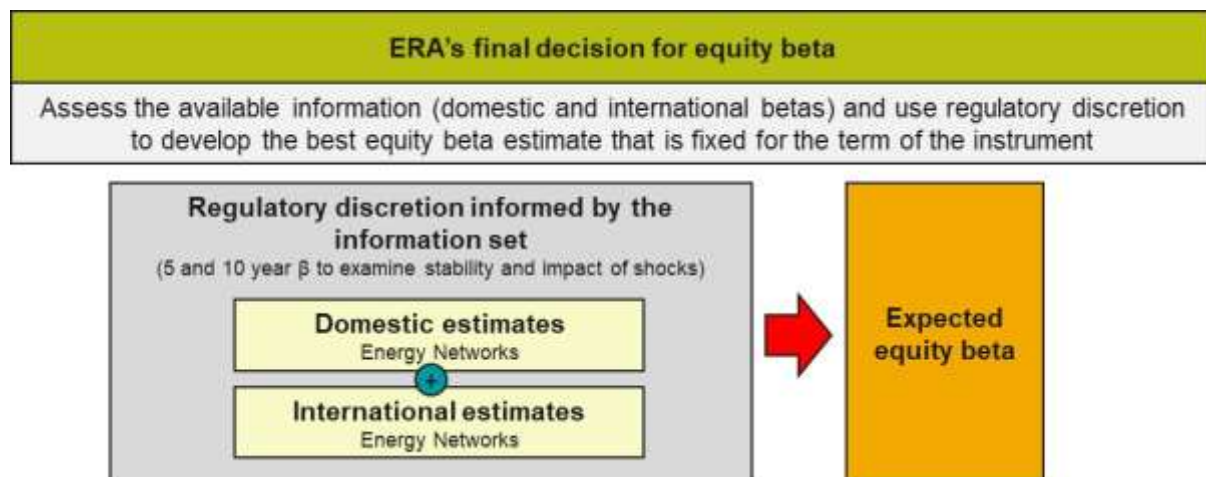
informed by the likelihood that some differences remain and must be accounted for by regulatory discretion.

For the final decision the ERA will consider international equity beta estimates but will not adjust the estimates based on statistical methods. Instead, the ERA will exercise its regulatory discretion when considering a point estimate from the foreign and domestic estimates.

Equity beta point estimate

The ERA's approach to determining an equity beta point estimate for the AA5 period is summarised in Figure 7.

Figure 7: ERA's approach to determining an equity beta point estimate



To determine a point estimate for equity beta the ERA:

- Uses domestic and international comparator firms.
- Considers five year and 10 year data periods.
- Mechanically estimates equity beta using the method described in the 2022 Final Gas Rate of Return Instrument, including the use of OLS and LAD estimators.
- Pools beta estimates by country.
- Examines the distribution of equity betas.
- Exercises regulatory discretion to determine the best point estimate.

In the 2022 Final Gas Rate of Return Instrument, the ERA has proposed an equity beta of 0.7 that was informed by the domestic and international energy network comparators detailed in Appendix 4 of the explanatory statement to the 2022 Final Gas Rate of Return Instrument.

For the purpose of this final decision, the ERA used a five year (July 2016 to June 2022) and 10 year (July 2011 to June 2022) sample period.

As the ERA is considering international comparators, the ERA has examined equity beta on a country-by-country basis.

To arrive at an estimate of equity beta, the ERA used its discretion informed by the estimates from all examined countries and timeframes.

The Australian domestic energy sample estimates are detailed in Table 7 and Table 8.

Table 7: Australian five year equity beta estimates at benchmark leverage

Estimator	Assets					Portfolios			Average of Assets and Portfolios
	APA	AST	DUE	SKI	Average of Assets	Equal Weighted	Value Weighted	Average of Portfolios	
OLS	0.70	0.24	0.32	0.40	0.42	0.40	0.39	0.39	0.40
LAD	0.82	0.45	0.32	0.49	0.52	0.51	0.61	0.56	0.54
Mean All Methods	0.76	0.34	0.32	0.45	0.47	0.45	0.50	0.48	0.47

Source: ERA analysis

Table 8: Australian 10 year equity beta estimates at benchmark leverage

Estimator	Assets					Portfolios			Average of Assets and Portfolios
	APA	AST	DUE	SKI	Average of Assets	Equal Weighted	Value Weighted	Average of Portfolios	
OLS	0.76	0.39	0.32	0.42	0.47	0.45	0.48	0.46	0.47
LAD	0.85	0.54	0.27	0.49	0.54	0.57	0.58	0.58	0.56
Mean All Methods	0.80	0.47	0.29	0.46	0.51	0.51	0.53	0.52	0.51

Source: ERA analysis.

The Australian energy network sample produces a range of individual firm beta estimates from 0.2 to 0.9. The average beta estimate from the Australian energy network sample is 0.5.

A summary of the domestic and international energy sample estimates is detailed in Table 9. Detailed beta estimates are provided in Appendix 6 of the explanatory statement to the 2022 Final Gas Rate of Return Instrument.

Table 9: Domestic and international equity beta estimates at benchmark leverage

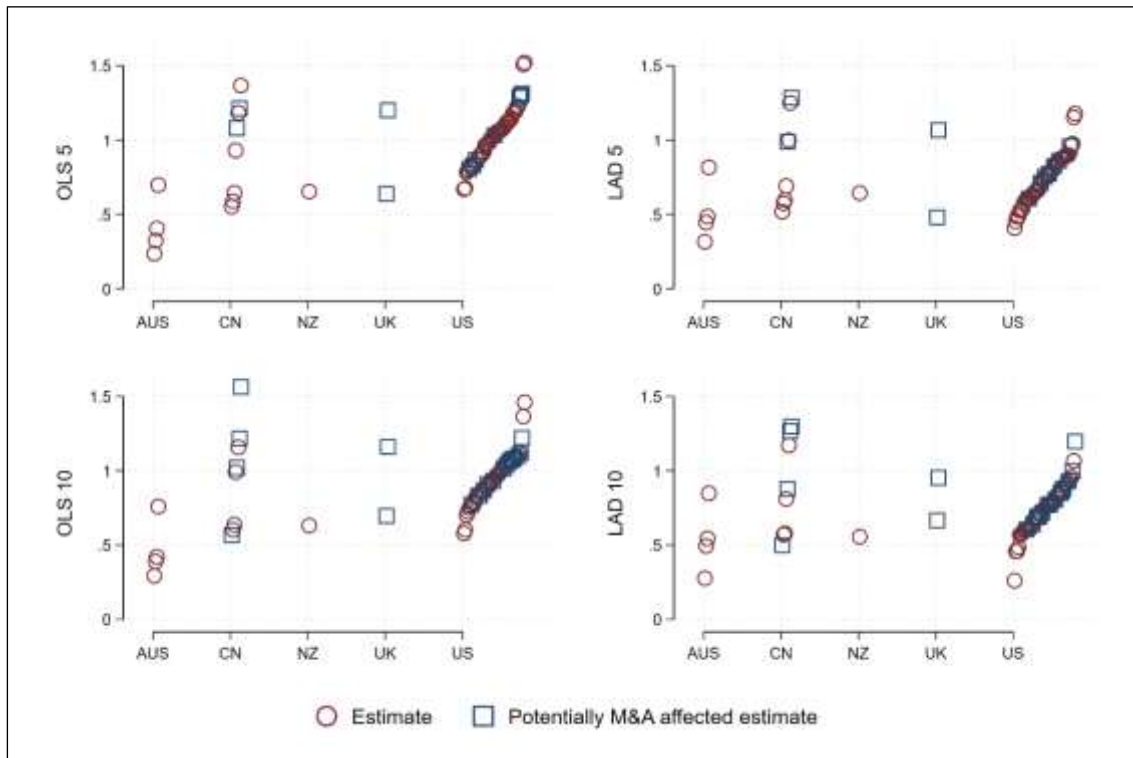
Estimator	AUS	US	CAN	UK	NZ	Mean of all countries
Panel A: 5 year estimates						
OLS	0.40	1.03	0.94	0.92	0.65	0.79
LAD	0.54	0.74	0.86	0.77	0.64	0.71
Mean All Methods	0.47	0.89	0.90	0.85	0.65	0.75
Panel B: 10 year estimates						
OLS	0.47	0.95	0.97	0.93	0.63	0.79
LAD	0.56	0.74	0.88	0.81	0.56	0.71
Mean All Methods	0.51	0.84	0.93	0.87	0.59	0.75

Source: ERA analysis.

The ERA considers that the domestic energy sample provides a range of equity beta estimates from 0.4 to 0.6. When international comparators are examined, this provides a range of estimates from 0.6 to 1.0. The average beta estimate across all countries is 0.75.

The ERA has considered the full distribution of five and 10-year equity beta estimates as illustrated in Figure 8, which identifies companies that may be affected by M&A.

Figure 8: Equity beta distributions at benchmark leverage



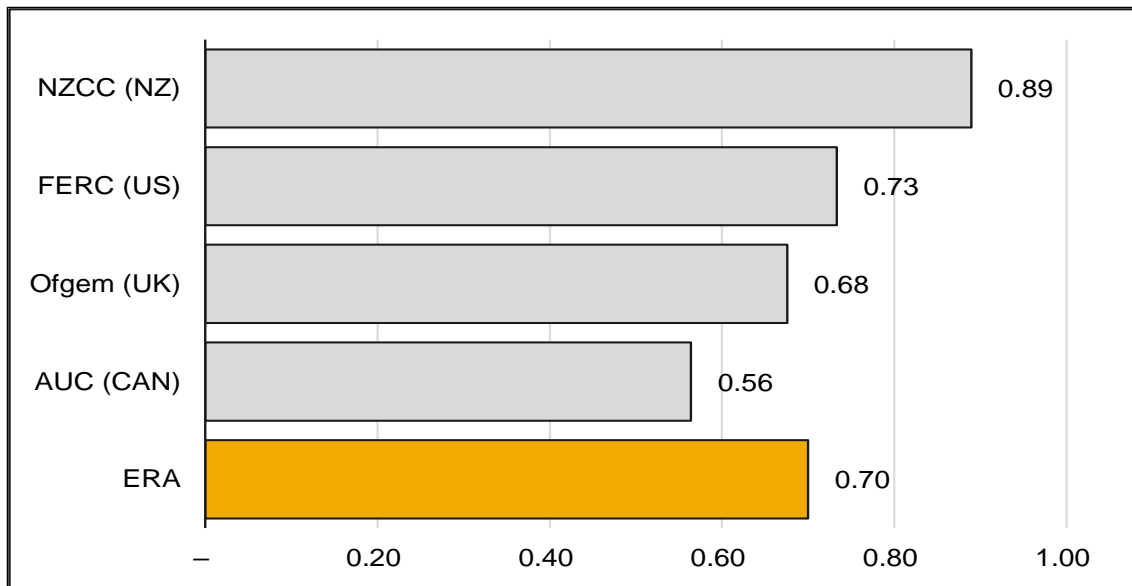
Source: Bloomberg, ERA analysis.

To select a point estimate for equity beta, the ERA considers all available information and uses its discretion to select a point estimate. Given the imprecision in the estimation process, the ERA will continue its practice of rounding to the nearest first decimal place.

As the international sample was selected based on legal, regulatory and institutional comparability, the ERA considers that the equity beta determinations from regulators in those jurisdictions can be considered as reference points.

The ERA has made some adjustments, principally to benchmark leverage, to make equity beta estimates broadly comparable. The results of such adjustments are illustrated in Figure 9.

Figure 9: Other economic regulators' equity beta estimates standardised to ERA parameters



Source: *The Brattle Group (2022)*,¹³¹ *Alberta Utilities Commission (AUC), ERA analysis*.

Note: All equity betas are re-levered to ERA target leverage. As FERC utilises actual leverage a notional 40% gearing ratio was assumed before being re-levered to ERA assumptions.

The ERA does not use such reference points in a mechanistic or deterministic manner. However, the ERA notes that the 0.7 point estimate lies within the range of equity beta determinations from comparable regulators.

The ERA considers 0.7 as the best estimate for equity beta for the benchmark energy network and applies this for Western Power's AA5. The equity beta will be fixed for the term of AA5.

Further detail on the ERA's equity beta can be found in the explanatory statement to the 2022 Final Gas Rate of Return Instrument.¹³²

For this final decision, the ERA has applied an equity beta of 0.7 consistent with the 2022 Final Gas Rate of Return Instrument to determine the rate of return.

¹³¹ The Brattle Group, *International Rate of Return Methods – Recent Developments*, September 2022.

¹³² ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 160-192.

12. Inflation

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

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

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

The expected rate of inflation is required:

- For the roll forward of the regulated 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.

The forecast of the expected rate of inflation also allows stakeholders to observe the real rates of change in tariffs and in the real rate of return, which are important contributors to changes in tariffs.

12.1 Western Power's proposal

Western Power proposed an approach for calculating the forecast inflation rate using the Treasury bond implied inflation approach.

The Treasury bond implied inflation approach uses the Fisher equation and the observed yields of:¹³³

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

This approach was the same method used in AA4 and is consistent with the 2018 Rate of Return Guidelines.¹³⁴

12.2 ERA's draft decision

For the draft decision the ERA maintained the Treasury bond implied inflation approach for estimating forecast inflation.

This forecast inflation rate was to be fixed for AA5.

¹³³ 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.

¹³⁴ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 236.

12.3 Western Power's revised proposal

Western Power has not provided further comments on inflation in its revised proposal and incorporated the ERA's AA5 draft decision into its AA5 revised revenue model.¹³⁵

12.4 Public submissions

No submissions to the draft decision and Western Power's revised proposal provided stakeholder comments on the forecast inflation rate.

12.5 ERA's final decision

The ERA accepts Western Power's proposed methodology for calculating the forecast inflation rate.

The ERA considers the Treasury bond implied inflation approach for estimating expected inflation should be applied as follows:

- Using the yields on five year Commonwealth Government Securities bonds.
- 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.

The ERA considers that recent increases in inflation and current inflation uncertainty underscores the need for a method for estimating expected inflation that is responsive to shifting and potentially volatile economic conditions and market expectations.

The ERA considers that the Treasury bond implied inflation approach provides the best estimate of inflation expectations for an access arrangement period because:

- It is a market-based approach. The rationale for using a market-based approach is that market prices reflect the aggregation of expectations of diverse market participants that invest and commit money. The forecasts of many different market participants are considered to contain more information and be more relevant than any one particular forecast model or method.
- The method is a dynamic market measure that is updated daily.
- The method is consistent with market forecasts built into other WACC parameters.

The ERA considers that the Treasury bond implied inflation approach is likely to result in the best estimate of inflation expectations for the AA5 period.

The ERA considers that the term of expected inflation should be five years, consistent with the length of the access arrangement period as it offers the best estimate of what inflation is expected to be over the access arrangement period.

The revenue model takes the best estimate of the five year inflation forecast out (of the nominal WACC) and puts back in the actual inflation over the five year access period (through the indexation of the RAB).

¹³⁵ Western Power, *Access Arrangement Information - Attachment 1.1 – Revised AA5 Regulatory Revenue Model*, 15 November 2022.

Further detail on the ERA's inflation methodology can be found in the explanatory statement to the 2022 Final Gas Rate of Return Instrument.¹³⁶

For this final decision, the ERA used a 20-day averaging period to 30 November 2022 to determine a forecast inflation rate of 2.58 per cent to determine the rate of return.

¹³⁶ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 214-216.

13. Value of imputation credits (gamma)

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.

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.

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

13.1 Western Power's proposal

Western Power proposed a gamma of 0.5, consistent with the benchmark gamma applied in AA4 and the 2018 Rate of Return Guidelines.¹³⁷

13.2 ERA's draft decision

For the draft decision the ERA applied a gamma of 0.5.

The ERA's estimate of gamma was derived by applying the Monkhouse formula, where gamma is estimated as the product of the distribution rate (0.9) and the utilisation rate (0.6).

Gamma was to be fixed for the AA5 period.

13.3 Western Power's revised proposal

Western Power has not provided further comments on gamma in its revised proposal and incorporated the ERA's AA5 draft decision into its AA5 revised revenue model.¹³⁸

13.4 Public submissions

No submissions to the draft decision and Western Power's revised proposal provided stakeholder comments on the estimation of gamma.

13.5 ERA's final decision

The ERA accepts Western Power's proposed gamma of 0.5.

¹³⁷ Western Power, *Access Arrangement Information: Access Arrangement revisions for the fifth access arrangement period*, 1 February 2022, p. 236.

¹³⁸ Western Power, *Access Arrangement Information - Attachment 1.1 – Revised AA5 Regulatory Revenue Model*, 15 November 2022.

The approach to gamma is based on:

- Contemporary Australian Competition Tribunal and Federal Court judicial reviews, which supported the use of the utilisation approach.
- Consideration of available data, including reviewing the limitations of Australian Taxation Office data for the estimation of gamma.
- Expert reports and analysis in respect of calculations of gamma.

The ERA has used a gamma of 0.5 for its most recent rate of return determinations, and the 2022 Final Gas Rate of Return Instrument.^{139, 140, 141, 142,143}

The ERA's estimate of gamma is derived by applying the Monkhouse formula, where gamma is estimated as the product of the distribution rate and the utilisation rate.

$$\text{Gamma} = \text{Distribution rate} \times \text{Utilisation rate}$$

Equation 5

The ERA has separately estimated the distribution rate and utilisation rate.

The distribution rate represents the proportion of imputation credits created that is expected to be distributed to investors. The ERA considers that the distribution rate is a firm-specific parameter, rather than market-wide.

The ERA's estimate of the distribution rate is 0.9. This is based on Dr Lally's estimate of the distribution rate based on the financial reports of the 50 largest ASX-listed firms (0.887), rounded to one decimal place.¹⁴⁴ Further, the ERA considers that Dr Lally's finding that the distribution rate may be slightly higher with the removal of foreign operations supports the view that the distribution rate should be at least 0.9.¹⁴⁵

The utilisation rate is the weighted average of the utilisation rates of individual investors. Investors who are able to fully use the credits have a rate of one and those unable to use them have a rate of zero. The ERA considers that the utilisation rate was a market-wide parameter, rather than firm-specific.

The ERA's estimate of the utilisation rate is derived using the equity ownership approach to determine the value-weighted percentage of domestic investors in the Australian equity market.

The ERA considers it appropriate to base its estimate of the utilisation rate on listed equity due to the different considerations regarding dividend policy in listed and unlisted businesses.

¹³⁹ ERA, *Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025*, April 2021, p. 312.

¹⁴⁰ ERA, *Final decision on proposed revisions to the Goldfields Gas Pipeline Access Arrangement for 2020 to 2024*, December 2019, p. 154.

¹⁴¹ ERA, *Final decision on proposed revisions to the Mid-West and South-West Gas Distribution Systems access arrangement for 2020 to 2024*, November 2019, p. 296.

¹⁴² ERA, *Final determination 2018 and 2019 Weighted Average Cost of Capital for the Freights and Urban Networks and Pilbara Railways*, August 2019, Chapter 9.

¹⁴³ ERA, *2022 Final Gas Rate of Return Instrument*, December 2022, p. 22.

¹⁴⁴ Dr Lally, M., *Estimating the Distribution Rate for Imputation Credits for the Top 50 ASX Companies*, June 2021, p. 3.

¹⁴⁵ Dr Lally, M., *Estimating the Distribution Rate for Imputation Credits for the Top 50 ASX Companies*, June 2021, pp. 3-4.

Dr Lally found that many unlisted companies are sole traders that have incorporated to reduce their tax rate (but only if they retain rather than distribute their profits), and many others are closely-held entities with dividend policy considerations quite different to those for listed companies.¹⁴⁶

The ERA's estimated utilisation rate is from the national accounts of the ABS, based on a five year average to March 2021 and rounded to the first decimal point.¹⁴⁷ The ERA considers the ABS data is the best available data to estimate the utilisation rate.

The ERA's estimate of the utilisation rate is 0.6.

The ERA determines gamma as a product of the ERA's estimate of the distribution rate and the utilisation rate which provides a gamma of 0.5, consistent with Western Power's proposal.

Further detail on the ERA's gamma methodology can be found in the explanatory statement to the 2022 Final Gas Rate of Return Instrument.¹⁴⁸

For this final decision, the ERA has applied a gamma of 0.5 to determine the rate of return, which will be fixed for AA5.

¹⁴⁶ Dr Lally, M., *Gamma and the ACT Decision*, May 2016, p. 26.

¹⁴⁷ ABS, *Australian National Accounts: Finance and Wealth, Catalogue 5232.0*, Tables 48 and 49.

¹⁴⁸ ERA, *Explanatory statement for the 2022 final gas rate of return instrument*, December 2022, pp. 219-220.

14. Final decision on rate of return

For the purposes of this final decision, the ERA has used the 20 trading days to the end of November 2022 to estimate the rate of return.

Based on the ERA's assessment and final decision in respect of each of the rate of return parameters as proposed by Western Power, the ERA has calculated the rate of return using the parameters it considers most appropriate in Table 10.

For this final decision the ERA determines that:

- The nominal after-tax cost of equity is 8.00 per cent.
- The nominal cost of debt is 6.22 per cent.
- The nominal after-tax WACC is 7.02 per cent.

The ERA does not approve Western Power's proposed average nominal after-tax WACC of 7.10 per cent for the AA5 period and requires Western Power to amend the nominal after-tax WACC to 7.02 per cent based on the parameters set out in Table 10 and the reasoning detailed in this final decision.

Required Amendment 1

The WACC must be amended to be consistent with the final decision.

Table 10: ERA's final decision on rate of return for AA5

Component	Western Power revised proposal	ERA final decision
<i>Averaging period</i>	<i>30 June 2022</i>	<i>30 November 2022</i>
Return on debt (%)		
5-year interest rate swap (effective yield)	4.070	4.110
Debt risk premium (10 year average)	1.883	1.825
Debt issuing cost	0.165	0.165
Debt hedging cost	0.123	0.123
<i>Nominal return on debt</i>	<i>6.241</i>	<i>6.223</i>
Return on equity		
Nominal risk free rate (%)	3.82	3.73
Market risk premium (%)	6.2	6.1
Equity beta	0.7	0.7
<i>Nominal return on equity (%)</i>	<i>8.16</i>	<i>8.00</i>
Other parameters		
Debt proportion (%)	55	55
Inflation (%)	2.96	2.58
Corporate tax (%)	30	30
Franking credit	50	50
Nominal after-tax WACC (%)	7.10	7.02
Real after-tax WACC (%)	4.03	4.33

Source: ERA analysis; Western Power, Access Arrangement Information - Attachment 1.1 – Revised AA5 Regulatory Revenue Model, 15 November 2022.