

Rate of Return Annual Update 2024

December 2024

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1 Introduction

This paper provides interested stakeholders with annually updated rate of return information, particularly time series market data. It shows changes in the data since publication of the AER's 2022 Rate of Return Instrument (2022 Instrument) in February 2023.¹ In our Explanatory Statement to the 2022 Instrument, we committed to continuing the publication of these annual updates – which we have been doing since 2019 – to provide stakeholders with regular data between Rate of Return Instrument reviews.²

The Rate of Return Instrument, which is binding on network businesses and the AER, specifies how we will determine the allowed rate of return on capital invested in regulated electricity and gas networks during the four-year period following its release. The rate of return is a significant driver of regulated revenue for energy network businesses, and its estimation can be complex and contentious.

In this paper, we have not attempted to update all data series considered during the 2022 Instrument review. Instead, we have selected content based on its importance as well as practical considerations, such as availability of data. The tables and figures have been prepared using our existing calculation approaches, as used to inform the 2022 Instrument, so that stakeholders can compare changes in market data on a consistent basis.³ We have not included a justification for our methodological choices or an interpretation of the results. This background information is provided in the Explanatory Statement to the 2022 Instrument, which should be read alongside this update.⁴ Appendix A to this paper includes chapter references to the Explanatory Statement for each section covered in this paper.

The next review of the Rate of Return Instrument (2026 Instrument) gets underway next year, which we anticipate will be a more efficient and effective streamlined process through the application of knowledge and learnings from past Instrument reviews. As a first step, we expect to publish a process paper in March 2025 to inform stakeholders of our approach to the 2026 Instrument review. This will be followed by a discussion paper in July 2025, representing the official start to the review. The intent of releasing this annual update paper is to provide a foundation for substantive, constructive discussion with stakeholders for the 2026 Instrument review.

¹ AER, *Rate of Return Instrument*, February 2023 (version 1.2 as amended March 2024)

² AER, *Rate of Return annual updates 2019–2022*. See <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/rate-of-return-annual-updates-2019-2022>

³ AER, *Rate of Return Instrument, Explanatory Statement*, February 2023.

⁴ AER, *Rate of Return Instrument, Explanatory Statement*, February 2023.

2 Indicative rate of return

Table 1 presents key rate of return parameters and an indicative rate of return, given the application of the 2022 Instrument using current market data. For this paper, we have:

- updated those parameters where the 2022 Instrument specifies a method informed by market data at each regulatory determination
- kept those parameters constant where the 2022 Instrument specifies that the value is fixed.

Table 1 Key components of the regulated rate of return (2022 to 2024)

Parameter	2022 Instrument (data as published in the 2022 Instrument Explanatory Statement)	2023 update	2024 update
Indicative overall rate of return (nominal vanilla)	6.84%	6.98%	6.41%
Gearing ratio	60%	60%	60%
Indicative return on debt (annual estimate)	6.52% (using on-the-day return on debt estimated over Dec 2022)	6.37% (using on-the-day return on debt estimated over Aug 2023)	5.53% (using on-the-day return on debt estimated over Aug 2024)
Market risk premium	6.2%	6.2%	6.2%
Equity beta	0.60	0.60	0.60
Indicative risk-free rate	3.60% (10-year term)	4.19% (10-year term)	4.00% (10-year term)
Indicative return on equity	7.32% (using a risk-free rate of return estimated over Dec 2022)	7.91% (using a risk-free rate of return estimated over Aug 2023)	7.72% (using a risk-free rate of return estimated over Aug 2024)
Value of imputation credits (gamma)	0.57	0.57	0.57
Benchmark credit rating	BBB+	BBB+	BBB+

Comparator: Table 0.1 (pp. 10-12) of the *2022 Instrument Explanatory Statement*.

Notes: Uses indicative averaging period across all business days in December 2022 (2022 Instrument), 20 business days to 31 August 2023 (2023 update) and 20 business days to 30 August 2024 (this annual update). Indicative rates are based on 'on-the-day' return on debt estimates and do not reflect a trailing average portfolio.

Source: AER, *Rate of Return Instrument*, February 2023 (version 1.2 as amended March 2024).

The indicative return on debt presented in Table 1 is an on-the-day rate, reflecting the annual (spot) cost of debt in the indicative averaging period. As specified in the 2022 Instrument, energy networks are in the process of transitioning from an on-the-day approach to a trailing average portfolio that reflects ten years of historical return on debt information. As the transition itself takes ten years, the regulated return on debt for each service provider will, therefore, depend on the date at which it commenced the transition to the trailing average portfolio approach.

3 Gearing

A regulated network service provider's financing is made up of debt and equity capital. The gearing ratio is the proportion of a network service provider's regulatory asset base financed by debt. The gearing ratio is used to weight the expected required returns on debt and equity to derive the weighted average cost of capital.

3.1 Estimation based on market values

Table 2 presents gearing estimates for five comparator businesses over the past five and ten years using market values of equity and debt (with book value of debt used as a proxy for the market value of debt).⁵

Table 2 AER gearing based on market values of equity and book values of debt

Year	ENV	APA	DUE	AST	SKI	Average
2006	66%	51%	79%	56%	60%	62%
2007	65%	59%	67%	55%	57%	61%
2008	77%	73%	76%	59%	70%	71%
2009	75%	68%	80%	70%	70%	73%
2010	74%	61%	80%	64%	65%	69%
2011	66%	53%	79%	64%	62%	65%
2012	63%	47%	72%	59%	59%	60%
2013	53%	46%	71%	57%	62%	58%
2014	47%	45%	64%	58%	55%	54%
2015	–	50%	62%	59%	56%	57%
2016	–	49%	51%	54%	54%	52%
2017	–	49%	–	50%	52%	50%
2018	–	45%	–	53%	57%	52%
2019	–	45%	–	53%	59%	52%
2020	–	45%	–	57%	59%	54%
2021	–	49%	–	49%	58%	52%
2022	–	45%	–	44%	–	45%
2023	–	50%	–	–	–	50%
2024	–	56%	–	–	–	56%
5-year average	n/a	49%	n/a	50%	58%	51%
10-year average	n/a	48%	57%	52%	56%	52%

⁵ Our gearing estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 84-94.

Year	ENV	APA	DUE	AST	SKI	Average
Average since 2006	65%	52%	71%	57%	60%	57%

Comparator: Table 4.1 (p. 87) of the 2022 Instrument Explanatory Statement.

Notes: Spark Infrastructure (SKI) estimates are as at 31 December each year. AusNet Services (AST) estimates are as of 31 March each year. Duet Group (DUE), APA Group (APA) and Envestra (ENV) estimates are as of 30 June each year. The average for all firms in a year does not make any adjustment for these timing differences.

Source: Annual reports, AER analysis; APA, *Annual report 2024*, 28 August 2024, pp. 84, 99, 156; APA, *Annual report 2023*, 23 August 2023, pp. 78, 93, 147; all other data is the same as published with the 2022 Instrument Explanatory Statement.

3.2 Estimation based on book values

Table 3 presents gearing estimates for five comparator businesses over the past five and ten years using book values of equity and debt.⁶

Table 3 AER gearing estimates based on book values of equity and debt

Year	ENV	APA	DUE	AST	SKI	Average
2006	91%	67%	82%	57%	81%	76%
2007	90%	69%	75%	57%	80%	74%
2008	82%	71%	76%	58%	89%	75%
2009	80%	70%	79%	67%	85%	76%
2010	79%	68%	79%	62%	66%	71%
2011	78%	63%	77%	60%	69%	70%
2012	78%	64%	77%	61%	68%	70%
2013	71%	63%	79%	61%	68%	68%
2014	71%	65%	76%	64%	67%	69%
2015	–	68%	74%	69%	66%	69%
2016	–	71%	65%	64%	69%	67%
2017	–	71%	–	62%	69%	67%
2018	–	70%	–	66%	73%	70%
2019	–	74%	–	69%	76%	73%
2020	–	77%	–	74%	77%	76%
2021	–	77%	–	66%	76%	73%
2022	–	81%	–	81%	–	81%
2023	–	86%	–	–	–	86%
2024	–	80%	–	–	–	80%

⁶ Our gearing estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 84-94.

Year	ENV	APA	DUE	AST	SKI	Average
5-year average	n/a	80%	n/a	74%	76%	79%
10-year average	n/a	75%	69%	69%	72%	74%
Average since 2006	80%	71%	76%	65%	74%	73%

Comparator: Table 4.2 (pp. 87-88) of the 2022 Instrument Explanatory Statement.

Notes: Spark Infrastructure (SKI) estimates are as at 31 December each year. AusNet Services (AST) estimates are as of 31 March each year. Duet Group (DUE), APA Group (APA) and Envestra (ENV) estimates are as of 30 June each year. The average for all firms in a year does not make any adjustment for these timing differences.

Source: As per Table 2. Annual reports, AER analysis; APA, *Annual report 2024*, 28 August 2024, pp. 84, 99, 156; APA, *Annual report 2023*, 23 August 2023, pp. 78, 93, 147; all other data is the same as published with the 2022 Instrument Explanatory Statement.

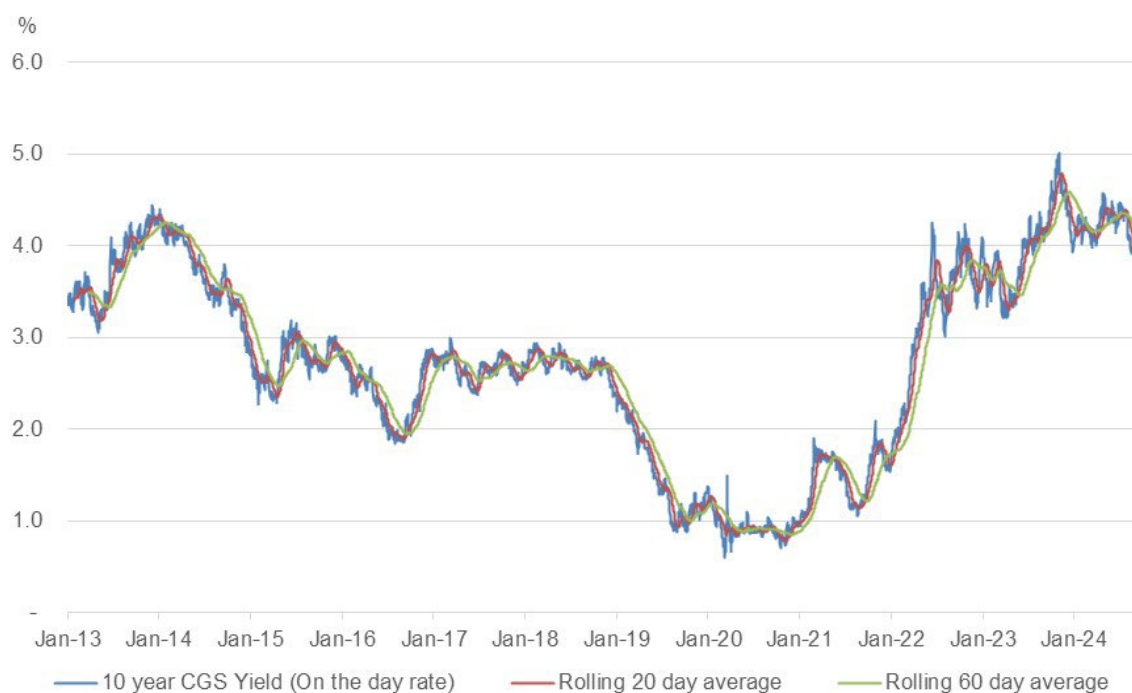
4 Risk-free rate

The risk-free rate is a key parameter in the Sharpe-Lintner capital asset pricing model (SL CAPM), which we use to estimate the return on equity.

The risk-free rate measures the return an investor would expect from a 'riskless' investment. We then add the returns on this riskless asset to the equity risk premium to estimate the return on equity.

We estimate the risk-free rate using the yield on Commonwealth Government Securities (CGS).⁷ Figure 1 compares the 10-year interpolated CGS yields against the 20 day and 60 day rolling averages.

Figure 1 10-year interpolated CGS yields (January 2013 to August 2024)



Comparator: Figure 6.4 (p. 125) of the 2022 *Instrument Explanatory Statement*.

Source: RBA interest rate statistics, F16, AER analysis.

⁷ Our use of the risk-free rate is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 105-128.

5 Equity beta

Equity beta is a key parameter in the Sharpe-Lintner capital asset pricing model (SL CAPM), which we use to estimate the return on equity.

Equity beta measures the ‘riskiness’ of a firm’s returns compared with that of the market. Specifically, it measures the standardised correlation between the returns on an individual asset or firm with that of the overall market.⁸

In determining a value for equity beta in the 2022 Instrument, we considered empirical estimates of equity beta from relevant Australian (domestic estimates) and international (international estimates) energy network businesses.⁹ We present the results of our update (to August 2024) in the sections below.

5.1 Domestic estimates

Table 4 lists our domestic comparator firms used for equity beta estimates.

Table 4 List of our comparator firms

Firm (ASX ticker)	Time/trading period	Sectors
AGL Energy Limited (AGK)	January 1990 – October 2006	Electricity, gas
Alinta (AAN)	October 2000 – August 2007	Gas
APA Group (APA)	June 2000 – present	Gas, minority interest in other energy infrastructure
DUET Group (DUE)	August 2004 – April/May 2017	Electricity, gas
Envestra Ltd (ENV)	August 1997 – October 2014	Gas
GasNet (GAS)	December 2001 – November 2006	Gas
Hastings Diversified Utilities Fund (HDF)	December 2004 – November 2012	Gas
Spark Infrastructure Group (SKI)	March 2007 ¹⁰ – November 2021	Electricity, gas
AusNet Services (AST), formerly SP AusNet (SPN)	December 2005 – February 2022	Electricity, gas

Comparator: Table 8.1 (p. 178) of the 2022 Instrument Explanatory Statement.

The recent delisting of SKI and AST means that 8 of the 9 firms in our comparator set have now been delisted, with only APA remaining. Consequently, as foreshadowed in our 2022 Instrument Explanatory Statement, we are reviewing the information available to inform our beta estimate for the 2026 Instrument review.

⁸ R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, McGraw-Hill: First Australian edition, 2000, pp. 186-188 (Brealey et al, *Principles of corporate finance*, 2000).

⁹ AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, p. 171.

¹⁰ The SKI data is available from December 2005, but the data prior to March 2007 reflects stapled securities traded as instalment receipts—these instalments require further leverage adjustment and makes beta estimation difficult.

There are eight portfolios (labelled P1 to P8) with differing constituent firms and differing time periods. Table 5 presents the re-levered weekly equity beta estimates for these portfolios using ordinary least squares (OLS) regression.

Table 5 Re-levered weekly beta estimates (OLS, data to August 2024)

Portfolios	Average of firm estimates	P1	P2	P3	P4	P5	P6	P7	P8	APA
Firms	All firms	APA, ENV	AAN, AGL, APA, ENV, GAS	APA, DUE, ENV, HDF, AST	APA, DUE, ENV, HDF, SKI, AST	APA, DUE, ENV, SKI, AST	APA, DUE, SKI, AST	APA, SKI, AST	SKI, AST	APA
Start	Various	23 Jun 2000	28 Dec 2001	23 Dec 2005	9 Mar 2007	9 Mar 2007	9 Mar 2007	9 Mar 2007	9 Mar 2007	23 Jun 2000
End	Various	12 Sep 2014	6 Oct 2006	23 Nov 2012	23 Nov 2012	12 Sep 2014	28 Apr 2017	26 Nov 2021	26 Nov 2021	30 Aug 2024
Equal weighted										
Longest available period	0.56	0.49	0.50	0.54	0.52	0.43	0.46	0.52	0.41	0.69
Post tech boom and excl. GFC	0.59	0.53	0.51	0.59	0.58	0.50	0.54	0.58	0.47	0.74
Recent 5 years	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.70
Value weighted										
Longest available period	n/a	0.53	0.68	0.47	0.47	0.44	0.49	0.56	0.40	n/a
Post tech boom and excl. GFC	n/a	0.58	0.69	0.56	0.55	0.53	0.58	0.63	0.48	n/a
Recent 5 years	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Comparator: Table 8.4 (p. 187) of the 2022 Instrument Explanatory Statement.

Note: We have excluded the recent 5-year estimates due to insufficient data. Our comparator firms include AusNet Services (AST). This firm was included in the 2013 Guidelines under its former name of SP Ausnet (SPN). It was renamed in 2014. Portfolio estimates for a scenario reflect beta estimates available over that scenario. Portfolio estimates can start and end on different dates. Please refer to Tables 8.1 and 8.2 (pp. 178-179) of the 2022 Instrument Explanatory Statement for more information on our comparator firms.

Source: AER analysis; Bloomberg.

Set out in the tables below, Table 6 summarises the historical ranges of beta estimates, Table 7 shows the historical average firm beta estimates, and Table 8 shows the historical beta estimates for APA.

Table 6 Historical ranges of re-levered weekly beta estimates (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023/August 2024)

Equal and value weighted portfolio estimates	Whole comparator set [P1 to P8]	Still listed and recently delisted firms (APA, SKI, AST) [P7]	Recently delisted majority regulated firms (SKI, AST) [P8]
Longest period			
2018 Instrument	0.42 - 0.67	0.52 - 0.55	0.42 - 0.43
2019 update	0.42 - 0.68	0.53 - 0.56	0.42 - 0.43
2020 update	0.40 - 0.68	0.51 - 0.54	0.40 - 0.41
2021 update	0.40 - 0.68	0.51 - 0.55	0.40 - 0.41
2022 Instrument	0.40 - 0.68	0.52 - 0.56	0.40 - 0.41
2023 update	0.40 - 0.68	0.52 - 0.56	0.40 - 0.41
2024 update	0.40 - 0.68	0.52 - 0.56	0.40 - 0.41
Post tech boom and excl. GFC			
2018 Instrument	0.50 - 0.67	0.64 - 0.67	0.52 - 0.53
2019 update	0.50 - 0.69	0.64 - 0.68	0.54 - 0.55
2020 update	0.47 - 0.69	0.60 - 0.62	0.47 - 0.47
2021 update	0.47 - 0.69	0.59 - 0.62	0.47 - 0.47
2022 Instrument	0.47 - 0.69	0.58 - 0.63	0.47 - 0.48
2023 update	0.47 - 0.69	0.58 - 0.63	0.47 - 0.48
2024 update	0.47 - 0.69	0.58 - 0.63	0.47 - 0.48
Recent 5 years			
2018 Instrument	0.49 - 0.88	0.81 - 0.88	0.70 - 0.72
2019 update	0.69 - 0.89	0.83 - 0.89	0.73 - 0.74
2020 update	0.44 - 0.69	0.59 - 0.68	0.44 - 0.44
2021 update	0.37 - 0.70	0.53 - 0.59	0.37 - 0.38
2022 Instrument	0.35 - 0.57	0.51 - 0.57	0.35 - 0.36
2023 update	0.32 - 0.53	0.47 - 0.53	0.32 - 0.34
2024 update	n/a	n/a	n/a

Comparator: Table 8.5 (pp. 187-188) of the 2022 Instrument Explanatory Statement.

Notes: We have excluded the recent 5-year estimates in 2024 due to insufficient data. The results for the 2020 update have been revised since its original publication due to an anomaly in SKI data.

Source: AER analysis; Bloomberg.

Table 7 Historical re-levered weekly average firm beta estimates (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023/August 2024)

Period	Apr 2014*	Sep 2018	Aug 2019	Aug 2020	Aug 2021	Dec 2022	Aug 2023	Aug 2024
Longest period	0.52	0.57	0.56	0.56	0.56	0.56	0.56	0.56
Post tech boom and excluding GFC	0.56	0.61	0.61	0.59	0.59	0.59	0.59	0.59
Recent 5 years	0.46	0.72	0.72	0.56	0.59	0.51	0.46	n/a

Comparator: Table 8.6 (p. 188) of the 2022 Instrument Explanatory Statement.

Notes: We have excluded the recent 5-year estimates in 2024 due to insufficient data. The results for the 2020 update have been revised since its original publication due to an anomaly in SKI data.

Source: * Bloomberg; AER analysis; Olan Henry, *Estimating beta: An update*, April 2014.

Table 8 Historical re-levered weekly beta estimates for APA (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023/August 2024)

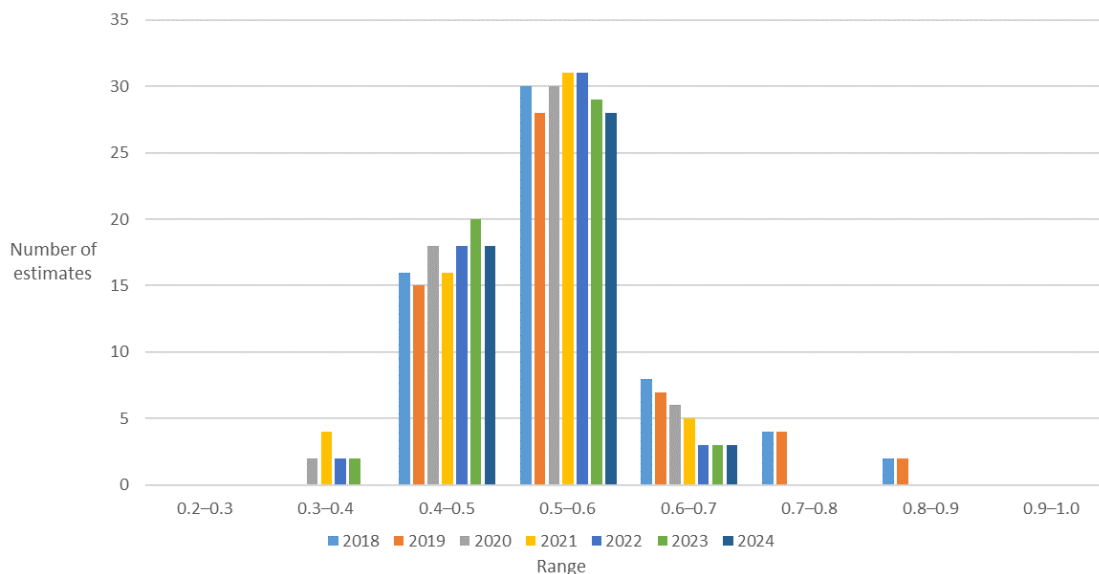
Period	Apr 2014*	Sep 2018	Aug 2019	Aug 2020	Aug 2021	Dec 2022	Aug 2023	Aug 2024
Longest period	0.59	0.68	0.69	0.70	0.69	0.69	0.69	0.69
Post tech boom and excluding GFC	0.64	0.75	0.75	0.77	0.75	0.75	0.74	0.74
Recent 5 years	0.54	1.06	1.06	0.93	0.87	0.82	0.74	0.70

Comparator: Table 8.7 (p. 189) of the 2022 Instrument Explanatory Statement.

Source: * Bloomberg; AER analysis; Olan Henry, *Estimating beta: An update*, April 2014.

Figure 2 shows the distribution of beta estimates.

Figure 2 Distribution of re-levered weekly beta by range (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023/August 2024)



Comparator: Figure 8.1 (p. 189) of the 2022 Instrument Explanatory Statement.

Notes: There are fewer total estimates from 2019 onwards because the 'Recent 5 years' category no longer includes portfolios ending in 2014 (P1 and P5). Similarly, the 'Recent 5 years' category in 2022 excluded P6, which ended in 2017. We have updated the chart to include P8. We have excluded the "Recent 5 years" estimates in 2024 due to insufficient data.

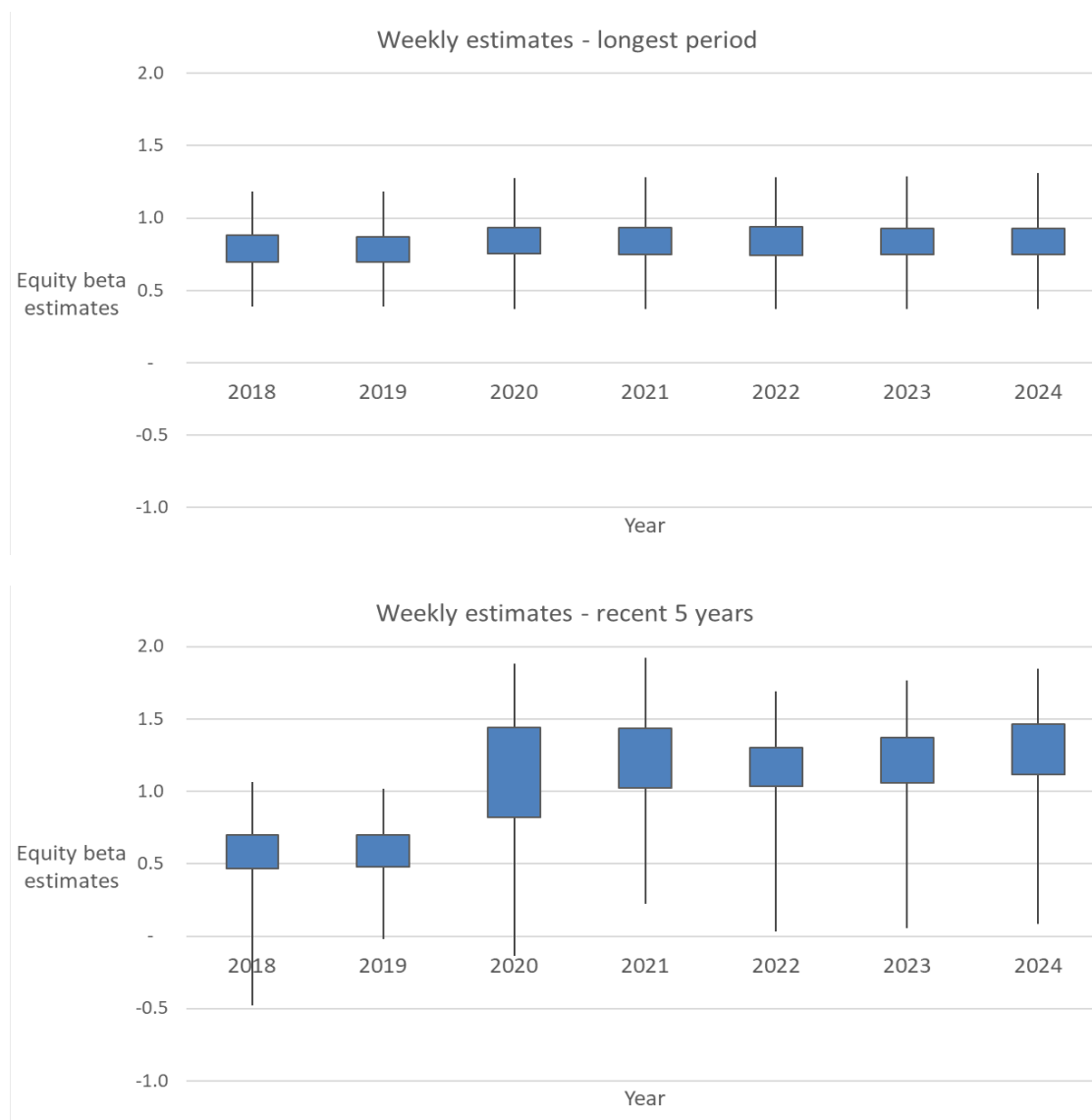
Source: AER analysis; Bloomberg.

5.2 International estimates

Our international beta estimates are based on a comparator set of 56 US firms. Figure 3 summarises the range of results of our updated international estimates and compares against estimates from the 2022 Instrument.¹¹

¹¹ Our use of international estimates for equity beta is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 180-182. We have used total return data and have recalculated our 2023 update using this data.

Figure 3 Summary of re-levered weekly international estimates (OLS, data to September 2018/August 2019/August 2021/December 2022/August 2023/August 2024)



Comparator: Figure 8.2 (p. 190) of the 2022 Instrument Explanatory Statement.

Note: This figure shows the quartile distribution of estimates by charting the minimum, first quartile, third quartile and maximum of the relevant estimates. The top of the top line indicates the maximum and bottom of the bottom line indicate the minimum. The bottom of the rectangle represents the first quartile. The top of the rectangle represents the third quartile.

Source: AER analysis; Bloomberg.

6 Market risk premium

The market risk premium (MRP) is the difference between the expected return on a market portfolio and the return on the risk-free asset. It compensates an investor for the systematic risk of investing in the market portfolio. Systematic risk affects all firms in the market (such as macroeconomic conditions and interest rate risk) and cannot be eliminated or diversified away through investing in a wide pool of firms.

In estimating the MRP, we have considered all relevant evidence available to us including evidence from historical excess return (HER) data and other methods of estimating a forward-looking MRP (such as dividend growth models, surveys and conditioning variables).

6.1 Historical excess returns

We have calculated the historical excess return (HER), updated to the end of calendar year 2023, and the annual market returns above the risk-free rate for different time periods.¹² The arithmetic, geometric and weighted averages for five sampling periods are presented in Table 9.¹³

Table 9 Historical excess returns using a 10-year term as of 31 December 2023

Sampling Period	Arithmetic average (%)	Geometric average (%)	Weighted average (%)
1883-2023	6.3	5.0	6.2
1937-2023	6.1	4.4	5.9
1958-2023	6.6	4.4	6.3
1980-2023	6.5	4.6	6.1
1988-2023	6.2	4.8	5.8

Comparator: Table 7.3 (p. 159) of the 2022 *Instrument Explanatory Statement*.

Notes: Calculated using an assumed imputation utilisation value (or theta value) of 0.65.

Source: Handley, *An estimate of the historical equity risk premium for the period 1883 to 2011*, April 2012, p. 6; AER update for 2012–2022 market data.

6.2 Dividend growth model

The Dividend Growth Model (DGM) uses analyst forecasts of current dividends, combined with estimates of dividend growth and the current share price, to estimate an implied MRP. We use the two-stage and three-stage DGM to observe the trend of the implied MRP, as set out in Tables 10 and 11, respectively.¹⁴

¹² Our historical excess returns estimations method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2022, pp. 139–145.

¹³ AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, p. 159.

¹⁴ Our DGM estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 145-148.

Table 10 Two-stage DGM estimates as of August 2023 and 2024

Averaging period	2023	2024
2-month average ending August	5.2	4.6
6-month average ending August	5.6	4.5
12-month average ending August	5.8	4.6

Comparator: Table 7.4 (page 160) of the *2022 Instrument Explanatory Statement*.

Notes: The growth rates used for the two-stage DGM for 2023 and 2024 were 3.85% and 3.75%, respectively.

Source: Bloomberg, AER analysis, Consensus Economics.

Table 11 Three-stage DGM estimates as of August 2023 and 2024

Averaging period	2023	2024
2-month average ending August	4.8	4.3
6-month average ending August	5.1	4.4
12-month average ending August	5.0	4.4

Comparator: Table 7.4 (page 160) of the *2022 Instrument Explanatory Statement*.

Notes: The growth rates used for the three-stage DGM for 2023 and 2024 were 3.85% and 3.75%, respectively.

Source: Bloomberg, AER analysis, Consensus Economics.

6.3 MRP survey results

MRP survey evidence comes from market practitioners who are asked what they expect the MRP to be in the Australian market. These surveys take on different forms and can vary in different ways, including questions asked, type of participants and number of participants.

In the approach to date, we have used survey evidence to inform our MRP estimate, as set out in Table 12. It informs us about investors' and market practitioners' expectations and/or what they apply in practice.¹⁵ In reporting the results for the MRP, we note that the survey results indicate some market participants adjust the risk-free rate, rather than the MRP.¹⁶

¹⁵ Our MRP survey results estimation method is described in AER, *2022 Rate of Return Instrument, Explanatory Statement*, February 2023, p. 162.

¹⁶ AER, *Overall rate of return, equity and debt omnibus – Final working paper*, December 2021, p. 44.

Table 12 MRP survey results (2012 to 2024)

Survey	Number of responses	Mean (%)	Median (%)	Mode (%)
Fernandez et al (2012)	73	5.9	6.0	n/a
Fernandez et al (2013)	17	6.8	5.8	n/a
Fernandez et al (2014)	93	5.9	6.0	n/a
Fernandez et al (2015)	40	6.0	5.1	n/a
Fernandez et al (2016)	87	6.0	6.0	n/a
Fernandez et al (2017)	26	7.3	7.6	n/a
Fernandez et al (2018)	74	6.6	7.1	n/a
Fernandez et al (2019)	54	6.5	6.1	n/a
Fernandez et al (2020)	37	7.9	6.2	n/a
Fernandez et al (2021)	31	6.4	6.3	n/a
Fernandez et al (2022)	34	6.3	6.0	n/a
Fernandez et al (2023)	39	6.2	6.0	n/a
Fernandez et al (2024)	34	5.5	5.4	n/a
KPMG (2013)	19	n/a	6.0	6.0
KPMG (2015)	~27	n/a	6.0	6.0
KPMG (2017)	45	n/a	6.0	6.0
KPMG (2018)	56	5.5	6.0	6.0
KPMG (2019)	59	5.9	6.0	6.0
Asher and Hickling (2013)	46	4.8	5.0	6.0
Asher and Hickling (2014)	27	4.4	4.6	6.0
Asher and Carruther (2015)	29	4.9	n/a	n/a
Carruther (2016)	24	5.3	n/a	n/a

Comparator: Table 7.5 (p. 162) of the *2022 Instrument Explanatory Statement*.

Source: Fernandez et al, *Survey: Market Risk Premium and Risk-Free Rate used for 88 countries in 2023*, June 2023; Fernandez et al, *Survey: Market Risk Premium and Risk-Free Rate used for 96 countries in 2024*, March 2024. All other data is the same as published with the 2022 Instrument Explanatory Statement.

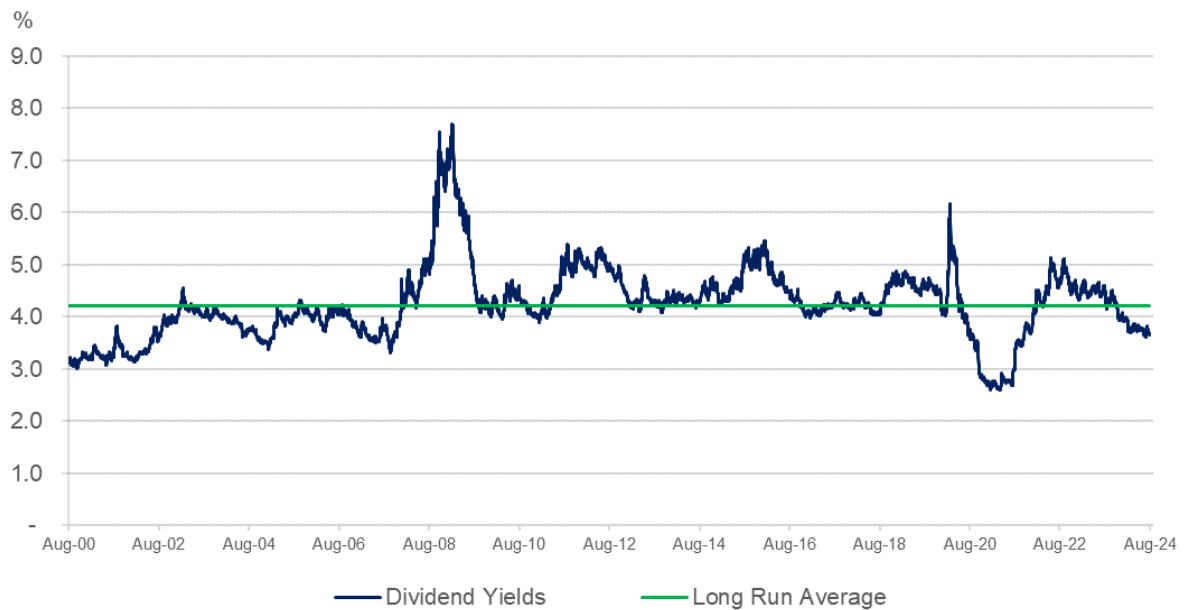
6.4 Conditioning variables

Conditioning variables are market data and indicators that provide information on the potential risk in the market.¹⁷ These include dividend yields, volatility index and credit spreads, as described below.

Dividend Yields

Dividend yields can be measured over time to give a signal of potential risk, as shown in Figure 4 for the ASX200.

Figure 4 Dividend yields from ASX200 (August 2000 to August 2024)



Comparator: Figure 7.5 (p. 164) of the 2022 Instrument Explanatory Statement.

Notes: Long run average taken from the start of the data series in 2000.

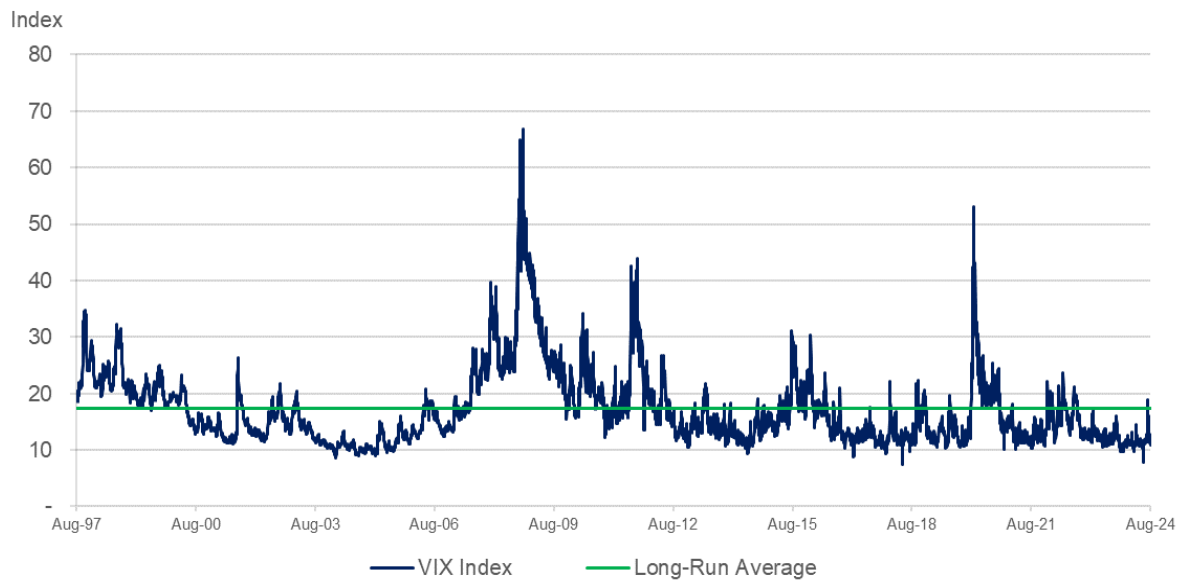
Source: AER analysis; sourced via Bloomberg code AS51.

Volatility index

The ASX200 volatility index (VIX) uses year ahead option prices to arrive at a measure of market volatility over time, as shown in Figure 5.

¹⁷ Our use of conditioning variables is described in AER, *2022 Rate of Return Instrument, Explanatory Statement*, February 2023, p. 155.

Figure 5 Implied volatility of ASX200 (August 1997 to August 2024)



Comparator: Figure 7.4 (p. 163) of the *2022 Instrument Explanatory Statement*.

Source: AER analysis; ASX200 VIX volatility index, sourced via Bloomberg code AS51VIX from 2 January 2008 and code CITJAVIX prior to 2 January 2008.

Long run average taken from the start of the data series in 1997.

Credit Spreads

Credit spreads from state governments and corporate debt can indicate risk in the market, as shown in Figure 6 and Figure 7, respectively.

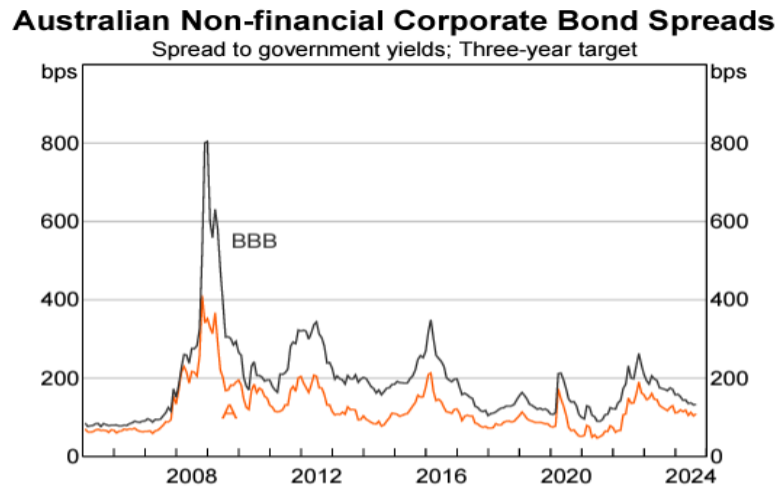
Figure 6 Credit spreads from state government debt (August 2000 to August 2024)



Comparator: Figure 7.6 (p. 164) of the *2022 Instrument Explanatory Statement*.

Source: AER analysis; Spreads between the Australian Sovereign 3 Year Index and the state government bonds with a term to maturity of 3 years, sourced via Bloomberg interest rate statistics.

Figure 7 Credit spread of corporate debt



Notes: Data updated to 19 September 2024.

Source: RBA, Chart Pack, downloaded September 2024.

7 Return on debt

7.1 Benchmark credit rating

Table 13 presents the historical credit ratings for Australian energy network businesses from 2013 to 2024.¹⁸

Table 13 Credit ratings

Issuer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 ¹⁹	2024 ²⁴
APA Infrastructure Ltd	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
ATCO Gas Australia LP	A-	A-	A-	A-	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+
DBNGP Trust	BBB-	BBB-	BBB-	BBB-	BBB	BBB	BBB	BBB	NR	NR	NR	NR
DBNGP Finance Co P/L	BBB-	BBB-	BBB-	BBB-	BBB	BBB	BBB	BBB	A-	A-	A-	A-
DUET Group	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
ElectraNet P/L	BBB	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB	NR	BBB	BBB	BBB
Energy Partnership (Gas) P/L	BBB-	BBB-	BBB-	BBB-	BBB+	BBB+	BBB+	BBB+	A-	A-	A-	A-
Australian Gas Networks Ltd	BBB	BBB+	BBB+	BBB+	BBB+	BBB+	A-	A-	A-	A-	A-	A-
ETSA Utilities	A-	A-	A-	A-	A-	NR	A-	NR	NR	NR	NR	NR
ETSA Utilities Finance P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Powercor Australia LLC	BBB+	BBB+	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
AusNet Services (Distribution) Pty Ltd	A-	A-	A-	A-	A-	NR	NR	NR	NR	NR	NR	NR
AusNet Services Ltd	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+	BBB+	BBB+
AusNet Service Holdings P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+	BBB+	BBB+
AusNet Transmission Group P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+	BBB+	BBB+

¹⁸ Our benchmark credit rating estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 222-225.

¹⁹ Data for 2023 and 2024 has been updated until August 2023 and August 2024, respectively.

Issuer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 ¹⁹	2024 ²⁴
SGSP (Australia) Assets Pty Ltd	BBB+	BBB+	BBB+	A-	A-	A-	A-	A-	A-	A-	A-	A-
The CitiPower Trust / CitiPower I	BBB+	BBB+	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
United Energy Distribution P/L	BBB	BBB	BBB	BBB	A-	A-	A-	A-	A-	A-	A-	A-
Victoria Power Networks Pt/L	NR	NR	BBB+	BBB+	BBB+	BBB+	BBB+	A-	BBB+	BBB+	BBB+	BBB+
Victoria Power Networks (Finance) P/L	NR	NR	BBB+	A-	A-	A-	BBB+	A-	A-	A-	A-	A-
NSW Electricity Networks Finance P/ L	NR	NR	NR	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Ausgrid Finance P/ L	NR	NR	NR	BBB+	BBB+	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Network Finance Company P/L	NR	NR	NR	NR	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+
Industry Median	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	A-	BBB+	BBB+	BBB+

Comparator: Table 9.6 (pp. 222-223) of the 2022 Instrument Explanatory Statement.

Note: Data for all years is up to December, except 2023 and 2024. Data for 2023 and 2024 has been updated until August 2023 and August 2024, respectively.

Source: Bloomberg, Standard & Poor's, Moody's. All other data is the same as published with the 2022 Instrument Explanatory Statement.

7.2 Return on debt from third-party yield curves

We use third-party yield curve data to estimate the return on debt. We source this data from a number of independent third-party providers.

In the 2013 Rate of Return Guideline, we relied on yield curve data from two data providers – Reserve Bank of Australia (RBA) and Bloomberg. In the 2018 Instrument, we added a third data provider – Thomson Reuters – to expand the number of data providers and, therefore, reduce the impact of outliers or missing observations on our cost of debt estimation. We retained this approach in the 2022 Instrument.

Figure 8 displays a time series of the debt yield curve using the benchmark return on debt methodology outlined in the 2022 Instrument (10-year term and BBB+ credit rating).²⁰

Figure 8 Debt yield curve time series (January 2014 to August 2024)



Source: Bloomberg, RBA, Thomson Reuters, AER analysis.

Notes: From 3 October 2023, the debt yield curve only contains data from Bloomberg and Thomson Reuters as RBA ceased the publication of Spread to Australian Government Securities and Spread to Bank Swap Rates.

7.3 Trailing average

The simple trailing average approach estimates the return on debt as the cost of debt that would be incurred by a benchmark business for debt raised over 10 regulatory years in equal increments.²¹

Table 14 presents an indicative trailing portfolio return on debt for a regulated network that commenced the transition in 2015. In that year, the portfolio was set using the on-the-day rate (the annual estimate). In each subsequent year, the most recent annual estimate is added to the portfolio with a 10% weight and the weight on the first year decreases by 10%.

We note that 2024 represents the first year that a network business would have fully transitioned its return on debt portfolio had it started transitioning in 2015.

²⁰ Our return on debt estimation method is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023 pp. 195-239 (choice of third party providers is discussed on pp. 225-228). We have not reported the yield curves by individual provider because this data is proprietary.

²¹ We assume the benchmark efficient entity refinances an equal share of debt each year. That is refinancing of 10% of total debt each year with new 10 years fixed rate debt. This results in us applying a weight of 1/10 for each year in the trailing average.

Table 14 Indicative trailing average portfolio return on debt (2015 to 2024)

Year	Annual estimate	Trailing average portfolio	Portfolio composition (weight x return on debt year)
2015	4.92%*	4.92%	100% x 2015
2016	4.15%*	4.85%	90% x 2015, 10% 2016
2017	4.45%*	4.80%	80% x 2015, 10% x 2016, 10% x 2017
2018	4.42%*	4.75%	70% x 2015, 10% x 2016, 10% x 2017, 10% x 2018
2019	2.69%	4.53%	60% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019
2020	2.40%	4.27%	50% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020
2021	2.49%	4.03%	40% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020, 10% x 2021
2022	6.14%	4.15%	30% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020, 10% x 2021, 10 x 2022
2023	6.37%	4.30%	20% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020, 10% x 2021, 10 x 2022, 10 x 2023
2024	5.53%	4.36%	10% x 2015, 10% x 2016, 10% x 2017, 10% x 2018, 10% x 2019, 10% x 2020, 10% x 2021, 10 x 2022, 10 x 2023, 10 x 2024

Notes: Indicative averaging periods were chosen in August each year. Calculations prior to 2019 (marked with*) use the return on debt calculation method specified in the 2013 Rate of Return Guideline. The 2022 figure in the above table (6.14%) differs from the 2022 figure in Table 1 (6.52%) because they reflect different averaging periods (August 2022 vs December 2022).

Source: Bloomberg, RBA, Thomson Reuters, AER analysis.

7.4 Energy infrastructure credit spread index

The energy infrastructure credit spread index (EICSI) was developed by Chairmont during the 2018 Instrument review, using data on actual debt costs collected from regulated networks.²² It reports a rolling 12-month historical average of all new debt instruments issued by privately-owned energy networks.²³

The primary EICSI metric is the spread over the swap rate (broadly equivalent to the debt risk premium), but the EICSI dataset is also used to report the average debt term and credit rating. It was used as a ‘sense check’ on our proposed regulated return on debt approach, as implemented in the finalised 2022 Instrument.²⁴

Figures 9 to 12 below present the updated EICSI incorporating updated information on the average term to maturity of actual debt issuance by regulated networks. The average term is

²² Chairmont, *Aggregation of return on debt data*, 28 April 2018.

²³ AER, *Discussion paper, Estimating the allowed return on debt*, May 2018, pp. 27-35.

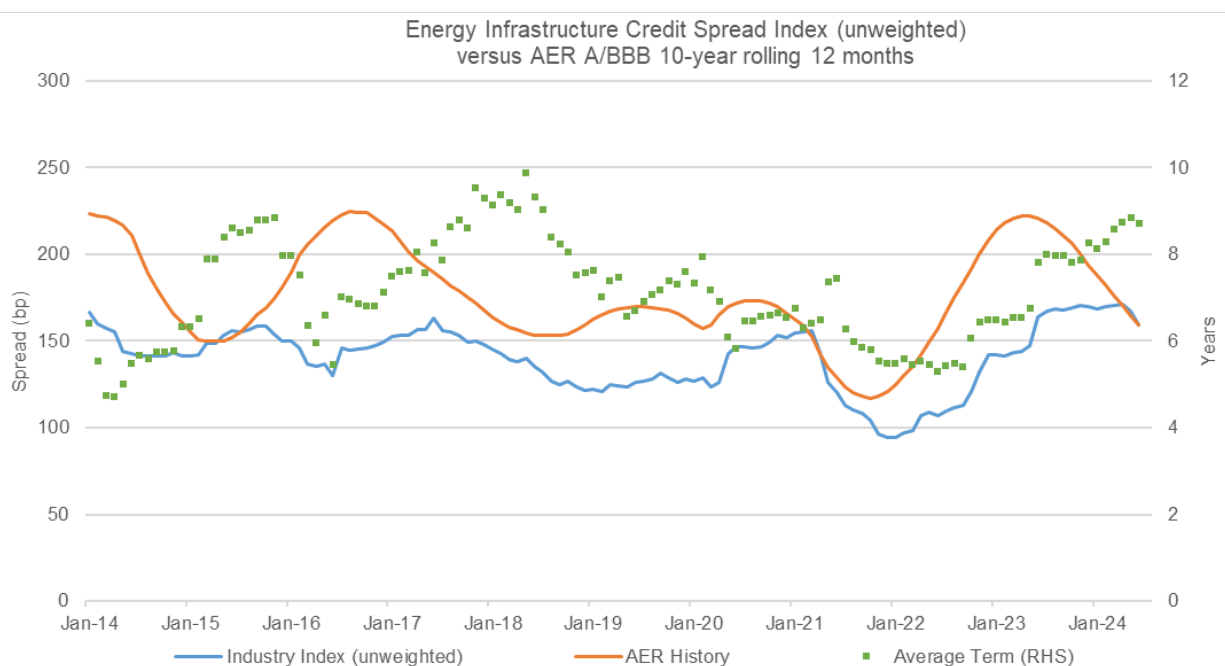
²⁴ Our use of the EICSI is described in AER, *2022 Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 198-203.

reported on a rolling 12-month window based on new debt issued (green squares). For comparison purposes, the spread on the AER's regulated return on debt is also presented (orange line).

The base analysis uses the same approach used by Chairmont in its 2018 report and considered in the 2018 and 2022 Instrument reviews.

Figure 9 displays the unweighted EICSI incorporating updated actual cost of debt information and revisions to historical data.²⁵

Figure 9 Comparing the EICSI (unweighted) over AER's benchmark estimate (January 2014 to June 2024)



Comparator: Graph 3 (p. 10) of the 2018 Chairmont report.

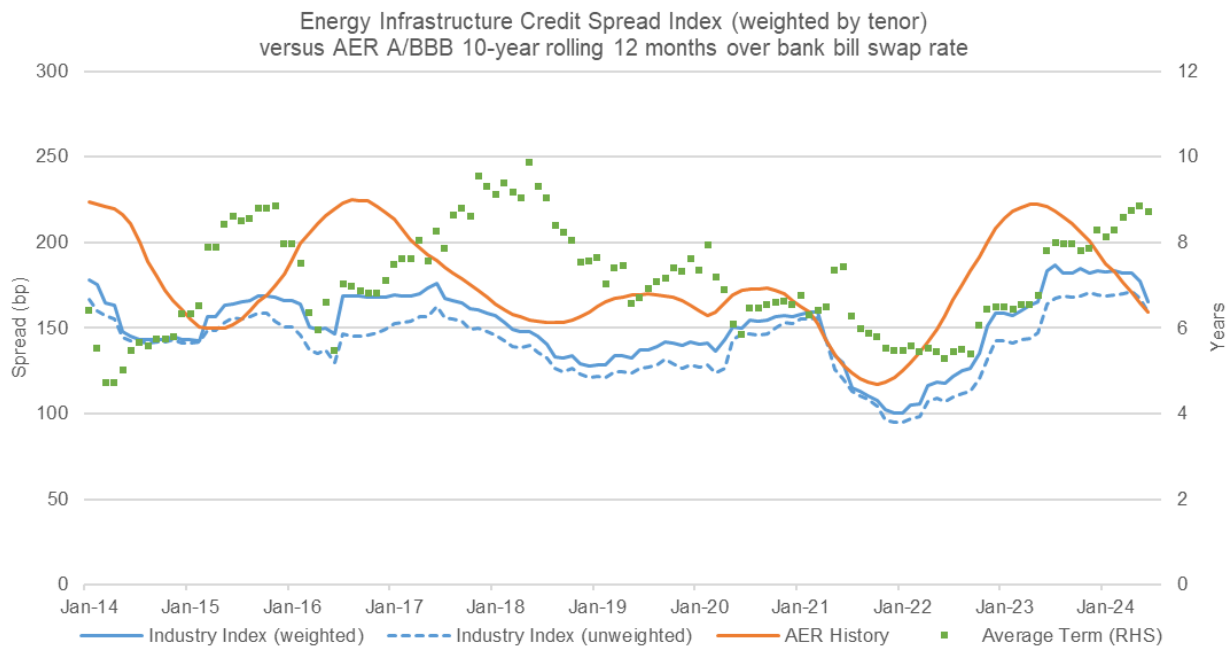
Notes: The spread is reported in basis points above the variable 3-month bank bill swap rate.

Source: AER analysis; Chairmont, *Aggregation of return on debt data*, 28 April 2018.

Figure 10 displays the EICSI reweighted by tenor to account for the difference in issuing long term debt compared to short term debt. This means the spread of longer term debt in the rolling data window (12 months) is given more weight than the spread of shorter term debt.

²⁵ In 2023, we collected actual debt costs from private-sector regulated networks through a Regulatory Information Notice (RIN). This information was received on 15 September 2023 and included new debt issued between 1 July 2022 and 30 June 2023 as well as resubmission of all old debt issued back to 1 July 2013.

Figure 10 Comparing the EICSI (weighted by tenor) over AER’s benchmark estimate (January 2014 to June 2024)

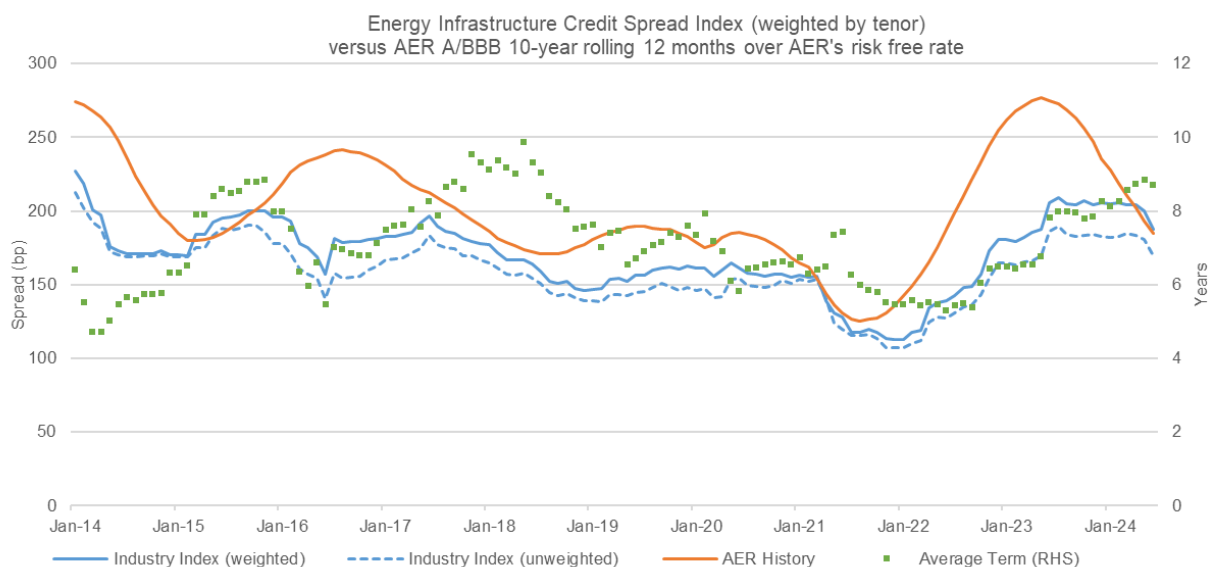


Notes: Spread is reported in basis points above the variable 3-month bank bill swap rate.

Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

Figure 11 presents the recalculated EICSI as a spread over the AER risk-free rate (from 10-year Commonwealth Government Securities) instead of AER’s benchmark estimate (bank bill swap rate).

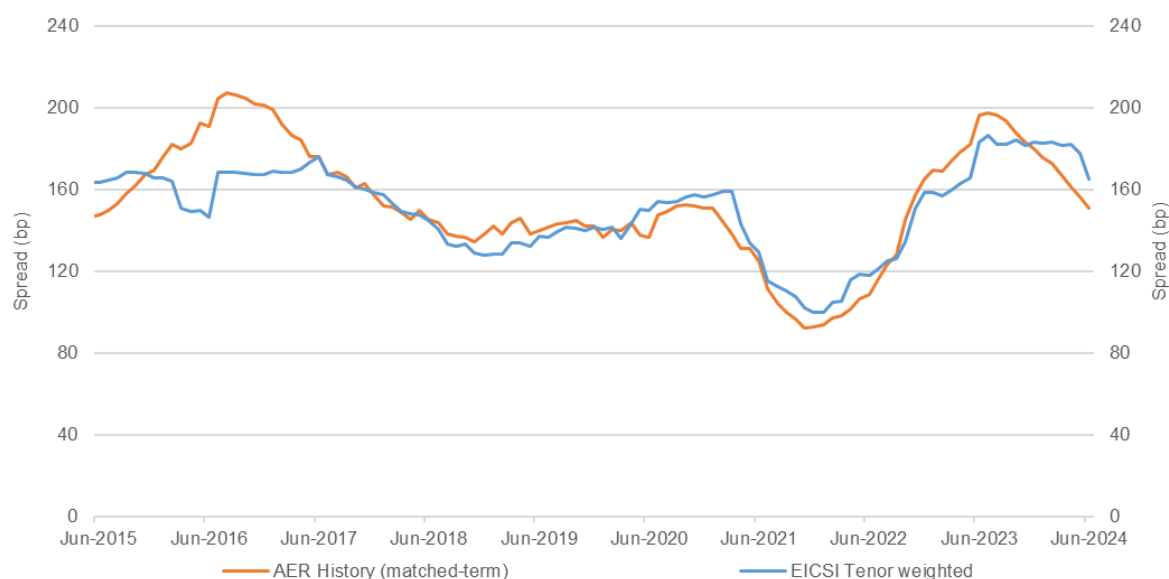
Figure 11 Comparing the EICSI (weighted by tenor) over AER’s risk-free rate (January 2014 to June 2024)



Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

Figure 12 presents the comparison between the EICSI (tenor weighted) and AER history with a matched term (matched to the EICSI term and not to the 10-year benchmark).

Figure 12 Comparison of EICSI 12-month rolling average (tenor weighted) against AER's A/BBB (matched-term) estimate (June 2015 to June 2024)



Comparator: Figure 9.6 (p. 214) of the 2022 *Instrument Explanatory Statement*.

Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

7.5 Debt term to maturity

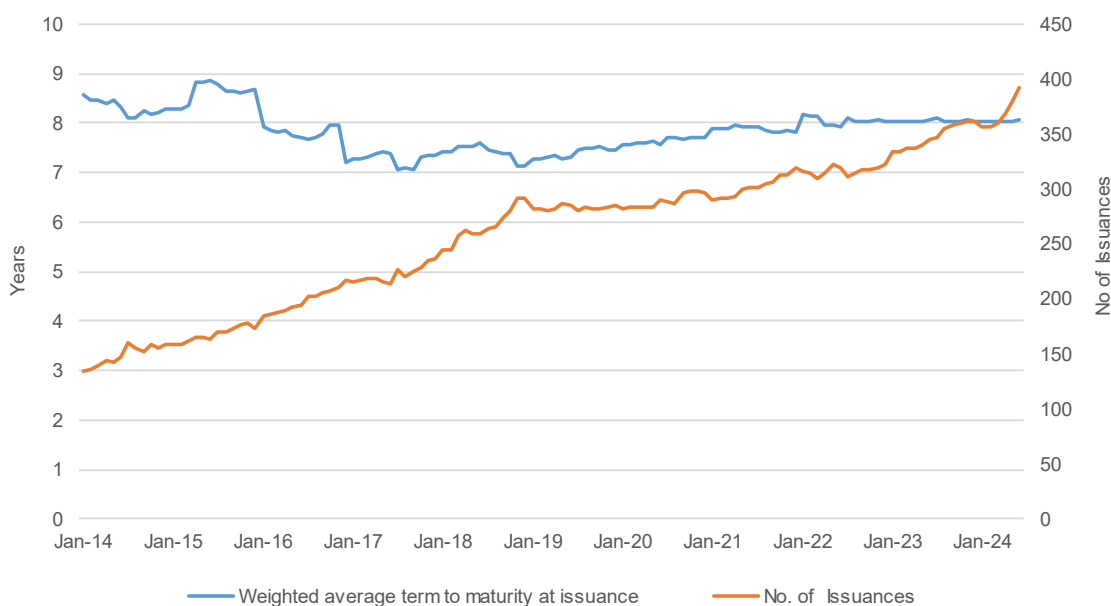
Figure 13 shows the graphical representation of the weighted average term to maturity at issuance (WATMI) and number of debt issuances in the period of 2014–2024. WATMI is dependent on three parameters:

- term to maturity
- face value of issuance
- number of debt issuances.

To obtain the industry WATMI, the drawdown sensitivity is taken as 100% (i.e. all debt instruments are fully drawn) and the term of each issuance is weighted by its face value. Debt is included in the WATMI from issuance until its maturity date. This analysis uses the same approach used by Chairmont in its 2019 report.²⁶

²⁶ Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

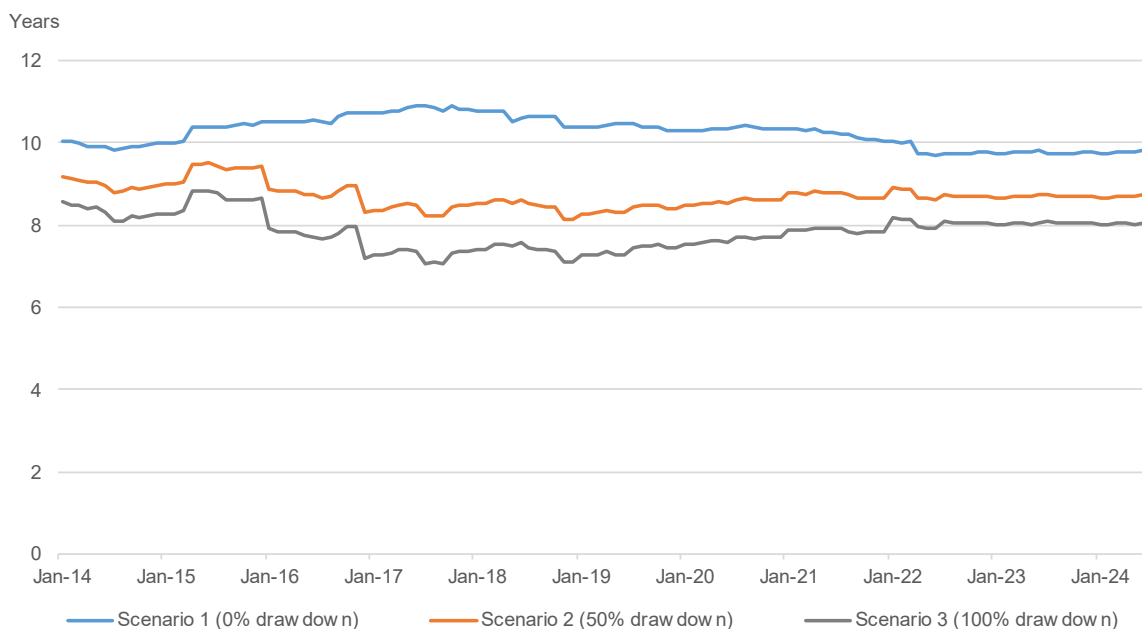
Figure 13 WATMI and number of debt instrument issued (January 2014 to June 2024)



Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

Figure 14 is a comparison of WATMI at different drawdown sensitivities on a month-to-month basis. Scenarios 1, 2 and 3 represent drawdowns of 0%, 50% and 100%, respectively.

Figure 14 WATMI – comparison of drawdown scenarios (January 2014 to June 2024)



Comparator: Figure 9.2 (p. 200) of the *2022 Instrument Explanatory Statement*.

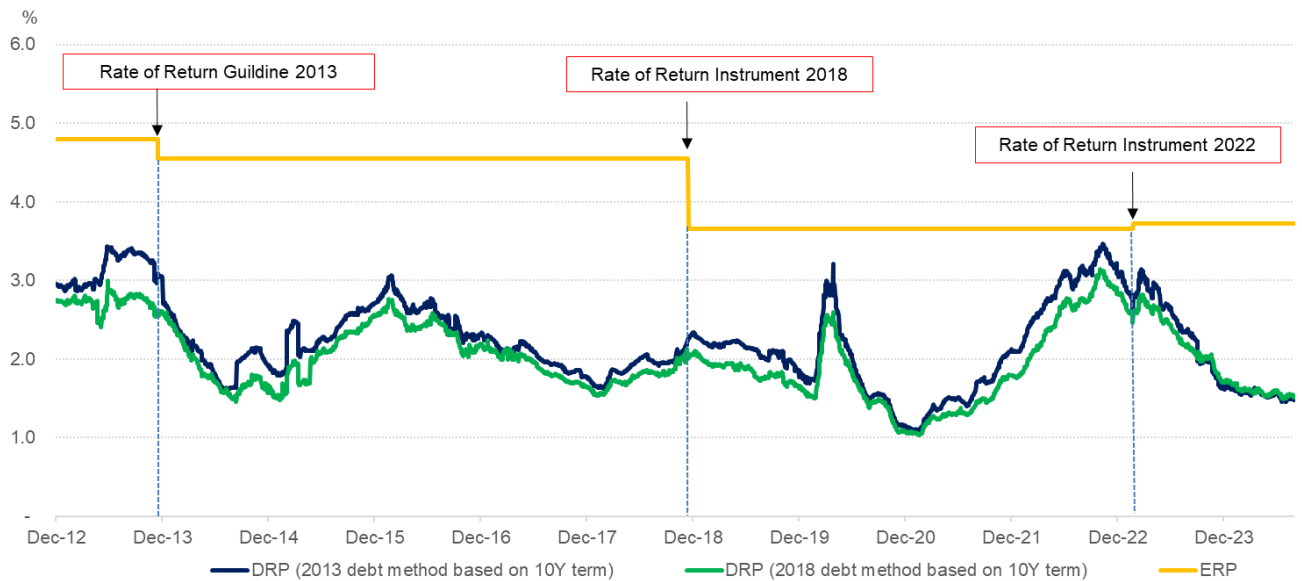
Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

8 Return on equity cross-check

8.1 Equity risk premium versus debt risk premium

Figure 15 provides an indication of the spread between the on-the-day equity risk premium (ERP) and the on-the-day debt risk premium (DRP). The chart informs us of the comparative and relative positions of the ERP and DRP since the 2013 Rate of Return Guideline.

Figure 15 Comparison of ERP and DRP (December 2012 to August 2024)



Comparator: Figure 11.17 (p. 294) of the 2022 *Instrument Explanatory Statement*. We adopted the same DRP method in the 2018 and 2022 instrument.

Source: AER analysis; Bloomberg; Thomson Reuters; RBA.

9 Value of imputation credits

9.1 Distribution rate from ASX top 50

One component of our estimate of the value of imputation credits (gamma) is the distribution rate (or payout ratio).²⁷ This is the proportion of imputation credits generated that are distributed to investors.

Dr Martin Lally estimated the distribution rate for the top 50 ASX companies as part of the 2018 Instrument review, and we have updated these estimates annually since then.²⁸ The latest update incorporates 2023 data and applies the same methodology used by Dr Lally.

Table 15 shows the overall distribution rate with updated data.

Table 15 Distribution rates for the ASX top 50 (2000 to 2024)

ASX top 50	2018 Instrument (2000–2017)	2022 Instrument (2000–2021)	2023 update (2000–2022)	2024 update (2000–2023)
Imputation distribution (\$m)	235,970	346,008	388,612	401,816
Tax payments (\$m)	265,770	393,786	428,659	446,315
Distribution rate	0.888	0.879	0.907	0.900

Comparator: Table 10.3 (p. 248) of the 2022 Instrument Explanatory Statement provided more detail on previous updates.

Notes: The top 50 ASX companies were determined at 1 August 2018, consistent with the 2018 report.

Source: AER analysis; Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, 17 October 2018, p. 3; 2021, 2022 and 2023 annual reports for the top 50 ASX companies as determined by Dr Lally in his report on 1 August 2018.

9.2 Utilisation rate from equity ownership

A component of our estimate of the value of imputation credits is the utilisation rate. This is the utilisation value to investors in the market per dollar of imputation credits distributed.

Our approach to estimating the utilisation rate is informed by the Monkhouse framework, where the utilisation value is equal to the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors.²⁹

We updated our estimates using September 2024 Australian Bureau of Statistics (ABS) finance and wealth data. Table 16 shows the utilisation rates with the updated data.

²⁷ Our approach to gamma is discussed in AER, *2022 Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 240-249.

²⁸ Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, 17 October 2018; Table 10.3 (p. 248) of the 2022 Instrument Explanatory Statement.

²⁹ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp.18–20; Our use of equity ownership to estimate the utilisation rate is described in AER, *Rate of Return Instrument, Explanatory Statement*, February 2023, pp. 248-249.

Table 16 Utilisation rates from the equity ownership approach (2000 to 2024)

Estimates	2018 Instrument (2000–2018)	2022 Instrument (2000–2022 Sep)	2023 update (2000–2023)	2024 update (2000–2024)
Range of annual results	0.612 - 0.697	0.618 - 0.702	0.618 - 0.702	0.618 - 0.702
Most recent point estimate	0.638	0.625	0.628	0.635
Average over the last 5 years	0.646	0.642	0.637	0.635
Average over the last 10 years	0.643	0.647	0.646	0.644

Comparator: Table 10.4 (p. 249) of the 2022 Instrument Explanatory Statement provided more detail on previous updates.

Notes: ABS data commences in September 2000 and runs to June 2018 (2018 Instrument), September 2022 (2022 Instrument), June 2023 (2023 update) and June 2024 (2024 update).

Source: AER analysis; [ABS Australian National Accounts: Finance and Wealth](#).

Appendix A

Table 17 Cross-reference to 2022 Instrument Explanatory Statement

Section	AER, 2022 Rate of Return, Final Explanatory Statement – Final decision
Benchmark gearing ratio	Section 4.3, pp. 85-88
Risk-free rate	Section 6.3.3, pp. 124-126
Market Risk Premium	
Historical excess returns	Section 7.3.2.1, pp. 139-145 Section 7.3.3.1, p. 159
Dividend growth model	Section 7.3.2.2, pp. 145-154 Section 7.3.3.2, p. 160
MRP surveys	Section 7.3.2.3, p. 154 Section 7.3.3.3, p. 162
Conditioning variables	Section 7.3.2.4, p. 155 Section 7.3.3.4, pp. 163-165
Equity Beta	
Domestic estimates	Section 8.3.1, pp. 174-175 Section 8.3.8, pp. 186-190
International estimates	Section 8.3.8, pp. 189-191
Return on debt approach	
Debt term to maturity	Section 9.3.1, pp. 195-203
Energy infrastructure credit spread index	Section 9.3.2, pp. 205-221
Benchmark credit rating	Section 9.3.3, pp. 222-225
Third-party yield curves	Section 9.3.4, pp. 225-228
Imputation tax credits	
Distribution rate	Section 10.3.4.1, pp. 247-248
Utilisation rate	Section 10.3.4.2, pp. 248-249
Equity risk vs Debt risk premium	Section 11.3.1.8.3, pp. 293-295