Draft

Rate of Return Instrument

Explanatory Statement

June 2022

AUSTRALIAN ENERGY REGULATOR

Inquiries about this publication should be addressed to:

Australian Energy Regulator
GPO Box 3131
Canberra ACT 2601
Tel: 1300 585 165

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Executive summary

We regulate the revenues and prices that electricity and gas networks (transmission and distribution) are permitted to charge their consumers. We do this because these networks are natural monopolies supplying essential services. Without regulation, the owners of these networks could charge excessive prices, damaging the broader economy and the interests of consumers. A key component of the prices these networks charge is the rate of return they recover for their capital investments. Electricity and gas networks are capital-intensive businesses and the return on capital is typically about half of their total revenue.

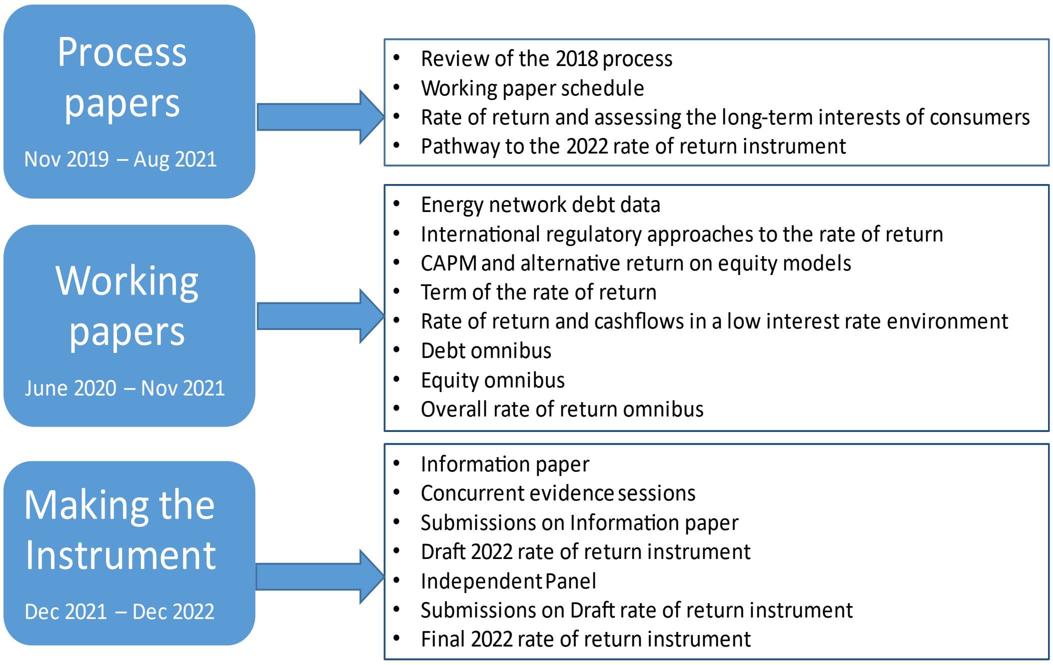
Australian governments have established legislation to regulate the operation of these networks including the rate of return they can recover for their capital investments. This is our role and the purpose of the 2022 Rate of Return Instrument (the Instrument).

This explanatory statement sets out our reasoning for the approach we propose to adopt in the Instrument. The Instrument is a separate document that specifies the methods, formulae and data to be used to calculate the rate of return. The Instrument is binding on providers of network services and ourselves. It determines the rate of return that will be used in our forthcoming regulatory decisions over the next 4 years.

Setting an appropriate rate of return requires the exercise of regulatory judgement. There are two main reasons for this. First, we are looking into the future. We are asking what rate of return is needed to attract an efficient level of investment in energy networks. We are looking for a rate of return that is neither too high nor too low. Second, the tools and data available to undertake this task are imperfect. There are high-level approaches and models available to assist, but experts, investment professionals and other regulators have different views about how they should be applied. Reasonable people can make different decisions when reviewing the same material.

In view of these uncertainties, we have undertaken an extensive consultation process to help us make the best judgements. We wanted to hear a full range of views on the methods and data available. We started in 2020 with a series of working papers that examined the fundamental components of the rate of return as well as some important topical issues. We held concurrent evidence sessions where we could hear directly from experts in the field and we received submissions from stakeholders. We are now publishing this draft Instrument which will be reviewed by an Independent Panel and we invite further submissions from stakeholders. In preparing this draft instrument we have carefully considered all submissions provided throughout the process. We address submissions in our discussion of our reasons. In appendix B we list the key issues made in submissions and identify the sections in this draft decision that discuss the issue. Figure 0.1 is a summary of our process.

Figure 0.1 Elements of the pathway to 2022



Our decision-making framework

The National Electricity Objective (NEO) and National Gas Objective (NGO) establish the ultimate objective for our decision-making. In each case, the objective is to promote efficient investment in, and efficient operation and use of, the relevant electricity or gas services, for the long-term interests of consumers with respect to the price, quality, safety, reliability and security of supply. We are required to make a Rate of Return Instrument under the NEL and the NGL. We may make an instrument only if satisfied the instrument will, or is most likely to, contribute to the achievement of the national electricity and gas objectives to the greatest degree.

Early in our working paper series we considered it would be helpful to set out how we saw this objective operating to guide our decision-making. We saw that stakeholders had different perspectives on the objective. In May 2021, following some targeted engagement, we published a position paper explaining our understanding and approach for applying the objective. In that paper we outlined a formulation of a guiding principle we have used to develop the draft Instrument. In no way do we see the guiding principle as supplanting or adding to our legislative objectives, rather we see it as an aid in applying the legislation. The guiding principle is:

> an unbiased estimate of the expected efficient return, consistent with the relevant risks involved in providing regulated network services.

We consider that the NEO, NGO and the long-term interests of consumers are best served through this guiding principle. As we have progressed through the process, we have seen a broad level of acceptance for this principle.

In addition to this principle, we have also employed a set of criteria to help guide our judgements. We first developed these criteria in 2013 and have reviewed and adjusted them in this process so that they are of most value. The criteria are:

1. Reflective of economic and finance principles and market information
2. Fit for purpose
3. Implemented in accordance with good practice
4. Models are based on quantitative modelling that is sufficiently robust and avoids arbitrary filtering
5. Market data is credible, verifiable, comparable, timely and clearly sourced
6. Flexible to allow changing market conditions and new information
7. Materiality
8. Longevity or sustainability of new arrangements.

The Consumer Reference Group (CRG) submitted that we should take into account its 5 principles before proposing a change to an established regime. The CRG considers its criteria are the minimum required of the AER to engender consumer confidence in regulatory processes and outcomes. We agree with the CRG that we should use a principled approach to assessing new information before making a change and, as noted above, our assessment criteria is for that purpose. The CRG's 5 principles are:

1. Promote behaviours that engender consumer confidence in the regulatory framework
2. Test against consumer impacts on prices
3. Test against impacts on service standards
4. Risks are borne by those best placed to manage them; and
5. There should be a high bar to change.

We consider the CRG's proposed principles, in practical terms, are reflected in our criteria. For example, consumer confidence is built when our decisions are based on sound economic and finance principles and market data is credible. Similarly, when considering potential changes, we look to the materiality and longevity and sustainability of the potential change.

The role of the CRG

Under our legislation, we are required to establish a CRG to advise on consumer engagement and to actively engage consumers and provide us with their insights.

The CRG has been set up to submit consumer perspectives including on technical and procedural issues during the rate of return process. The final membership encompasses representatives with a diverse range of skills and experience.

Framework for the rate of return

We apply a 'building block' model to set regulated revenues for electricity and gas network service providers (NSPs). The building blocks – return on capital, return of capital, operating expenditure and tax – reflect the expected costs that would be incurred by a benchmark efficient business operating the network. This is a form of incentive regulation, because building blocks are estimated in advance of a regulatory control period (typically 5 years) and the network retains any benefit (or bears any detriment) where it is able to reduce costs below our estimates. Revealed costs are then used to inform building block estimates for the following control period, so that efficiency gains are passed on to consumers. We also operate a number of incentive schemes in conjunction with the building block framework. The return on capital building block is set by applying a rate of return on capital to the regulatory asset base each year. This rate of return is calculated using the approach set out in the Instrument.

We use a nominal vanilla weighted average cost of capital (WACC) formulation. We separately estimate an efficient return on debt and return on equity and then combine them according to the ratio of debt to total debt and equity. The tools we have available to estimate the return on debt are better than for equity. For debt, we can directly observe the debt instruments issued by the businesses we regulate and use this information to review and adjust our approach to setting a benchmark allowance. For equity, our task is to estimate the returns investors expect in the future to incentivise efficient investment for the long-term interests of consumers. This task faces two particular challenges. First, unlike debt we cannot directly observe expected returns on equity. Our judgements are informed through indirect measures. Second, the models available for estimating expected returns are incomplete and require judgement about their inputs. Nevertheless, we have information and models that are of considerable value in estimating the expected return on equity.

Summary of our draft decision

Our draft decision is for a Rate of Return Instrument that requires the rate of return to be calculated at the time of each determination and updated annually. The methods and the input data to be used are summarised in Table 0.1. The results in the second and third columns of the table apply the 2018 Instrument using end of February 2022 data and the draft 2022 Instrument using the same data. This allows stakeholders to compare outcomes on a consistent basis. We have used February 2022 as our reference point for all data in this explanatory statement. By using February 2022 as our reference point, we have been able to develop our estimates consistently and we have had sufficient time to check our data and calculations. We will update this data for our final decision using September data.

However, since February we have seen a material increase in the value of Commonwealth Government Securities (CGS). If we apply more recent data, we would see materially different headline rate of return estimates. We think it is important that stakeholders are aware of the potential consequences of this movement in interest rates. We have therefore included Table 0.2 which shows updates to key elements of the rate of return based on end of April 2022 data along with the February data for comparison.[1]

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[1] Calculated using the 20 day averaging period ending 29 April 2022. The debt estimate is an 'on-the-day' rate and does not reflect a trailing average.

Table 0.1 Summary of our draft decision applying data at end of February 2022

Parameter	2018 Instrument	Draft 2022 Instrument
Overall rate of return		
Indicative rate of return	4.71%	4.76%
Estimation approach	Weighted average of the: • nominal pre-tax return on debt, and • nominal, post-company tax, pre-imputation return on equity Weighted by the gearing ratio Updated annually (to reflect annually updating return on debt)	Weighted average of the: • nominal pre-tax return on debt, and • nominal, post-company tax, pre-imputation return on equity Weighted by the gearing ratio Updated annually (to reflect annually updating return on debt)
Gearing ratio		
Value of gearing ratio	0.6	0.6
Return on debt		
Indicative return on debt	4.00%	4.00%
Estimation approach	10-year trailing average, updated annually	10-year trailing average, updated annually
	10-year transition into the trailing average (continue transitions already underway)	10-year transition into the trailing average (continue transitions already underway)
	Benchmark to observed market rate curves: • for a given credit rating and term • for each annual update, averaged over periods nominated by regulated business	Benchmark to observed market rate curves: • for a given credit rating and term, • for each annual update, averaged over periods nominated by regulated business
Benchmark term of debt	10 years	10 years
Benchmark credit rating	BBB+	BBB+
Source of market rate curves	RBA, Bloomberg & Thomson Reuters	RBA, Bloomberg & Thomson Reuters
Weighting of sources of market rate curves	Equal weight	Equal weight
Market rate curves to proxy the benchmark credit rating	Weighted average of Broad BBB and Broad A curves	Weighted average of Broad BBB and Broad A curves
Weighting of curves	2/3 weight on BBB curves, 1/3 weight on A curves	2/3 weight on BBB curves, 1/3 weight on A curves
Averaging period conditions	Nominated before the start of the period and not after submitting a regulatory proposal for the relevant regulatory period	Nominated before the start of the period and not after submitting a regulatory proposal for the relevant regulatory period
	Between 10 days and 12 months in length	Between 10 days and 12 months in length
	Starts no earlier than 16 months before, and ends no later than 4 months before, the start of the relevant regulatory year	Starts no earlier than 17 months before, and ends no later than 5 months before, the start of the relevant regulatory year
	Periods for each year in a regulatory period should not overlap	Periods for each year in a regulatory period should not overlap
Return on equity		

Parameter	2018 Instrument	Draft 2022 Instrument
Indicative return on equity	5.78%	5.90%
Estimation approach	The Sharpe-Lintner Capital Asset Pricing Model formula, where return on equity is the product of: • the risk-free rate, and • the sum of the market risk premium and the equity beta Set for the entirety of each regulatory period and not updated annually	The Sharpe-Lintner Capital Asset Pricing Model formula, where return on equity is the product of: • the risk-free rate, and • the sum of the market risk premium and the equity beta Set for the entirety of each regulatory period and not updated annually
Value of market risk premium	6.1%	6.8% for regulatory periods <= 5 years and one month 6.7% for regulatory periods > 5 years and one month <= 7 years 6.6% for regulatory periods > 7 years <= 9 years 6.5% for regulatory periods > 9 years
Value of equity beta	0.60	0.60
Indicative risk-free rate	2.12% (10-year term)	1.82% (5-year term)
Risk free rate estimation approach	Yield to maturity on 10-year Commonwealth Government bonds, averaged over period nominated by regulated business	Yield to maturity on Commonwealth Government bonds with a term matching the term of the regulatory period (typically 5 years), averaged over period nominated by regulated business
Risk free rate averaging period conditions	Nominated in advance	Nominated in advance
	Regulated business to nominate length between 20 to 60 consecutive business days	Regulated business to nominate length between 20 to 60 consecutive business days
	Start no earlier than 7 months before the start of the regulatory period Finish no later than 3 months before the start of the regulatory period	Start no earlier than 8 months before the start of the regulatory period Finish no later than 4 months before the start of the regulatory period
Imputation credits		
Value of imputation credits	0.585	0.585
Estimation approach	The 'utilisation' approach, where gamma is the product of the utilisation rate and distribution rate	The 'utilisation' approach, where gamma is the product of the utilisation rate and distribution rate
Value of imputation credit distribution rate	0.90	0.90
Value of imputation credit utilisation rate	0.65	0.65

Notes:
1. Indicative rates are based on market rates for the risk-free rate and return on debt over February 2022 (20-day average). Indicative rates are based on 'on-the-day' return on debt estimates and do not reflect a trailing average (we note that service providers are currently at different stages of transitioning to the trailing average). The indicative rate for the previous approach reflects the application of this approach over the same period and not rates of return allowed in past determinations.
2. The 2022 Instrument and 2018 Instrument approaches both set out the 'first-best' or most-likely approach. A number of contingencies are triggered in certain events, such as if certain data is not available or nominated averaging periods do not comply with the conditions in the Instrument.

Table 0.2 Draft decision key rate of return estimates – April 2022 data

Parameter	2018 Instrument (February data)[1]	2022 Instrument (February data)[1]	2022 Instrument (April data)[2]
Indicative rate of return	4.71%	4.76%	5.88%
Gearing ratio	0.6	0.6	0.6
Indicative return on debt3	4.00%	4.00%	5.23%
Indicative return on equity	5.78%	5.90%	6.86%
Market risk premium	6.1%	6.8%[4]	6.8%[4]
Equity beta	0.60	0.60	0.60
Indicative risk free rate	2.12% (10-year term)	1.82% (5-year term)	2.78% (5-year term)
Value of imputation credits	0.585	0.585	0.585

Notes:
1. Indicative rates are based on market rates for the risk-free rate and return on debt over February 2022 (20-day average).
2. Indicative rates are based on market rates for the risk-free rate and return on debt ending 29 April with a 20-day average
3. Indicative rates are based on 'on-the-day' return on debt estimates and do not reflect a trailing average (we note that service providers are currently at different stages of transitioning to the trailing average).
4. For a 5-year period. Historical excess returns are averaged to the most recent full calendar year – 2021.

Key issues for the 2022 Instrument

As we have moved through the process developing the Instrument, we have made considerable progress in narrowing the issues in contention. There is broad stakeholder and expert agreement on the majority of issues, including some of the key foundational issues.

Therefore, for this draft decision we confirm our proposed approach to the following key aspects:

- our decision-making framework and the application of our legislative requirements as summarised in section 1.2 and expanded in chapter 2
- the use of a nominal vanilla weighted average cost of capital (WACC) formulation (see chapter 3)
- application of a trailing average approach to determine the return on debt (see chapter 9)
- continued use of third-party debt yield curves to estimate the return on debt at each point in time (see chapter 9)
- the standard Sharpe-Lintner CAPM model used as the basis for determining the return on equity (see chapter 5)
- using Commonwealth Government Securities as proxy for the riskless investment for our purposes (see chapter 6).

Table 1.1 in chapter 1 provides a summary of each of the individual issues we have reviewed and sets out our position on each issue.

However, there remains differences of view amongst stakeholders and experts on a handful of key topics. These remaining topics have potentially material impacts on the final rate of return. These topics attract the majority of our consideration in this explanatory statement.

The 6 priority topics we have identified are:

- term of the return on equity
- market risk premium (MRP)
- equity beta
- use of our industry debt Index
- weighted trailing average return on debt
- cross checks of the rate of return

The following sections provide an outline of our position and considerations on each topic.

Context for the key issues

Before turning to each of the key topics, we outline the broader context of how each issue fits in our framework.

The first 3 topics are motivated by the standard Sharpe-Lintner Capital Asset Pricing Model (CAPM or SL CAPM) we use for estimating the return on equity. The CAPM requires specification of 3 parameters: the rate of return on riskless assets (the risk-free rate), a measure of the sensitivity of returns of the specific firm to variations in the market as a whole (the equity beta) and the expected excess return on the market (or market risk premium (MRP)).

- The return on Commonwealth government securities is generally considered a good proxy for the risk-free rate and is the most directly observable parameter we have in the equity space. However, there is a question about whether we should be estimating returns based on the duration of the forthcoming regulatory period (typically 5 years) or a longer time horizon. Whichever choice is made we need to apply parameters consistent with our choice of term in the CAPM.
- The equity beta can be estimated from market data, but there are challenges in selecting comparator firms, the period over which beta is estimated and the estimation interval. These challenges and the debate around their resolution are the reason this topic features.
- The MRP can be informed by historical excess returns in the market. However, there are questions about whether the MRP should also be informed by other estimates of excess returns (such as those that can be calculated from dividend growth models). There are also broader questions about the stability of the return on equity and underlying MRP through time.

The use of our industry debt index features because we have observed variations between our return on debt and the debt costs derived from the actual debt instruments of the businesses we regulate. We have explored whether we should adjust our return on debt because of the variations we have seen in our industry debt index.

We have considered whether we need to adjust our current simple trailing average return on debt because of the expected need for large investments in our networks as we move to greater reliance on renewable electricity generation. We have considered whether moving to an approach that weights for future levels of capital investment would be more robust to potential movements in market conditions.

Finally, we have considered whether there are other indicators that might allow us to draw broad conclusions about the adequacy of the rate of return set out in our draft instrument. This is an 'in the round' type of assessment or a sense check of our overall approach.

Term of the return on equity

This topic came to our attention in 2020 during our review of how inflation should be incorporated into our regulatory framework. Before our review we estimated expected inflation based on a 10-year term. During the review, regulated networks persuaded us that it would be more consistent to employ a term for inflation that matched the length of the regulatory period (typically 5 years).

At the time, we did not express a concluded view on whether we should also employ a shorter term in other parts of our regulatory framework–in particular, for our estimate of the return on equity. In the process of developing this Instrument we have turned our attention to the question of the appropriate term for the return on equity.

There is disagreement among stakeholders about which approach we should take.

Our CRG has submitted:[2]

> … the term for estimating the return on equity remains a matter of judgement. While previous reviews consistently found in favour of a ten-year term, the AER left few realistic options on the table when it decided in December 2020 to shorten the estimation term for inflationary expectations. On that basis alone, the CRG accepts the AER should now align the term for the return on equity with the estimation term for inflationary expectations. It is essential that the AER explain if and what impacts this change has on the assessment of other parameters and the materiality of the overall impact on consumers.

Networks and investors submit that we should maintain our current approach of estimating the return on equity over a 10-year horizon. Networks and investors point to the common practice of investment professionals of using a 10-year term, amongst other reasons. There are also differences of view among the experts who participated in our concurrent evidence session.

Overall, we think the better view is that we should estimate the return on equity over a period that matches the regulatory period (typically 5 years) rather than 10 years.[3] In reaching this view we highlight:

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2 CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 11.

3 In this explanatory statement we sometimes refer to a 5-year period when discussion the term of the return on equity, but this is a short-hand for the length of the regulatory period.

- Our task is to set a revenue allowance for the regulatory period for an efficient benchmark. At the start of each regulatory period, the revenue allowance (and therefore prices and cashflows) is reset using updated market data.
- Our practice of resetting the allowed rate of return on equity at each regulatory determination affects the profile and riskiness of regulatory cash flows. In turn this impacts the expected return investors require.
- Matching the term of the allowed return on equity to the length of the regulatory period better aligns our regulatory allowance with the efficient costs of providing regulated services and risks borne by the investors.
- Matching the equity term to the length of the regulatory period is consistent with how we set the term of expected inflation. The same mathematics we relied on in determining the term of expected inflation applies in the case of return on equity.
- Market practitioners value assets into perpetuity and therefore tend to use long-term estimates. By contrast we are undertaking a different task. We are determining a return on equity that will typically last for 5 years and then will be reset and applied to the residual value of the accumulated regulatory asset base going forward. In these circumstances, if we use anything other than the term of the regulatory period, then the zero net present value condition is not met, and investors are not correctly compensated for risk. An efficient network would not have an expectation of achieving a normal return.
- When considering any change to our approach from our 2018 Instrument we have taken into account whether it meets the required bar for change. This considers a number of factors including internal consistency of the regulatory framework, consistency of the approach with its original purpose and with well-accepted economic and finance principles, materiality, longevity and stability of new arrangements. We also reflected on our overarching principle of using an unbiased estimate of the expected efficient return, consistent with the relevant risks involved in providing regulated network services. In this instance, we consider the change meets the required bar for change, because it will both better achieve the NPV=0 condition and also bring consistency to our approach. With respect to consistency, our revenue allowance including our approach to estimating inflation will be set consistently following this change. Without this change to term, we consider our approach will not best achieve the NEO and NGO and there is a risk of material economic distortions.

We acknowledge that arguments have been put forward to maintain our current approach. Key points include:

- It has been our regulatory practice to use a term of 10 years for considerable time. Regulatory stability is promoted by continuing this approach.
- Most other regulators employ a 10-year term.
- Investors typically use a 10year discount rate when making their investment decisions on infrastructure investments. If we change to a shorter term our revenue allowance would not meet investor expectations.

What a change to the term of equity means in practice

There are a number of factors moving in different directions:

- Typically, the risk-free rate is lower when the term is shorter. This would tend to reduce our return on equity. However, the relationship between the 10-year rate and shorter rates has some variability (see Figure 0.2). At times, shorter rates may even be higher than longer rates, although since 2013 shorter rates have been consistently lower. At February 2022, the 5-year rate was 1.82% and the 10-year rate was 2.12%. At the end of April 2022, the 5-year rate was 2.78% and the 10-year rate was 3.01%.
- When applying a term aligned with the regulatory period, we need to adjust our estimates of MRP. Typically, our estimated MRP is higher when using a shorter term due to the term structure of risk-free rates being upward sloping on average. This tends to offset the effect from the risk-free rate.

Figure 0.2 Yields for 10-year and 5-year government bonds

In chapter 11, we have undertaken a sensitivity analysis based on post global financial crisis data. Across this period, a 5-year term would have lowered the return on equity by approximately 0.3%, on average, compared to a 5-year term. Had the 2018 Instrument been based on equity returns that were 0.3% lower, we estimate that this would have reduced household bills by $10 per year.[4]

4 Our calculation of bill impacts is based on an assumption that a 1% change in the rate of return results in a 8.2% impact on NSPs' unsmoothed revenues. Assuming a 50% network component of the $2,000 average household bill, this results in a 4.1% bill impact. This calculation ignores demand impacts.

Market risk premium (MRP)

In making this draft decision, the approach to determining the market risk premium is where there is greatest uncertainty. Our current approach has been to set the MRP primarily based on estimates of historical excess returns. This approach has some desirable properties:

- Investor expectations of future returns are informed by past realised returns.
- Historical excess returns are able to be estimated simply.
- Deriving the MRP from historical excess returns produces an MRP that is reasonably stable over time.
- Using a fixed MRP will result in the total return on equity moving in line with the risk-free rate. The risk-free rate moves in line with economic conditions, which means that our return on equity will also tend to move with the base cost of money as it varies with changing market conditions.
- The CRG submits that applying this approach consistently over time will ride through short-term economic cycles and promote stability and predictability.

However, a case can be made that our current approach might be improved if we give greater weight to other information in determining the MRP. In particular, networks and investors have submitted that we should give a meaningful role to dividend growth models (DGMs) or explicitly recognise some type of negative relationship between the MRP and risk-free rate. Therefore, we have considered an option that combines estimates of historical excess returns with DGM estimates of the MRP.

Using an alternative approach to estimating the MRP is supported by:

- Some experts in our concurrent evidence sessions consider that the total expected return on equity is likely to be more stable through time than movements in the risk-free rate. They suggest this is likely to manifest in a negative relationship between the MRP and risk-free rate.
- Applying a MRP that varies inversely to the risk-free rate may be more responsive to short term market conditions.
- In a report for us in June 2021, Cambridge Economic Policy Associates (CEPA) undertook some basic econometric modelling. This modelling indicated a negative relationship between the MRP and risk-free rate.
- If we employ a DGM in our approach to estimating the MRP it may bring a forward looking characteristic because DGMs employ forecasts of growth and dividends.

Ultimately, we think choosing the approach that will most advance our objective is an exercise in judgement and reasonable minds may differ in this judgement. For this draft Instrument we prefer to maintain our current approach. We think its advantages are greater than the alternative. In reaching this view we note:

- While some experts in our concurrent evidence sessions consider there is likely to be a negative relationship between the MRP and risk-free rate, there was no clarity on the nature of the relationship or how it could be reliably estimated.

- CEPA caveated its econometric estimation noting challenges in using earnings yield models to produce accurate measures of the MRP.
- Dividend growth models have material weaknesses.
- Running DGM models adds a level of complexity and reduces predictability and replicability.
- Our review of the available cross-checks suggests that our current approach has operated reasonably well and we do not see an urgent case for change. The CRG proposed a general consumer principle that there should be a high bar for change.

To inform stakeholders in making submissions, in this explanatory statement we explore the merits of alternative approaches. We specify in detail 2 options that we think are most viable:

- continuation of our current approach setting a fixed value of the MRP in the Instrument primarily based on estimates of historical excess returns (HER) – this is our preferred approach applied in this draft decision.
- specifying a formula for calculating the MRP at each point in time when we make each regulatory determination over the life of the Instrument (option 3b) – in summary, the formula is:
  - the most recent estimate of HER (50%) plus the most recent estimate of the MRP from our 3-stage DGM employing a variable growth rate (50%). We also explain an option of using the ENA's calibrated DGM rather than our 3-stage model.

While we prefer to continue our current approach, we explain how each option could be incorporated in the Instrument including the relevant formulae and data series. This detail will enable stakeholders to engage more deeply with the options. If we are persuaded to change our position for the final Instrument, stakeholders will have been able to provide comments on the mechanics of each approach.

How the two options perform in practice

We have undertaken sensitivity testing to better understand how the 2 options may operate in practice. In the first instance, we have run both approaches over the previous 4 years. This analysis shows that the DGM option would have produced a more stable and higher return on equity than our current approach over this period. Had the MRP in the 2018 Instrument reflected the second option (HER with 50% weighting plus 3-stage DGM with 50% weighting) we estimate that the return on equity could have been 0.46% higher, on average over the 2018 to 2022 period. We estimate that this would have increased household bills by $15 per year. However, we also observe that the relationship between the MRP and risk-free rate as estimated by the DGM is not stable through time.

At this point in time, using data to the end of February 2022, we observe that the two options to estimating the MRP produce similar results. The 5-year term HER option produces 6.8% while the HER and DGM option produces 6.6%.[5]

Looking forward we have tested both approaches using symmetrical variations in the risk-free rate. We have also run alternative sensitivities where we have varied the responsiveness of the DGM to movements in the risk-free rate. Once again, we see that the DGM option produces a more stable return on equity (and therefore more stable prices), although the level of stability depends on how the DGM is performing. If the 2022 Instrument is based on the DGM option, it could mean that increases in the risk-free rate have a smaller impact on the return on equity than our current approach of relying on the HER. The difference between the options may be material.

Equity beta

In this draft decision, we propose to adopt the same overall approach in the 2018 Instrument to estimating equity beta. This has led us to adopting a beta value of 0.6, which is consistent with the 2018 Instrument.

Our draft value for beta (0.6) is primarily informed by the beta estimates of the existing Australian comparator set of 9 firms, which show that:

- the longest period available estimates have remained relatively stable despite recent market volatilities
- the recent 5-year estimates have declined notably in early 2020.

Our approach has been to place most weight on the long-run estimates while also being informed by the recent 5-year data. However, we have placed less weight on the reductions in the short-run estimates than we would have otherwise because:

- the 5-year estimates are only available from 3 comparator firms (Spark Infrastructure, AusNet, and APA) and may not fully reflect the true trend
- 5-year estimates of international energy firms have tracked in the opposite direction.

In this review, a key issue on equity beta is the diminishing number of the Australian comparators we use for estimating beta. This has declined from 3 in the 2018 review to being just one (APA) – Spark Infrastructure and AusNet having recently been de-listed due to takeovers. For the majority of the time period since 2018, we still had data from these 3 firms, but this underlines a challenge to our current approach going forward.

Some stakeholders considered that data from international energy firms may contain useful information. We have considered issues around using international energy firms in the past. In our 2018 review, we reported beta estimates of a group of international energy firms, which was used as a crosscheck only. We have continued to update their beta estimates in

5 See Table 7.5 in section 7.2.2.3.

our rate of return annual update since then to inform stakeholders' consideration and our own analysis of this matter.

We have also engaged on this issue as part of our working paper series, commissioned a number of expert reports, and detailed our considerations in our final omnibus working paper released in December 2021. Having considered the latest submissions and other relevant evidence before us, our view remains that there are likely considerable complexities around developing an approach involving using international firms as comparators. In particular, international firms likely have different characteristics and operating and market environments to the regulated 'pure play' Australian energy network businesses and, as a result, may not be directly comparable to those we regulate.

We have also considered a number of other issues relating to equity beta including setting a separate equity beta for the regulated gas networks and the potential low beta bias. On those issues our draft decision is to maintain the 2018 Instrument approach (discussed in detail in chapter 8).

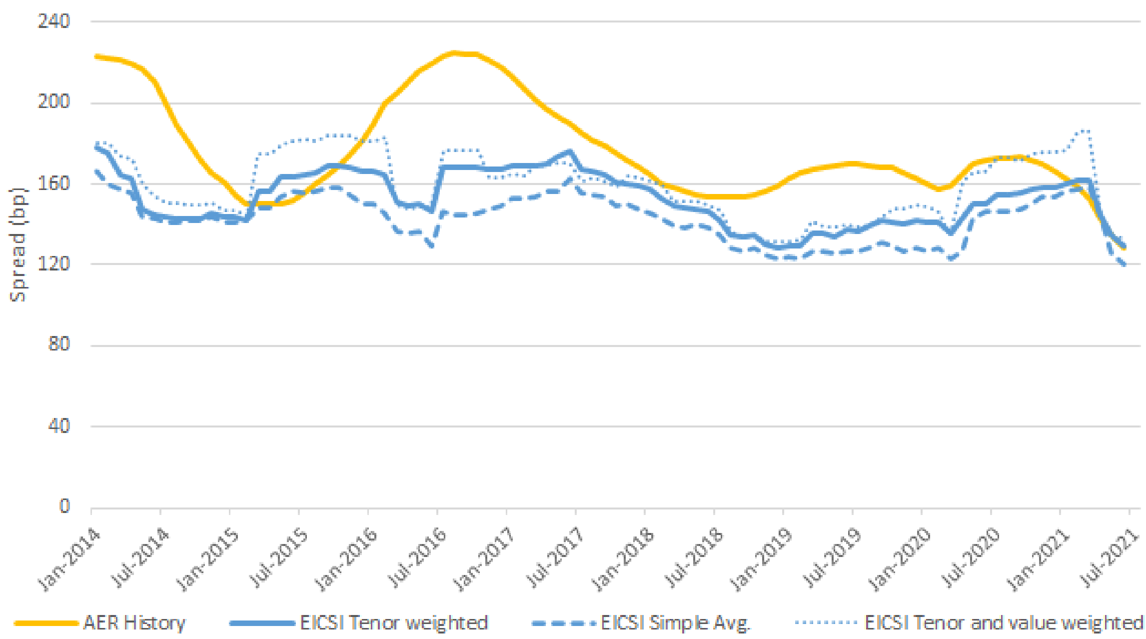
Use of our industry debt index

We developed the Energy Infrastructure Credit Spread Index (EICSI) in 2018 with assistance from Chairmont using actual debt issuance data obtained from regulated NSPs. It reports a rolling 12-month historical average of credit spreads across all new debt instruments issued by privately owned NSPs.[6]

The EICSI provides an indication of the cost of NSP-issued debt to compare with our estimate of the cost of debt. The primary EICSI metric is the spread over the swap rate (credit spread), which is similar to the debt risk premium. This allows us to monitor the performance of our benchmark return on debt against NSPs' actual cost of debt. Figure 0.3 shows our most recent update of the index

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

Figure 0.3 Comparison of EICSI 12-month rolling average (unweighted, tenor weighted and tenor and face value weighted) against AER A/BBB (10-year term) estimate (January 2014 to June 2021)



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

Figure 0.3 shows that the EICSI has remained below our benchmark for almost the entire period observed. We have conducted analysis of this discrepancy. We have also explored improvements and adjustments to the index and employed a number of these changes. However, we do not consider that the current data suggests the observed outperformance is material and persistent at this time. We acknowledge that term appears to be a key driver of the observed outperformance, but we do not consider there is sufficient evidence that 10 years is no longer an appropriate benchmark. We also consider there to be significant practical limitations on implementing an adjustment to term to reflect the results of the EICSI.

Our decision is to maintain our current approach of using the EICSI as a ‘sense check’ on our benchmark return on debt. We considered further options in our working papers of using the results of EICSI in a more formulaic way. For example, making adjustments to the benchmark credit rating or term to reflect the EICSI and remove any potential differential. For this draft decision we are not proposing to adjust our approach to estimating the return on debt on the basis of the EICSI because our conclusions drawn from the data and the practical limitations that are present.

Weighted trailing average return on debt

In this draft decision, we propose to maintain the 10-year simple trailing average approach with annual updates as adopted in the 2018 Instrument to determine NSPs’ return on debt allowances. We propose to continue the transition that has commenced in a previous determination for an NSP and allow NSPs to complete the 10-year transition period from the previous 'on the day' approach to the trailing average approach.

In our working paper series, we considered implementing a weighted trailing average approach to account for expected large projects to be undertaken in the next few years in line with NSPs' transition towards renewable energy, which will require large capital investments. We examined whether a weighted trailing average may better align with the NPV=0 condition and so may better promote efficient investment. However, in our analysis, we identified a number of issues that could mitigate potential benefits provided by a weighted trailing average, while adding significant complexity.

Compared with the simple trailing average, a weighted trailing average would better satisfy the NPV=0 condition if the benchmark business:

- raised extra debt beyond the 10% level of its existing debt balances
- financed its new capital investment by issuing debt and equity in the proportion consistent with the benchmark gearing ratio.

However, we are not certain a benchmark business would find it efficient to increase debt raising significantly beyond 10% of its debt balance in a year to raise large amounts of capital for new projects. Instead, the benchmark business is likely to issue proportionately more equity than that consistent with the benchmark gearing level, especially at the project's early stages. We note that the businesses we regulate adjust their gearing depending on their individual circumstances even though we set a benchmark allowance. This is intended under our incentive framework. The benefit provided by a weighted trailing average is diminished under such conditions.

Even when a benchmark business does raise its debt issuance beyond 10% in a year, there are administrative complexities and practical difficulties with implementing a weighted trailing average. We considered whether to set the weights using forecasts or through a true-up after actual capital expenditure is known.

The effectiveness of using a forecast depends on the accuracy of the forecast. We have observed that forecast capital expenditure in the Post Tax Revenue Model (PTRM) differs, both in timing and magnitude, from actual capital expenditure. In particular, we frequently see projects that are delayed by several years. This means weights based on PTRM debt issuance assumptions may not be reflective of the actual debt costs.

Using actual capital expenditure to set the weights would result in the need to apply a true-up mechanism. Application of such a mechanism would add complexity and may also result in uncertainty because the true-up could occur under a different Instrument.

Further, we have compared outcomes under the simple and weighted trailing average across a range of scenarios over the next 5 years. We see that the difference between the 2 approaches varies considerably across our scenarios. In a range of cases the difference is not material.

For the weighted approach to produce a materially different outcome there needs to be both a very large increase in capex and interest rates. The business that is most likely to be impacted is Transgrid as it is expecting to undertake a number of large transmission projects as part of the Integrated System Plan. Transgrid did not support the weighted approach. We observe that Transgrid’s regulated asset base is likely to increase progressively as new projects are undertaken and commissioned. The immediate impacts in this regulatory period may therefore be modest. Further, the timing of Transgrid's regulatory cycle means that the 2026 rate of return instrument will apply to its 2028 regulatory determination and adjustments can therefore be made if issues arise.

While some of the future large new projects would be undertaken by the incumbent NSPs, there is potential for new entrants into the sector. The current simple trailing average approach with the transition period arrangement of starting with on the day cost of debt will go some ways to mitigate any mismatch between the return on debt allowance and cost of debt for new NSPs. This is due to the design of the 10-year transition period arrangement, which places greater weight on the prevailing cost of debt, which then gradually reduce to 10% each year at the end of the transition period.

Finally, many submissions to our Information paper also generally supported retaining the current approach, noting that it had the most merit, and the case for change has not yet been made.

As such, at this time we consider it is not sufficiently necessary to make a change from our current simple trailing average approach. We intend to continue to monitor debt financing practices of the NSPs and revisit the issue in our 2026 Instrument review.

Other topics

In this section we discuss a few topics that are important for our decision but do not feature in our list of priority topics.

Gearing

To apply our nominal vanilla weighted average cost of capital (WACC) formulation we need an approach for combining the return on debt and equity. Our approach is to combine them according to the ratio of debt to total debt and equity. This is known as the gearing ratio. We have reviewed the latest data on the level of gearing adopted by our comparator firms. Our review can be found in chapter 4.

In summary, we have concluded to continue using our current benchmark gearing ratio of 60%. The most recent data is showing average gearing slightly below 60% but there is some variability in the data. We are not sufficiently confident in the trend of the data to lower our gearing at this point. In addition, we note that the overall WACC does not vary materially with gearing due to the two offsetting effects of gearing on the overall WACC value. Therefore, we consider the benefits of maintaining consistency in our approach outweigh the potential benefits of a change.

Gamma

Under the Australian imputation tax system, investors receive imputation credits for tax paid at the company level. For eligible shareholders, imputation credits offset their Australian income tax liabilities. The value of imputation credits (known as gamma or 'γ') needs to be factored into regulation to recognise that imputation credits benefit equity holders, in addition to any dividends or capital gains they receive.

Because we use a post-tax framework with a rate of return after company tax but before personal tax, the value of imputation credits is not a WACC parameter. Instead, it is a direct input into the calculation of a regulated firm's tax liability, via the corporate tax component of the building block model.

Our draft decision is to adopt the same approach as the 2018 instrument when estimating gamma. This involves:

- using the 'utilisation' approach, under which gamma is equal to the product of 2 parameters – distribution rate and utilisation rate
- using the same data source to inform estimation of the 2 parameters.

Applying this approach, we have adopted the same values for the distribution rate (0.90) and utilisation rate (0.65) resulting in a gamma of 0.585 as in the 2018 instrument.

Gamma has been considered in great depth in the past. Our approach has also been tested in a number of court cases with our approach found to be open to us by the Full Federal Court.

Given this our consultation to date has focused on a couple of discrete issues. Having considered submissions and information before us, we do not believe there is sufficient evidence that warrants a change to our approach (gamma is discussed further in chapter 10).

Crosschecks of the rate of return

We have explored a range of measures that might provide some insight into the suitability of our overall rate of return. All of these measures suffer limitations, but collectively may provide a sense check of our overall outcome.

After reviewing the available cross checks, we consider that there is a level of support for our overall approach, although this is not universal across all of the cross checks.

In our final working paper, we identified 6 potential cross checks. Out of the six we think that financeability tests, RAB multiples and scenario testing have the most to offer and we focus on those below. For information, we include a brief overview of the other cross checks we have reviewed at the end of the section.

Financeability tests

Financeability tests aim to assess whether a business is able to raise debt capital at a given credit rating. In practice these assessments are undertaken by rating agencies and are informed by subjective judgements and financial metrics. Therefore, it is not possible to undertake a hypothetical assessment for a benchmark firm with precision. As such, regulators typically condense their analysis to a review of financial metrics against a benchmark rule of thumb. The most common ratio used is funds from operations to net debt (FFO to net debt). It is a measure of free cashflow and tends to be assessed against a benchmark of 7%.

This analysis is limited because:

- it does not include the subjective component undertaken by rating agencies
- the 7% benchmark is itself subjective.
- most importantly, financeability is actively managed by the firm to optimise debt costs. Financeability is especially sensitive to the choice of amount of debt compared with equity. In the past few years, we have seen regulated firms actively choose a higher level of debt, recognising this could lead to a credit rating downgrade.

What the data shows

In 2018 we calculated FFO to net debt for each of the businesses we regulate. We did these calculations based on our benchmark gearing of 60% because we wanted to test our benchmark rather than the actual position of each business. This analysis showed variation across businesses, but 21 out of 29 were able to meet the 7% rule of thumb.

We repeated this analysis for our final working paper using 2021 data. The results showed 24 of the 32 firms met the 7% rule of thumb, as seen in Table 0.3 below. These results suggest that financeability has not deteriorated under the 2018 Instrument. Higher depreciation and revenue adjustments seem to have offset the decline in return on equity. We also note that, since publishing our financeability analysis in December 2021, stakeholders have not raised issues that would suggest we need to revisit our analysis or to re-consider our interpretation of the results. The results are summarised in Table 0.2 below.

Table 0.3 Update of 2018 Instrument FFO/net debt analysis

Measure	2018	2021 (2018 firms)	2021 (all firms)	2021 (firms not in 2018 analysis)
Number of firms	29	29	32	3
Average FFO/net debt	8.44%	8.32%	8.33%	8.42%
Industry average return on equity	7.06%	5.86%	5.78%	5.00%
Number of firms with less than 7% FFO/net debt	8	7	8	1
Number of firms with higher FFO/net debt compared with 2018		12 out of 29		
Average increase in FFO/net debt		0.89%		
Average decrease in FFO/net debt		-0.82%		

Source: AER, *Rate of return final omnibus paper*, Table 17, p.127.
Note: Net debt is estimated as the average of opening and closing debt proportion (60%) of the RAB. Average change in FFO/net debt is the simple average of the difference between each firm's 2018 estimate to the 2021 estimate. We estimated each firm's FFO/net debt as the average over the relevant five-year period.

RAB multiples

Regulated asset base multiples (RAB multiples) are a measure of the value of the firm compared with the RAB. The equity value of the firm is measured according to the value of its shares. These values can be observed continuously if the firm is listed on the share market (known as trading multiples) or observed at a point in time where a large parcel of shares is exchanged or through a takeover of the firm (known as transaction multiples).

There is disagreement among stakeholders and experts about the merit of RAB multiples as a cross check. This disagreement arises because RAB multiples can be influenced by a range of factors beyond the regulated rate or return and return on equity. These factors include:

- firms undertaking business activities beyond the regulated element ("unregulated business")
- control premium, overpayment or "winner's curse"
- incentive rewards and outperforming price control targets
- expected growth in unregulated business and/or incentive rewards or outperformance.

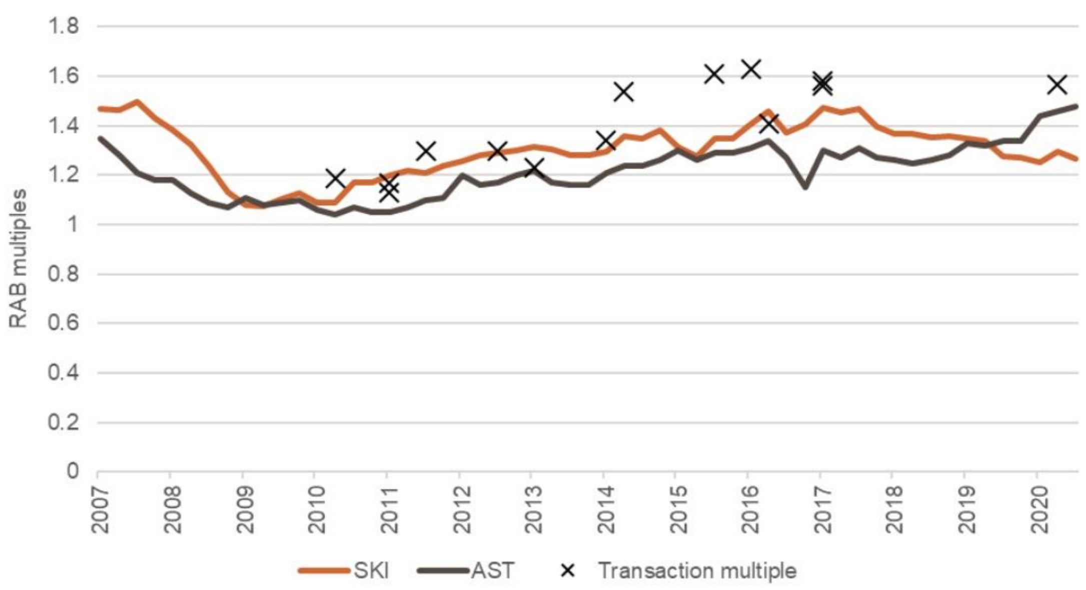
The CRG submits that RAB multiples are important and can provide additional relevant information that cannot be ignored or assigned to simply a role as a 'sense-check'. At the other extreme, the Network Shareholders Group (NSG) stated that RAB multiples provide '…no information at all on the sufficiency of regulated returns'.

We accept that care is needed in the interpretation of RAB multiples, but we do not think it is credible to say that RAB multiples contain no information at all. Where businesses have a large proportion of their revenue derived from regulated activities, we think the rate of return and the return on equity are likely to be material contributors to the value of the firm and this will be reflected in the RAB multiples. In the case of Spark Infrastructure and Ausnet Services, around 72% and 85% of revenue is from regulated services.

What the data shows

We have been tracking RAB multiples since 2007 as shown in Figure 0.4 below

Figure 0.4 AER regulated networks - transaction and trading multiples



We observe:

- RAB multiples have varied over time from a low of 1.0 to a high of 1.6.
- Transaction multiples have tended to be higher than trading multiples.
- RAB multiples have generally shown an upward trend since 2010 – this has been over the period where our regulated return on equity has been tracking lower with the risk-free rate.

In our final working paper, we concluded:

> We cautiously note that the information would suggest our current and expected rates of return are at least sufficient (as part of the overall regulatory compensation to investors) and potentially higher than that needed to attract investment.

Since that conclusion we have seen competitive bidding for AusNet Services between Brookfield and APA.

In addition to reviewing raw RAB multiples we have been undertaking work to disaggregate some of the components implicit in RAB multiples. We recently published a report prepared by CEPA undertaking this analysis. We have yet not tested this report with stakeholders and so we do not give it weight for this draft decision. We welcome stakeholder views to inform our final decision.

Scenario testing

In this explanatory statement, we make a distinction between sensitivity analysis and scenario testing. We describe sensitivity analysis as an approach for observing movements in the rate of return to movements in the underlying parameters. We describe scenario testing as an approach for observing rate of return outcomes in different states of the world. Variations in the return on equity are of most interest for this review, but by making some assumptions these results can be extended to the overall rate of return, revenues and prices.

There has been some debate amongst stakeholders about the value of this type of analysis and the methodology that should be employed. The strengths of scenario testing are that:

- it allows stakeholders, including us, to see the rate of return under different conditions and states of the world
- it may act as a sense check for our rate of return if properly implemented especially because the rate of return Instrument is fixed for the duration of its application (that is, 4 years).

We have undertaken a suite of sensitivity tests across multiple facets of the instrument. We have chosen variations in the underlying parameters that are large enough to illustrate the respective sensitivity. We do not make any judgement about the likelihood of these variations. We also acknowledge that more extreme sensitivities could be explored. Table 0.4 provides a list of all the tests undertaken.

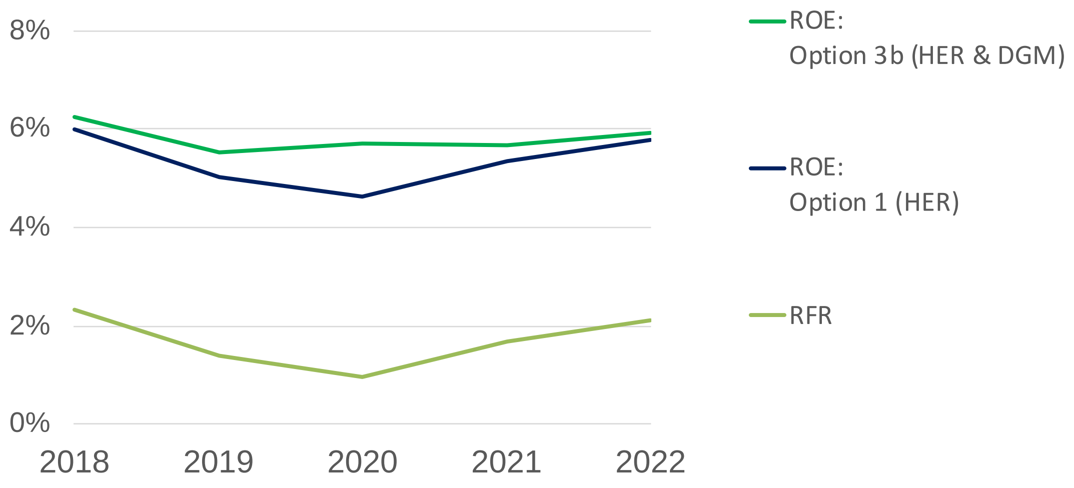
Table 0.4: Sensitivity testing

Test undertaken	Description	Results
MRP	Comparing outcomes of the following MRP options: • Historical excess returns (HER) • combined HER and 3-Stage DGM	Under the HER approach, if interest rates change by ±3%, we estimate: • an ROE impact of ±3% • a household bill impact of ±$96. Under the combined HER and 3-Stage DGM approach, if interest rates change by ±3%, we estimate: • an ROE impact of ±2.3% • a household bill impact of ±$74.
Beta	Using differing beta values to examine the impact on: • ROE • revenues • household bills	We estimate that each ± 0.1 change in beta has the following impacts: • ± 0.7% on ROE • ± 2.2% on Revenues • ± $22 per year on household bills.
Term	Using a 10-year and 5-year term to examine the impact on ROE.	Based on observed spreads between 10-year and 5-year government bonds, we estimate that the change from 10-year term to 5-year term will: • reduce the ROE by approximately 0.3% • reduce household bills by approximately $10 per year. However, the impact over short periods could be between $1 and $26 per year.

What the data shows

- How the return on equity varies with the risk-free rate:
  - We explore movements in the return on equity for differing values of the risk-free rate under 2 options for setting the market risk premium:
    - setting a fixed MRP based on historical excess returns (HER) (this draft decision option 1) and
    - allowing the MRP to vary based on a combination of historical excess returns and our 3-stage dividend growth model (option 3b).
- The results are summarised in Table 0.4. Key conclusions are:
    - based on current market rates at this time, the return on equity is similar under our 2 options for determining the MRP, as seen in Figure 0.5
    - if the risk-free rate changes in the future, the HER and DGM combination approach is likely to generate a more stable return on equity (and therefore prices) but this depends on how the DGM reacts to changes in the risk -free rate over time.

Figure 0.5: Comparison of ROE for Option 1 and Option 3b



Source: AER analysis

Note: Option 1 resulted in a lower return on equity for most of the 2018 instrument years, although rising risk-free rate values in 2022 bring both options to approximately the same level.

- How the return on equity varies with beta:
- We considered whether there was evidence to support an equity beta between 0.5 and 0.7. The 2018 Instrument used an equity beta of 0.6. We estimate that each ± 0.1 change in beta has the following impacts:
  - ± 0.7% on ROE
  - ± 2.2% on revenues
  - ± $22 per year on household bills
- Overall, we were confident that an equity beta of 0.6 was well supported by the evidence.
- How the return on equity varies with the term of the return on equity:

  For this scenario we analysed the difference between the 10-year and 5-year government bonds, to estimate the plausible impacts of using a 5-year term compared with a 10-year term for the return on equity (see Figure 0.2).
- Based on the observed spreads from 2010 to 2022, the difference between the 10-year and 5-year government bonds was approximately 0.5% on average. To reflect this in the SL CAPM, we assume the RFR is 0.5% lower under a 5-year term compared with a 10-year term. When combined with our MRP estimation being 0.3% higher, a beta of 0.6, and gearing of 60%, the return on equity would be 0.3% lower, if this average persists in the future. This would in turn reduce household bills by $10 per year. If we refer to the period 1988 to 2022 the difference between 10-year and 5-year government bonds was smaller, at approximately 0.3% on average. Using the same method outlined above, this would suggest a smaller reduction in household bills of $3 per year.

We have also considered 3 possible states for scenario testing:

- a low interest rate environment

- a high interest and high inflation environment
- a low economic growth environment.

We do not express any view about the likelihood of these scenarios. We have chosen them because they span a range of environments. In broad terms we are satisfied with how this draft Instrument would operate under a range of conditions. This is likely to be in the long-term interests of consumers because it provides a stable environment to support the efficient investment that consumers need in a range of circumstances. Consumers have told us that they value stability. In terms of return on equity, we find that an approach that uses a DGM to estimate the market risk premium is likely to produce a more stable return on equity and prices over time. But it may also lead to a higher overall return on equity on average. We find there is an advantage in estimating the market risk premium using historical excess returns because it allows the return on equity to move more in line with the base cost of money (the risk-free rate).

Historical profitability

Over the past few years, we have been expanding our reporting of historical profitability measures. They are reported in our annual network performance reports. In September 2021 we reported on the return on regulated equity (RoRE).

What the data shows

Our conclusions from the 2021 performance report were that from 2014 to 2020:[7]

- average electricity network returns on regulated equity declined materially
- despite this, electricity networks achieved returns on regulated equity that exceeded forecast returns on equity by approximately 4.2%
- this occurred against a backdrop of declining forecast returns on equity and this decline has progressed as:
  - interest rates have declined, including the rates on Commonwealth Government Securities based on which we forecast the risk-free rate
  - we have applied the 2013 Rate of return guideline and, from 2020, have begun to apply the 2018 binding Rate of Return Instrument – so far, the 2018 Instrument has applied to 5 DNSPs and one TNSP
- the difference between forecast and real returns was higher in the earlier years and narrowed materially after the introduction of the 2013 Rate of return guideline.

Our analysis of this crosscheck clearly shows RoRE declining with interest rates in combination with the progressive application of the 2013 Rate of return guideline and the 2018 Instrument. But it also shows average returns significantly above our regulated return due to a range of factors including the incentive framework we operate. However, this

[7] AER, Electricity network performance report, September 2021.

crosscheck does not provide an insight into whether lower returns on equity, of themselves, are appropriate or problematic.

Investment trends

The rationale for why investment trends can provide some indication of the rate of return is that:

- an allowed rate of return that is too high may encourage inefficient overinvestment
- an allowed rate of return that is too low may discourage efficient investment.

A key issue with using investment trends as a cross check is that investment levels are determined by many factors and rate of return is only one of these factors. For example, a comparison between pre-2013 and post-2013 investment would need to consider the network reliability standard changes in New South Wales and Queensland in 2005, and the rollout of mandatory smart metering in Victoria, over this period.

We are now moving into a period where substantial investment in transmission networks is required to support the shift to renewable energy sources. It is important that we consider this need as part of this review.

What the data shows

Therefore, it is not possible to draw conclusions about whether the rate of return has been set appropriately from previous investment trends.

Rate of return by other regulators and practitioners

This type of evidence can provide an indication of the required rate of return for the following reasons:

- Other regulators also set the rate of return for regulated businesses. Their estimates may be comparable with our rate of return because they are for businesses with similar risks and the other regulators may have similar objectives to us.
- Discount rates used by market analysts and valuation reports may be an indication of the rate of return expected by investors.
- Depending on the purpose of the discount rates used by statutory bodies, they may provide an indication of the rate of return expected by investors.

However, we also note a range of factors that limit the suitability of this type of information because of the difference in approach and characteristics of the regulated entities.

What the data shows

We have compared the return on equity that would be produced using our draft instrument with other regulators.[8] Compared with other local regulators our allowed return on equity is

[8] Using data as at month end February 2022.

lower. When compared with European regulators our return on equity is around the mid-point.

After re-considering other regulators' decisions, both in terms of the quantitative results and the methods used, we consider our December 2021 position holds: there is limited value in the use of other regulators' rate of return as a cross check. We note that differences in outcome reflect differences in the underlying methodology.

The decision in the round

We now step back and ask ourselves how this draft decision as a whole is sitting. In particular, we consider whether the NEO and NGO would be better advanced by continuing the 2018 Instrument (with parameters updated for latest data) or whether we can improve against the objectives by making changes.

Continuing the 2018 approach has aspects to commend it. Much of the data we have available to inform our decision is at similar levels now compared with 2018. Further, there is a level of support for the 2018 approach from the cross checks. The CRG has submitted that we should employ a principle of a high bar for change. We accept the general principle proposed by the CRG. Stability and predictability of the regulatory framework and its application is important for both investors and consumers. Stability and predictability promote efficient investment because investors and consumers can make commitments with confidence. They can reasonably foresee how they will be treated under the regulatory framework.

In contrast, we have identified one change we think would lead to a superior outcome – adjusting the term we use for estimating the return on equity. Although, this change may not shift the final rate of return by a large margin at this point in time, it will promote consistency in the regulatory framework. Without this change there is a risk that the inconsistency in our approach will cause material distortions. The change to the term of equity is also supported by the same basic propositions that led us to change our approach to estimating expected inflation.

We have also identified an option for estimating the market risk premium that may give a more stable return on equity through time (although that is not our preferred choice). This option involves using a combination of historical excess returns and outcomes from a dividend growth model to vary the market risk premium at each regulatory decision. This option may introduce a more forward-looking element if dividend growth models are able to reflect future changes in market conditions. This option also means our return on equity may not move one-for-one with the risk-free rate.

However, we think our current approach to estimating the market risk premium is a safer option because it is a well understood approach and can be readily estimated in advance. It has the desirable property of allowing the return on equity to vary with movements in market conditions (as reflected in movements in the risk-free rate). Our current approach also avoids implicitly introducing a relationship between the market risk premium and risk-free rate when such a relationship cannot be estimated with confidence.

To assist in resolving these choices we have returned to our overarching principle:

an unbiased estimate of the expected efficient return, consistent with the relevant risks involved in providing regulated network services.

We consider that the approach in the 2018 Instrument has delivered outcomes that are consistent with the relevant risks. As such, we think the NEO and NGO are best advanced by largely continuing our current approach. Minimising change is likely to promote stability and predictability and therefore, efficient investment.

However, using a 10-year term to estimate the return on equity is not consistent with the first element of the principle. Using a 10-year term is likely to lead to a biased outcome because our task is to set an efficient return for the next regulatory period.

In this draft decision we have chosen to change our approach to estimating the return on equity to use a term that matches the length of the regulatory period (typically 5 years), but otherwise apply the approach in the 2018 Instrument. This approach achieves a balance. By largely leaving our current approach in place we are able to promote stability and predictability. At the same time, making the change to the term of the return on equity removes a source of bias in our approach.

Table 0.5: Criteria of draft decision cross checks assessment

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information • (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and are informed by sound empirical analysis and robust data.	Our assessment of the overall rate of return through crosschecks considers relevant and verifiable market information, and reflects well-accepted economic and finance principles. For some individual cross checks, such as RAB multiples, we have sourced independent insights to support their use. The cross checks broadly support continuation of the 2018 instrument.
2	Fit for purpose • (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and consider the limitations of that purpose • (b) promote simple over complex approaches where appropriate.	Our draft decision is informed by the use of: • market data • financial models • other evidence (expert views, independent analysis) Our approach uses simple methods for estimation and testing. Where individual crosschecks do not meet this criterion, they have less of a role in informing our decision, namely: • Historical profitability • Investment trends • Information from other practitioners (other regulators and analysts).
3	Implemented in accordance with good practice • (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Our approach to applying cross checks is based on robust, transparent and replicable market based analysis in accordance with good practice. Where individual crosschecks do not meet this criterion, they are excluded from a role in informing our decision. Information from

Assessment criteria		Draft decision
		other practitioners (other regulators and analysts) have less value.
4	Where models of the return on equity and debt are used these are • (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation • (b) based on quantitative modelling that avoids arbitrary filtering or adjustment of data, that does not have a sound rationale.	Models underlying crosscheck analysis of overall rate of return are based on robust quantitative modelling and avoid arbitrary adjustments without sound rationale.
5	Where market data and other information is used, this information is • (a) credible and verifiable • (b) comparable and timely • (c) clearly sourced.	Market data and other evidence used for cross checks are from credible and verifiable and reflects latest data available at the time.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	Crosschecks have used the latest information available and consider shorter-term outcomes to the extent they reflect changing market conditions. Where individual cross checks do not meet this criterion, they are excluded from a role in informing our decision. Information from other practitioners (e.g. other regulators and analysts) has been excluded on this basis because there are issues with comparability and difficulties in updating to reflect changes.
7	The materiality of any proposed change.	Most of the 2018 Instrument remains appropriate. The change we are proposing to the term on equity is important for the integrity and consistency of our approach.
8	The longevity or sustainability of new arrangements.	The draft Instrument is largely a continuation of the 2018 Instrument. Our scenario testing shows that the draft instrument is robust to a range of potential states of the world.

1 Our review process

The current Rate of Return Instrument was published on 17 December 2018 (the 2018 Instrument). We are cognisant that the Rate of Return Instrument we publish is a binding instrument that will determine the allowed rate of return on capital in regulatory determinations for the following 4-year period. Given its material impact and binding nature, we need to ensure that we consider the evidence before us thoroughly and that stakeholders are offered the opportunity to present their perspectives. We consider it best practice to establish a clear process and to improve on the process used in the 2018 review.

On 4 November 2019 we released a consultation paper that proposed a pathway to the 2022 Instrument, together with a report by The Brattle Group summarising stakeholder feedback on the process used to set the 2018 Instrument.[9] Having considered submissions on our consultation paper and stakeholder feedback received by The Brattle Group on our 2018 Instrument making process, in May 2020 we published our position paper, *Pathway to the 2022 Instrument* (Pathway to 2022).[10] That paper focused on the decision-making process, not the content of the Instrument. It provided a high-level outline of the decision-making stages and our proposed timelines for them and outlined high-level roles for various entities involved in the consultation and review process. We also committed to publishing annual updates on key data series informing the rate of return and a series of working papers on technical aspects of the rate of return ahead of the 2022 Instrument making stage.

Our steps and processes include those prescribed in the National Electricity Law (NEL) and National Gas Law (NGL), such as the concurrent evidence sessions[11] and the Independent Panel review.[12]

We also established the Consumer Reference Group (CRG) to advise us on consumer engagement, to actively engage consumers and provide us with their insights.[13] The CRG is an important element in providing a strong consumer perspective in the consultation process given the challenges (such as resourcing, coordination and information asymmetry) facing individual consumers seeking to be heard.

In August 2021 we published our position paper on the Pathway to 2022 process, focusing on the Independent Panel and concurrent evidence sessions.[14] The concurrent evidence sessions allowed the AER Board to engage with expert views and obtain an overview to assist the Board to make its decision. The Independent Panel's work is intended to support the AER to make the best possible Instrument by reviewing the draft Instrument and the

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9 AER, *AER Consultation Paper – Pathway to 2022 Rate of Return Instrument*, November 2019; The Brattle Group, *Stakeholder Feedback on the AERs Process for the 2018 Rate of Return Instrument*, 27 June 2019

10 AER, *Pathway to 2022 Rate of Return Instrument – Position Paper*, May 2020

11 NEL, s18M; NGL, s30H

12 NEL, s18P; NGL, s30K

13 NEL, s18M(1) and s18N; NGL, s30H(1) and s30I

14 AER, *Pathway to 2022 Rate of Return Instrument – Position Paper*, August 2021

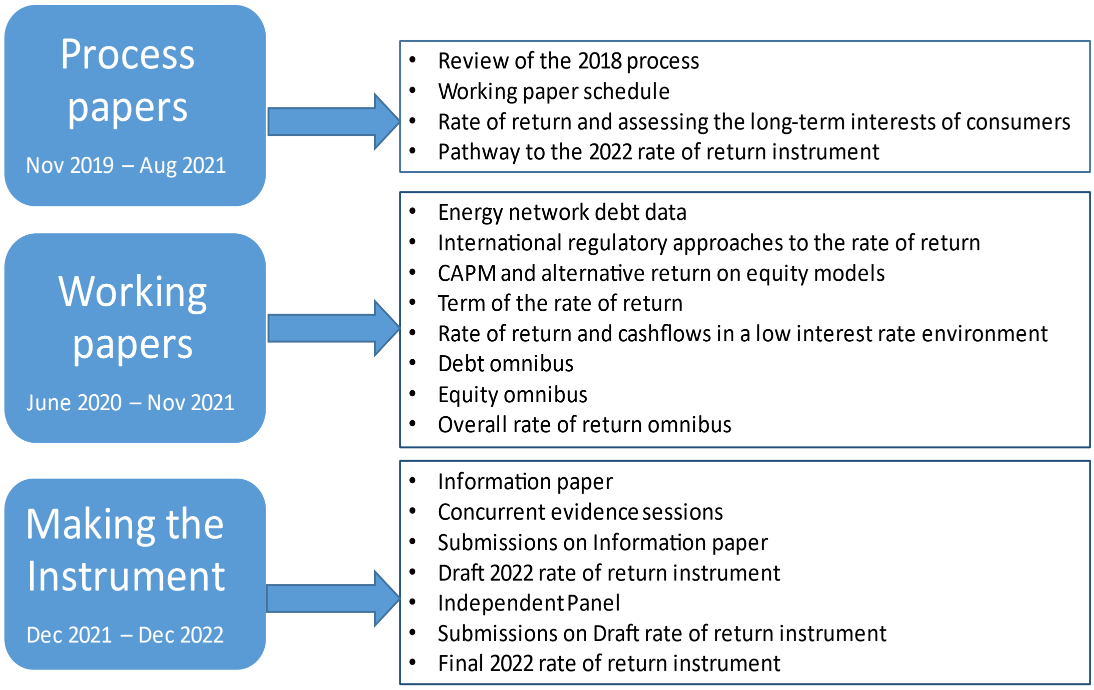
information available to us in making the 2022 Instrument. The questions for the Independent Panel are:

- In the panel's view, is the draft Instrument supported by evidence and reasons, taking into account competing factors such as accuracy, consistency, accessibility and transparency?
- In the panel's view, is the draft Instrument likely to contribute to the achievement of the National Electricity Objective and National Gas Objective?

Additionally, we established 2 other stakeholder groups, the Investor Reference Group (IRG) and Retailer Reference Group (RRG). These groups provided us more regular feedback from these stakeholders and have allowed us to hear different perspectives.

The major elements of our pathway to 2022 are illustrated in Figure 1.1.

Figure 1.1 Elements of the pathway to 2022



Working papers

Our approach to getting to this draft decision via our Pathway to 2022 was to transparently set out our thinking on the specific technical issues discussed in the working papers as the papers progressed through stakeholder engagement. All our working papers included a draft paper step, which provided us an opportunity to hear from stakeholders before finalising the papers. This draft paper stage included written submissions as well as a public forum where stakeholders discussed the material in our draft papers.

We covered 8 discrete topics in our working paper series. They were:

1) *Energy network debt data* – This paper explored options for using the Energy Infrastructure Credit Spread Index (EICSI) in the Rate of Return Instrument and recommended a preferred approach.[15]

2) *International regulatory approaches to the rate of return* – This paper analysed the decisions of international regulators and how they used different methods and data to set the rate of return. The paper outlined some ways this might influence the rate of return in our decisions.[16]

3) *CAPM and alternative return on equity models* – This paper identified our current understanding of various equity models and our preferred options for how they could be used to determine the rate of return.[17]

4) *Term of the rate of return* – This paper investigated the appropriate term for the return on equity and return on debt. The paper also considered whether the terms for equity, debt and expected inflation should be aligned.[18]

5) *Rate of return and cashflows in a low interest rate environment* – This paper considered the consequences of lower interest rates and investigated whether we need to adjust our approach to the rate of return.[19]

6) *Overall rate of return* – This draft paper provided an overview of our rate of return framework, our decision-making process and our positions to date. It also explored a number of discrete topics that were not captured in the other working papers.[20]

7) *Equity omnibus* – This draft paper explored a number of technical aspects of estimating the expected return on equity. In particular, we wanted to check that the approach we employ is robust in a range of market conditions.[21]

8) *Debt omnibus* – This draft paper discussed the data that is available to allow us to set a return on debt that aligns with the debt costs that network businesses experience.[22]

The last 3 topics were separately published at the draft stage but combined to one omnibus final working paper.[23]

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[15] AER, *Energy Network Debt Data – Final working paper*, 18 November 2021

[16] AER, *International regulatory approaches to rate of return – Final working paper*, 16 December 2020

[17] AER, *CAPM and alternative return on equity models – Final working paper*, 16 December 2020

[18] AER, *Term of the rate of return & Rate of return and cashflows in a low interest rate environment - Final working paper*, September 2021

[19] AER, Term of the rate of return & Rate of return and cashflows in a low interest rate environment – Final working paper, September 2021

[20] AER, *Rate of return - Overall rate of return draft working paper*, July 2021

[21] AER, *Rate of return - Equity draft working paper*, July 2021

[22] AER, *Rate of return - Debt draft working paper*, July 2021

[23] AER, *Rate of return - Final omnibus paper*, December 2021

Our working paper series allowed us to explore a large number of issues across the breadth of rate of return and has provided an important check that we have not missed any key aspects requiring consideration and potential change. Through our working papers, we were genuinely looking for issues that might be impacted by new theoretical and empirical evidence since the previous review. Through the working paper series, we were able to transparently put forward positions on our preliminary thinking and seek to narrow down the issues in contention and put forward our preliminary positions on issues. In some instances, we were satisfied to put forward preferred or preliminary positions on our thinking. A preferred position is one that we have taken after having considered extensive evidence and the results of consultation, but where we are open to considering additional evidence. A preliminary position indicates our initial thoughts on the issue. Where we considered an issue needs more analysis and wider input, we indicated an open position.

Our working papers traversed a large number of issues, but we have managed to narrow the issues to a small number of matters of methodology. While there was some debate whether a specific issue needed consideration via a working paper, stakeholders largely agreed with our consultative open engagement approach to the narrowing of issues.

Once we had completed the first 5 working papers listed above, we set out all of the issues explored and our preliminary thinking on each of them in our *Overall rate of return draft working paper*.[24] Thereafter, having considered stakeholder submissions, we identified that the issues that had some disagreement were narrowed down to 6 key topics. Our omnibus final working paper focused on these 6 topics.[25]

In December 2021 we published our information paper, which was the first paper in the 'Making the Instrument' set of papers which take us from the positions set out in the individual working papers to the final 2022 Instrument. The purpose of this paper was two-fold:

- to set out priority topics for the concurrent evidence sessions
- to call for submissions to inform our Draft rate of return Instrument.

Our information paper also set out the material that we had previously considered on each topic and included a hyperlink to the relevant document so that stakeholders could easily find the relevant material.

Transcripts of our concurrent evidence sessions are available on our website.[26] We received 16 submissions, which are listed in Appendix A, and Appendix B provides a summary of the key points contained in those submissions.

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24 AER, *Rate of return - Overall rate of return draft working paper*, July 2021

25 AER, *Rate of return - Final omnibus paper*, December 2021

26 AER, *Rate of Return Instrument 2022*, 11 April 2022, https://www.aer.gov.au/publications/guidelines-schemes-models/rate-of-return-instrument-2022/initiation

Table 1.1 sets out the issues we canvassed, their position in our 2018 Instrument and how they progressed through our working paper series. Our positions fell into:

- those where we have a preferred position (blue highlight / A)
- those where we have a preliminary position (yellow highlight / B)
- those where we have taken no position and are seeking views (green highlight / C).

The table also sets out the positions in this 2022 Instrument draft decision.

Table 1.1 Rate of return issue and positions

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
Energy network debt data	Use the EICSI as a crosscheck for benchmark credit rating.	A EICSI is to be used directly to determine the benchmark blend of A and BBB bonds.	B Preliminary position is to further analyse and consult on whether the residual outperformance identified, or departures on term, should be adjusted for and what form such an adjustment may take.	Use the EICSI as a 'sense check' on our benchmark return on debt.
	Use the weighted average term to maturity at issuance (WATMI) as the floor of possible options for the benchmark debt term.	B An updated WATMI, combined with the more detailed drawdown data, may be useful in determining a benchmark debt term.	B Preliminary position that the WATMI can be useful in determining the benchmark debt term. Open to considering change to the benchmark debt term further but note the practical difficulties and further analysis required.	Analysis of industry debt data does not show clear evidence that the current benchmark of 10 years is no longer an appropriate benchmark term. Maintain the benchmark return on debt term at 10 years.
International regulatory approaches to the rate of return	Review of Instrument to be held every 5 years consistent with legislation. Annual updates to be undertaken each year.	A Review of Instrument to be held every 4 years consistent with legislation. Annual data updates published.	–	Review of Instrument to be held every 4 years consistent with legislation. Annual updates to be undertaken annually.
	Set the risk-free rate only at the beginning of each reset period.	A Set the risk-free rate only at the beginning of each reset period.	–	Set the risk-free rate only at the beginning of each reset period.
	Make no adjustments for expected incentive scheme outcomes.	A Make no adjustments for expected incentive scheme outcomes.	–	Make no adjustments for expected incentive scheme outcomes.
CAPM and alternative return on equity models	Standard Sharpe-Lintner CAPM model used as the basis for determining the return on equity.	A Standard Sharpe-Lintner CAPM model used as the basis for determining the return on equity.	–	Standard Sharpe-Lintner CAPM model used as the basis for determining the return on equity.
	The term of equity and debt were of 10-year duration.	B	A	Terms of equity, debt and inflation do not have to be of the same value.

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
Term of the rate of return		It is unnecessary to align the term of equity, debt and expected inflation.	Preferred position is that the terms of equity, debt and inflation do not have to be of the same value.	
	10-year term for return on equity, consistent with life of underlying asset.	C 10-year term consistent with existing practice or 5-year term for return on equity, consistent with length of the regulatory period.	C This topic remains open and we will continue to consult on this topic as part of our 2022 review including at the concurrent evidence sessions. We still considered that there are merits with matching the equity term to the length of the regulatory period despite not receiving strong stakeholder support.	Term for return on equity that is consistent with length of the regulatory period.
	Return on debt determined through a trailing average approach.	A Return on debt determined through a trailing average approach.	A Preferred position is to estimate the return on debt through a trailing average approach.	Return on debt determined through a trailing average approach.
	10-year term for return of debt.	B Match the term of the return on debt to that of an efficient firm's borrowing.	B Preferred position is to match the term of the return on debt to that of an efficient firm's borrowing based on Dr Lally's advice. Preliminary position is that the WATMI can be useful in determining the benchmark term but note the practical difficulties of change and further analysis required.	10-year term for return of debt.
Rate of return and cashflows in a low interest rate environment	–	A We are currently in a low interest rate environment.	–	–
		A The reduction in our return on debt has been in line with movements in the broader market for debt and the costs the regulated businesses face.	–	

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
	Commonwealth Government Securities are an appropriate proxy for the riskless investment for our purposes.	A Commonwealth Government Securities are an appropriate proxy for the riskless investment for our purposes.	–	Commonwealth Government Securities are an appropriate proxy for the riskless investment for our purposes.
	Measures of financeability are not used directly when setting the rate of return.	B Measures of financeability are not used directly when setting the rate of return.	B Consistent with our preliminary position on overall crosschecks, our preliminary position is that we intend to review financeability tests as a sense check on our overall allowed rate of return.	Measures of financeability are not used directly when setting the rate of return.
Equity omnibus	Use comparator set of 9 Australian firms to estimate equity beta.	B Use comparator set of 9 Australian firms to estimate equity beta.	A Our preliminary position is to maintain the current approach for estimating beta. This includes retaining the current comparator set. We need to lay the foundation for future reviews to consider approaches that may involve being informed by international energy firms and domestic infrastructure firms.	Use comparator set of 9 Australian firms to estimate equity beta.
	Give the greatest weight to equity beta estimates from the longest estimation period.	A Give the greatest weight to equity beta estimates from the longest estimation period.	A Our preliminary position is to continue to place most weight on the longest period estimates.	Give the greatest weight to equity beta estimates from the longest estimation period.
	Set a forward-looking market risk premium.	A Set a forward-looking market risk premium.	–	Set a forward-looking market risk premium.
	Diminished confidence in the use of dividend growth models.	C Consider if the dividend growth model might be used to inform the relationship between the MRP and risk-free rate.	C Open to considering the use of estimates from the dividend growth model to inform our point estimate of	In determining the MRP, we do not use estimates from the dividend growth model to inform our point estimate of the MRP within the range

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
			the MRP within the range observed from the evidence we look at.	observed from the evidence we look at.
		–	C Open to considering the use of estimates from the dividend growth model estimate(s) alongside the historical excess returns estimate by applying a method to give weight to both sets of estimates.	Although we have considered using dividend growth model estimate(s) alongside the historical excess returns estimate by applying a method to give weight to both sets of estimates, given features of its application remain unresolved at this point in time we do not use this approach to determine the MRP.
	In determining the MRP, consider the historical excess return, both the arithmetic and geometric mean MRP, and MRP surveys and conditioning variables.	A In determining the MRP, consider the historical excess return, both the arithmetic and geometric mean MRP, and MRP surveys and conditioning variables.	C Open to considering the historical excess return, both the arithmetic and geometric mean MRP, and MRP surveys and conditioning variables.	In determining the MRP, we had regard to the historical excess returns using both the arithmetic and geometric mean, MRP surveys and conditioning variables, and set the value of the MRP using the arithmetic average.
	No reliance placed on the Wright approach.	C Consider the potential for a relationship between the MRP and risk-free rate, and whether an appropriate implementation method is available.	A Not pursue the potential for a relationship between the MRP and risk-free rate, and whether an appropriate implementation method is available.	No reliance placed on the Wright approach.
	Allow networks flexibility in nominating the averaging period for the risk-free rate.	A Allow networks flexibility in nominating the averaging period for the risk-free rate.	–	Allow networks flexibility in nominating the averaging period for the risk-free rate.
	Averaging period was between 20 and 60 consecutive business days within a window running from between 3 and 7 months prior to the commencement of the regulatory control period.	A Shift the allowed nomination period window for the risk-free rate forward in time by one month to lessen timing issues.	–	Averaging period was between 20 and 60 consecutive business days within a window running from between 4 and 8 months prior to the commencement of the regulatory control period.

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
	Use crosschecks to inform our overall return on equity point estimates.	B Use crosschecks to inform our overall return on equity point estimates.	–	Use crosschecks to inform our overall return on equity point estimates.
	Adopt a single benchmark for electricity and gas businesses.	B Adopt a single benchmark for electricity and gas businesses.	A Our preliminary position is to continue to adopt a single benchmark for electricity and gas businesses and to consider gas network stranding risk under the broader regulatory framework. We are open to considering further evidence on this matter.	Adopt a single benchmark for electricity and gas businesses.
	Do not adjust for 'low beta bias'.	–	A Our preliminary position is to not adjust for 'low beta bias'.	Do not adjust for 'low beta bias'.
Debt omnibus	Application of a simple trailing average approach to determine the return on debt, with a 10% weighting for each of the 10 years.	C Seek views on weighting trailing average approach by capex spending.	C We will continue to explore and analyse the available options: • Option 1: Maintain the current (simple trailing average) approach. • Option 2: Weighted trailing average that applies to every regulated business. Weights are based on the debt issuance assumptions in the PTRM. • Option 3: Weighted trailing average only starts to apply when a large increase in the regulatory asset base (RAB) (and therefore debt issuances) is forecast. We would need to set a threshold for the shift to a weighted trailing average. Once the weighted trailing average is triggered,	Application of a simple trailing average approach to determine the return on debt, with a 10% weighting for each of the 10 years.

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
			weights are based on the debt issuance assumptions in the PTRM. • Option 4: Weighted trailing average that applies to all TNSPs. Weights are based on the debt issuance assumptions in the PTRM. Our preliminary position is that if a weighted trailing average (using any of the above options) was to be adopted, it should be based on the debt issuance assumptions in the PTRM.	
	The debt averaging period must start no more than 16 months before the regulatory period and finish no less than 4 months prior to the commencement of the regulatory period.	A Change timing so the debt averaging period must start no more than 17 months before the regulatory period and finish no less than 5 months prior to the commencement of a regulatory year.	–	The debt averaging period must start no more than 17 months before the regulatory period and finish no less than 5 months prior to the commencement of the regulatory period.
	Included only pure debt instruments in the EICSI, excluding hybrids, working capital and bridging loans, any instrument with a term under 12 months, and any instrument not used to finance the RAB.	A Included only pure debt instruments in the EICSI, excluding hybrids, working capital and bridging loans, any instrument with a term under 12 months, and any instrument not used to finance the RAB.	–	Include only pure debt instruments in the EICSI, excluding hybrids, working capital and bridging loans, any instrument with a term under 12 months, and any instrument not used to finance the RAB.
	Used the EICSI purely as a crosscheck for benchmark credit rating.	B Implement the EICSI by adjusting the weights of A and BBB data to match network cost of debt over the past 4 years.	B Preliminary position is to further analyse and consult on whether the residual outperformance identified, or departures on term should be adjusted for, and what form such an adjustment may take.	Use the EICSI as a ‘sense check’ on our benchmark return on debt.
	Instrument set out a number of contingencies to ensure that the	A	–	Continuation of 2018 approach.

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
	formulaic application of the Instrument could be applied in instances where all relevant debt data was not available.	Continuation of 2018 approach.		
	Debt raising costs collected based on historical criteria.	A Debt raising costs collected through a debt RIN to be issued in 2021.	–	Continued collection of debt raising cost data through debt RINs. Have not been considered as part of the 2022 Instrument as they form part of the regulated operating expenditure and do not contribute to the rate of return.
	Continued use of the RBA and Bloomberg data providers, while adding Thomson Reuters.	A Continued use of the RBA, Bloomberg and Thomson Reuters data providers.	–	Continued use of the RBA, Bloomberg and Thomson Reuters data providers.
		B Consider the merits of any additional debt data providers.	–	Continued use of the RBA, Bloomberg and Thomson Reuters data providers.
	Debt averaging periods must be between 10 days and a year in length and not overlap with each other.	A Debt averaging periods must be between 10 days and a year in length and not overlap with each other.	–	Debt averaging periods must be between 10 days and a year in length and not overlap with each other.
	Nominal vanilla WACC, estimated as a weighted average of the return on equity and return on debt.	A Nominal vanilla WACC, estimated as a weighted average of the return on equity and return on debt.	–	Nominal vanilla WACC, estimated as a weighted average of the return on equity and return on debt.
Overall rate of return omnibus	Place primary reliance on market value estimates and the continued use of existing observation periods when estimating gearing.	A Place primary reliance on market value estimates and the continued use of existing observation periods when estimating gearing.	–	Place primary reliance on market value estimates and the continued use of existing comparator averages over 5, 10 and 16-year observation periods.
	In calculating gearing, hybrid securities excluded from Envestra	C	–	Exclude hybrid securities for empirical estimates of gearing.

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
	and Spark Infrastructure, but included for AusNet services.	Seek views on the inclusion of hybrid securities for gearing.		
	After reviewing data, consistency with previous use of 60% gearing.	B Consider adjusting gearing to more closely align with market data.	–	Maintain a gearing ratio of 60% for the 2022 Instrument.
	Distribution rate for imputation credits obtained through the use of ASX50 firms, utilisation rate from ABS wealth data.	A Distribution rate for imputation credits obtained through the use of ASX50 firms, utilisation rate from ABS wealth data, pending investigation of ATO data.	–	Distribution rate for imputation credits obtained through the use of ASX50 firms, utilisation rate from ABS wealth data.
	Assume that non-resident investors assign no value to imputation credits.	B Assume that foreign non-resident investors assign no value to imputation credits.	–	Assume that non-resident investors assign no value to imputation credits.
	Crosschecks have limitation but can provide contextual information. However, they are not useful in informing the rate of return directly.	C Seeking views on the use of crosschecks.	B Our preliminary position is to use overall crosschecks as a sense check on our overall allowed rate of return. That is, gauge whether the regulatory allowance is likely to be sufficient; alternatively, evidence is used to assist with identifying potential issues with our regulatory regime and areas of further research and inquiry. We intend to review RAB multiples, scenario testing and financeability tests. To the extent any information can be drawn, RAB multiples may act as a trigger for investigation and indicate if the total compensation (inclusive of the rate of return) provided to investors is sufficient. We think historical profitability, investment trends, other regulators’	Crosschecks have limitation but useful as a sense check on our overall rate of return. Our primary focus is on RAB multiples, scenario testing and financeability tests. Historical profitability, investment trends, other regulators’ rate of return and other practitioners’ discount rates have greater limitations and have less value than RAB multiples, scenario testing and financeability.

Working paper	2018 Instrument position	Positions published as at July 2021	Proposed positions on the 6 focus issues – December 2021	2022 draft Instrument positions
			rate of return and other practitioners' discount rates have greater limitations and are of less value than RAB multiples, scenario testing and financeability.	

1.1 Invitation for submissions

The Australian Energy Regulator (AER) invites interested parties to make submissions on this draft decision by **5pm AEST on Friday 2 September 2022**.

We prefer that all submissions are in Microsoft Word or another text readable document format. Submissions on our issues paper should be sent to: **rateofreturn@aer.gov.au.**

Alternatively, submissions can be sent to:

Mr Warwick Anderson
General Manager
Australian Energy Regulator
GPO Box 3131 Canberra ACT 2601

This submission period is the final opportunity for stakeholders to provide submissions ahead of the final Instrument. We will consider and respond to all submissions received by that date in our final Instrument, which will be published in **December 2022**.

We prefer that all submissions be publicly available to facilitate an informed and transparent consultative process. Submissions will be treated as public documents unless otherwise requested. Parties wishing to submit confidential information should:

- clearly identify the information that is the subject of the confidentiality claim
- provide a non-confidential version of the submission in a form suitable for publication.

We will place all non-confidential submissions on our website. For further information on our use and disclosure of information provided to us, see the ACCC/AER Information Policy.

Please direct enquiries about this paper or about lodging submissions to rateofreturn@aer.gov.au.

1.2 Next steps

Table 1.2 sets out the next steps in our Pathway to 2022.

Table 1.2 Timeline for finalisation of the 2022 Instrument

Milestone	Date
Public forum on draft Instrument	TBC (before the Independent Panel report)
Independent Panel review report	29 July 2022
Submissions on draft Instrument close	2 September 2022
Second public forum on draft Instrument	TBC (after submissions close)
Final Instrument	December 2022

2 How the Instrument contributes to the legislative objectives

2.1 Key concepts in the legislative objectives

We undertake our regulatory functions in accordance with the legislative framework set out in the National Gas and Electricity Laws, and the National Gas and Electricity Rules. Under this legislative framework we must review our rate of return guidelines periodically and publish amended guidelines, if necessary. The guidelines must contribute to the achievement of the legislative objectives.

In section 2.1 we discuss the key concepts in the legislative objectives that guide our decision-making on the allowed rate of return.

In section 2.2 we set out our view on benchmark efficiency in the context of setting the rate of return

In section 2.3 we consider how we exercise our judgement and measure success in setting the rate of return

In section 2.4 we set out our considerations of the risks involved in the provision of regulated energy network services and how this relates to the allowed rate of return.

What is set out in this chapter is largely unchanged from the views we expressed when making our 2018 Rate of Return Instrument.[27]

2.1.1 National gas and electricity objectives

The legislation governing our regulation of energy network services currently provides multiple objectives and considerations for our decision on the Rate of Return Instrument. These are found in the:

- national gas and electricity objectives
- revenue and pricing principles.

In this section we discuss what these provisions entail, how they impact on our decision-making and our views on the common concepts that apply across all of the legislative objectives and principles.

2.1.1.1 National gas and electricity objectives

The National Electricity Objective (NEO) and the National Gas Objective (NGO) establish the ultimate objective of our decision-making.[28] In each case, the objective is to promote efficient investment in, and efficient operation and use of, the relevant electricity or gas services for

[27] AER. Rate of return instrument Explanatory statement, February 2018, pp 27-56.

[28] NEL, s. 7; NGL, s. 23.

the long-term interests of consumers with respect to the price, quality, safety, reliability and security of supply.[29]

We may make an instrument only if satisfied the instrument will, or is most likely to, contribute to the achievement of the national electricity and gas objectives to the greatest degree.[30]

To lay a foundation for our review, in May 2021 we prepared the position paper 'Rate of return and assessing the long-term interests of consumers'.[31] This paper set out our views about what the National Electricity Objective (NEO) and National Gas Objective (NGO) mean in the context of setting the expected rate of return. In particular, we discussed how the concept of the long-term interests of consumers, mentioned in the NEO and NGO, features in setting the expected rate of return.

In forming our position, we took into account the views expressed on this topic by the Consumer Reference Group (CRG) and Energy Networks Australia (ENA).

In this paper we developed a guiding principle that will aid us to develop a Rate of Return Instrument that best achieves the NEO and NGO. That guiding principle is that the expected rate of return should be:

> an unbiased estimate of the expected efficient return, consistent with the relevant risk involved in providing regulated network services.

2.1.2 Revenue and pricing principles

In support of the national gas and electricity objectives, the National Electricity Law and National Gas Law set out revenue and pricing principles.[32] These principles underlie the achievement of the national gas and electricity objectives and we have considered these principles in making our decision. In making a Rate of Return Instrument, the AER must have regard to the revenue and pricing principles.[33]

The revenue and pricing principles are expressed in essentially similar terms for both electricity and gas. These are discussed in Table 2.1 and our considerations of these has not changed since we made the current Instrument in 2018.

Table 2.1 Revenue and pricing principles in the NEL and NGL

Revenue and pricing principle	AER consideration
A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in:	We consider that a reasonable opportunity to recover efficient costs of providing regulated services is achieved when the rate of return satisfies the 'NPV=0' condition. The NPV=0 condition means that the ex-ante expectation

29 The NEO contains an additional objective of the reliability, safety and security of network system: see NEL s.7.

30 NEL, s. 18I(3); NGL, s. 30D(3).

31 AER, *Rate of return, Assessing the long term interests of consumers* Position paper, May 2021.

32 NEL, s. 7A; NGL, s. 24.

33 NEL, s. 18I(5)(a); NGL, s. 30D(5)(a).

Revenue and pricing principle	AER consideration
• providing regulated services; and • complying with a regulatory obligation or requirement or making a regulatory payment.	is that over the life of an investment the expected cashflow from the investment meets all the operating expenditure and corporate taxes, repays the capital invested and there is just enough cashflow left over to cover investors' required return on the capital invested. We consider that the efficient cost of capital is reflected in market rates. We consider that benchmarking and incentive regulation provides appropriate incentives for efficient costs. We note that this principle refers to the efficient costs of providing regulated services, and that an efficient cost of capital must be commensurate with the risk of providing regulated services.
A service provider should be provided with effective incentives in order to promote economic efficiency with respect to the regulated services the operator provides. The economic efficiency that should be promoted includes • efficient investment in the network with which the operator provides regulated services; and • the efficient provision of regulated services; and • the efficient use of the system with which the operator provides regulated services.	Effective incentives for efficiency are provided through the use of benchmarking and incentive regulation, and the use of market data as benchmarks. An efficient cost of capital must be commensurate with the risk of providing regulated services.
Regard should be had to the regulatory asset base adopted • in any previous determination or arrangement, or • in the Rules.	We take into account the regulatory asset base when determining an allowed rate of return through consideration of the NPV=0 condition. This means that the rate of return should contribute to an ex-ante expectation that over the life of an investment the expected cashflow from the investment repays the capital invested.
A price or charge for the provision of a regulated service should allow for a return commensurate with the regulatory and commercial risks involved in providing the service.	An efficient cost of capital must be commensurate with the risk of providing regulated services. Our consideration of the risk of providing regulated services is set out in greater detail in section 2.4.
Regard should be had to the economic costs and risks of the potential for under and over investment by a regulated network service provider in the relevant system.	A rate of return that is too high may encourage overinvestment, while a rate of return that is too low may encourage underinvestment. Overinvestment may not be in the long-term interests of consumers with respect to price. Underinvestment may not be in the long-term interest of consumers with respect to quality of service.
Regard should be had to the economic costs and risks of the potential for under and over utilisation of the relevant system.	Under-utilisation may be a result of overinvestment and over-utilisation may be a result of underinvestment. A rate of return that is too high may encourage overinvestment and a rate of return that is too low may encourage underinvestment.

Source: NEL; NGL; AER analysis.

2.1.3 Balancing concepts in the revenue and pricing principles

Each of these principles has an important guiding role when determining an appropriate way to calculate the rate of return to achieve the national gas and national electricity objectives. For example, if the rate of return is set at a rate that is too low to promote efficient investment in infrastructure, it will lead to underinvestment. It may not allow a provider a reasonable opportunity to recover at least its efficient costs in providing services or complying with regulatory obligations. It will not provide effective incentives for efficient investment in, provision for, or use of services. It will not be a rate that provides for a return that is likely to be commensurate with the commercial and regulatory risks. It may lead to various economic costs and risks that might arise from underinvestment in the network system. All of these factors would compromise the realisation of the national gas and electricity objectives.

Similarly, if the rate of return is set too high, it will provide an incentive to overinvest in network infrastructure. It will not reflect a return that is commensurate with the regulatory and commercial risks. It will not promote efficient investment in the network system and it is likely to lead to under-utilised investment in regulated assets.

There is a balance involved in having regard to these principles. We aim to determine a rate of return and a value for imputation credits that will provide the appropriate investment incentives that will lead to neither overinvestment nor underinvestment in assets and will achieve an appropriate balance of sustainable long-term consumer outcomes in respect to price, quality, safety, reliability and security of supply. This task is not one that can be undertaken mechanically. Instead, it is one that requires the exercise of judgement looking to future outcomes. The objectives and principles guide our assessment of the evidence.

2.1.4 Key concepts in the legislative objectives and principles

There are certain common repeated concepts within these legislative objectives and principles that are particularly relevant to setting the rate of return and the value of imputation credits. We adopt standard, well-established regulatory economic approaches to our understanding of each these concepts.

Efficiency is the first of these concepts. For example, the legislative objectives provide that we must have regard to:

- efficient investment in, and efficient operation and use of, the relevant electricity or gas services for the long-term interests of consumers with respect to a number of service outcomes[34]
- a reasonable opportunity to recover at least the efficient costs in providing certain regulated services and complying with regulatory obligations requirements or making regulatory payments[35]
- effective incentives in order to promote economic efficiency with respect to certain regulated services.[36]

Economists typically think of efficiency in 3 dimensions: productive, allocative and dynamic. Table 2.2 sets out how this applies in the context of the rate of return.

34 NEL, s7; NGL s23

35 NEL s7A(2); NGL s24(2)

36 NEL s7A(3); NGL s24(3)

Table 2.2 Application of efficiency concepts to rate of return

Dimension of efficiency	Economic meaning	Application to rate of return estimation
Productive efficiency	Achieved when output is produced at minimum cost. This occurs where no more output can be produced given the resources available – that is, the economy is on its production possibility frontier. Productive efficiency incorporates technical efficiency. This refers to the extent that it is technically feasible to reduce any input without decreasing the output or increasing any other input.	Refers to least cost financing (that is, the lowest allowed return on debt and equity) subject to any constraints, such as risk. For our determinations to be productively efficient we need to incentivise service providers to seek the lowest cost financing (all else being equal).
Allocative efficiency	Achieved when the community gets the greatest return (or utility) from its scarce resources.	Allocative efficiency can be achieved by setting an allowed return consistent with the expected return in the competitive capital market (determined by demand and supply) for an investment of similar degree of risk as a service provider supplying regulated services.
Dynamic efficiency	Refers to the allocation of resources over time, including allocations designed to improve economic efficiency and to generate more resources. This can mean finding better products and better ways of producing goods and services.	Refers to the existence of appropriate incentives. We can encourage dynamic efficiency by setting an allowance that does not distort investment or consumption decisions. Dynamic efficiency is advanced through incentive regulation rather than cost of service regulation that compensates a service provider for its actual costs no matter how inefficient.

Source: AER analysis; Productivity Commission, On efficiency and effectiveness: Some definitions, May 2013; AER, Better regulation: Rate of return guidelines consultation paper, May 2013.

Productive efficiency is promoted through benchmarking and incentive regulation and through setting the rate of return as a market cost of capital reflective of the risks involved in providing regulated services. Allocative efficiency is promoted through estimating the rate of return as a market cost of capital commensurate with the risk involved in providing regulated services. Dynamic efficiency is promoted through benchmarking and incentive regulation, and through adherence to the NPV=0 condition. The use of market data, benchmarking and the NPV=0 condition are discussed further below. We note here that the NPV=0 condition is an ex-ante concept and regulated businesses returns are not guaranteed because they still face risk.

The second common repeated concept is compensation for risk and the relationship between risk and return. The legislative principles provide that we must have regard to prices that allow for a return commensurate with the regulatory and commercial risks involved in providing the service.

When estimating the allowed rate of return we consider the degree of risk involved in providing regulated services. This also contributes to the achievement of the legislative objectives by promoting efficiency – it is well accepted that there is a risk-return trade-off and it would not be efficient to determine an allowed return that is not commensurate with the risks involved. Further consideration of the risks involved in providing regulated services is set out in section 2.4.

2.1.5 Criteria we have developed to help guide our judgements

As noted in the executive summary, we have developed the following criteria to assist us to exercise our regulatory judgment:

1) Reflective of economic and finance principles and market information
2) Fit for purpose
3) Implemented in accordance with good practice
4) Models are based on quantitative modelling that is sufficiently robust and avoids arbitrary filtering
5) Market data is credible, verifiable, comparable, timely and clearly sourced
6) Flexible to allow changing market conditions and new information
7) Materiality
8) Longevity or sustainability of new arrangements.

The first 6 of these criteria were developed when making our 2013 Rate of return guideline and are explained in detail in the explanatory document to the guideline.[37] We proposed to include criteria 7 and 8 when we made our 'Overall rate of return draft working paper' in July 2021.[38] These additional criteria were added to ensure change would not be adopted lightly in the absence of compelling evidence and that any case for change must demonstrate there was a clear improvement or benefit to be realised.

As noted earlier, we consider our assessment criteria capture the 5 principles the CRG considered we should take into account before proposing a change. The CRG criteria, and support for these criteria, are discussed further in section 2.3.

2.1.6 Market data

We will consider market data where it is available to assist us. As covered above, we have a number of criteria that have helped guide our exercise of judgement, including a specific criterion for market data – that the market data is credible, verifiable, comparable, timely and clearly sourced. We have considered these criteria, including what different stakeholders have indicated about how various pieces of market data align with these criteria, in determining how we have had regard to and used various pieces of market data.

2.2 Benchmark efficiency

The regulatory framework the AER operates under is largely an ex-ante allowance regime, where forecasts are set and business have a financial incentive to beat these forecasts. The following sections discuss the benchmark rate of return we set under the Rate of Return

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37 AER, Better Regulation Explanatory Statement Draft rate of return guideline, August 2013, pp 27-32.

38 AER, Overall rate of return Draft working paper, July 2021, p22.

Instrument (RoRI) and the incentives the framework create, the NPV=0 condition, estimating a market cost of capital, and setting a return commensurate with the risk of providing regulated network services.

2.2.1 Benchmarking and incentive regulation

We estimate a benchmark rate of return, which is then applied to a specific service provider, rather than determining the returns of a specific service provider based on all of its specific circumstances.[39] We note:

- while we have set a single benchmark for all regulated businesses in this draft Instrument, we would have set multiple benchmarks if we considered this was legally permissible and would better achieve the NEO and/or NGO[40]
- the allowed return on capital will vary for different businesses depending on when their allowed return on capital is estimated under the Instrument.

The service providers' actual returns could also differ from the benchmark regulatory allowance depending on how efficiently it finances and operates its business. This is consistent with incentive regulation. That is, our rate of return approach drives efficient outcomes by creating the correct incentive by allowing (requiring) service providers to retain (fund) any additional income (costs) from outperforming (underperforming) the efficient benchmark.[41]

We consider that the objective of the allowed rate of return under an incentive regulatory framework is not to provide a guaranteed degree of outperformance. However, we also note that it is important for allocative and dynamic efficiency that the allowed rate of return provides (in expectation) an opportunity for service providers to recover their efficient costs (without expectation of monopoly rents), consistent with the NPV=0 condition.

We have updated our empirical analysis in a number of areas consistent with incentive regulation. We have reviewed our benchmark gearing, credit rating, debt term and overall debt costs by examining the recent, actual costs and financial management practices of service providers. We have also reviewed our equity beta estimates based on equities market data.

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[39] See AER, Better regulation: Explanatory statement rate of return guideline, December 2013, ch. 3.

[40] For example, we would have set a different equity beta for gas and electricity networks if we considered this would better achieve either the NEO and NGO.

[41] NEL, s. 7A(3); NGL s. 24(2)(b).

2.2.2 The NPV=0 condition

As the regulatory regime is ex-ante[42], we consider a rate of return that meets the objectives must provide ex-ante compensation for efficient financing costs. This is a zero net present value (NPV) investment condition, which is described as follows:[43]

> The zero NPV [NPV=0] investment criterion has 2 important properties. First, a zero NPV [NPV=0] investment means that the ex-ante expectation is that over the life of the investment the expected cashflow from the investment meets all the operating expenditure and corporate taxes, repays the capital invested and there is just enough cashflow left over to cover investors' required return on the capital invested. Second, by definition a zero NPV [NPV=0] investment is expected to generate no economic rents. Thus, ex-ante no economic rents are expected to be extracted as a consequence of market power. The incentive for investment is just right, encouraging neither too much investment, nor too little.

In concurrent evidence session 2 held this year there was general agreement with the principle that the rate of return should be set to achieve NPV=0 condition, although experts disagreed on how returns should be set to achieve that condition.[44] As noted in the overview, this draft Rate of Return Instrument has changed to using a term that better matches the regulatory period for estimating the return on equity because we consider this will better achieve the NPV=0 condition. In most cases this will result in us using a 5-year term for estimating the return on equity because the vast majority of regulatory periods are 5 years in length and the return on equity is reset at the commencement of each regulatory period.[45] We believe this change will result in a new RoRI that will better achieve the NEO and NGO.

The NPV=0 condition and the reason for changing the term of equity used in the CAPM is discussed further in section 6.2. Throughout this explanatory statement, we use the terms 'NPV=0 condition' and 'NPV=0 principle' interchangeably.

2.2.3 Market cost of capital

Because the market for capital finance is competitive, an efficient service provider is expected to face competitive prices in the market for funds. Therefore, we consider efficient financing costs are reflected in the prevailing market cost of capital (or WACC) for an

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42 The AEMC describes, 'allowed revenues for network businesses are now set using the expenditure required by prudent, efficient operators as a benchmark. Companies have incentives to beat the benchmarks so they can keep some of their savings and pass the rest on to customers'. See AEMC, Overview 2014–15.

43 Partington, G., Satchell, S., *Report to the AER: Discussion of the allowed cost of debt*, 5 May 2016, p. 14.

44 2022, AER Concurrent Evidence Session 2 - Proofed Transcript, pp. 10-64.

45 As set out in the Draft Instrument, where regulatory determinations have an expected regulatory term longer than 5 years and one month in length we will estimate the return on equity using a longer term to ensure these businesses are appropriately compensated.

investment with a similar degree of risk as that which applies to a service provider for providing regulated services.[46] As Alfred Kahn stated:

> since the regulated company must go to the open capital market and sell its securities in competition with every other would-be issuer, there is clearly a market price (a rate of interest on borrowed funds, an expected return on equity) that it must be permitted and enabled to pay for the capital it requires.[47]

We consider employing a rate of return that is commensurate with the prevailing market cost of capital (or WACC) is consistent with the NPV=0 investment condition. We also consider economic efficiency more generally is advanced by employing a rate of return that reflects rates in the market for capital finance. Similarly, Partington and Satchell interpret efficient financing costs as the opportunity cost of capital, which is a market rate of return for assets with a given level of risk.[48]

Table 2.3 outlines how we have applied benchmarking and incentive regulation in coming to our draft decision.

Table 2.3 Application of benchmarking in coming to our draft decision

Element	Application of benchmarking
Gearing ratio	In coming to a benchmark gearing ratio, we have had regard to observed gearing levels of listed Australian energy networks. These gearing levels are the result of these firms managing their financing practices as part of their operations in competitive capital markets.
Return on equity – risk-free rate	We estimate the risk-free rate from market yields on CGS.
Return on equity – market risk premium	Our market risk premium benchmark is informed by market data on: • the historical returns on the All Ordinaries • analyst forecasts and market prices of equities that are used in dividend growth models • conditioning variables derived from market prices and dividends.
Return on equity – beta	Our equity beta estimate is informed by market prices and dividends of listed Australian energy networks relative to the market prices and dividends for the ASX 300.
Return on debt – credit rating and term	Our benchmark credit rating is derived from observed credit ratings of privately owned Australian energy network firms. Our benchmark debt term is informed by observed term of debt issuances of privately owned service providers. These firms are managing their financing practices as part of their operations in competitive capital markets.
Return on debt – yield	The return on debt is estimated from market yields on Australian corporate bonds.

[46] See Partington, G., Satchell, S., *Report to the AER: Discussion of the allowed cost of debt*, 5 May 2016, p. 15. We note the cost of capital (from a firm's perspective) is also known as investors' required rate of return (from an investors' perspective).

[47] Kahn, A.E., *'The economics of regulation: Principles and institutions'*, The MIT Press, Massachusetts, 1988, p. 45.

[48] Partington, G., Satchell, S., *Report to the AER: Discussion of the allowed cost of debt*, 5 May 2016, p. 15.

Element	Application of benchmarking
Imputation credits – utilisation rate	Our benchmark utilisation rate is derived from the ABS equity ownership statistics for all Australian equity. This ownership data is the result of the operation of equity markets.
Imputation credits – distribution rate	Our benchmark distribution rates are derived from the observed distribution rates of listed Australian equity. These listed Australian firms determine their distribution rates as part of their operations in competitive equity markets.

2.2.4 Commensurate with risk

When estimating our benchmark rate of return we consider the degree of risk involved in providing regulated services. This is consistent with the revenue and pricing principles, which state that a price or charge should allow for a return that matches the regulatory and commercial risks involved in providing the regulated service to which that charge relates. It also contributes to the achievement of the legislative objectives by promoting efficiency – it is well accepted that there is a risk-return trade-off and it would not be efficient to determine an allowed return that is not commensurate with the risks involved.

Further consideration of the risks involved in providing regulated services is set out in section 2.4.

2.3 Exercising our judgement and measuring success

The AER must exercise its discretion when determining the Rate of Return Instrument that it considers will best achieve the NEO and NGO. In doing so, the AER has:

- focused on trying to achieve the best overall decision
- considered any risk-cost trade-offs
- considered the views of all stakeholders, including the survey results of the CRG survey of consumers' views on various topics.

As we did in making the 2018 Rate of Return Instrument, we have reconsidered the input parameters to be used in the 2022 Rate of Return Instrument to best achieve the NEO and NGO. In this draft Instrument the only material methodological change we have made (relative to the 2018 Instrument) is to alter the term of the risk-free rate and make any necessary changes to the MRP to be consistent with the application of the risk-free rate within the Capital Asset Pricing Model. However, we note our MRP estimate has increased materially under the historical excess return estimation methodology used in making the 2018 Instrument due to relatively high equity returns post 2017.

2.3.1 Risk-cost trade-off

The risk-cost trade-off topic was discussed extensively during the 2018 RoRI process. This was documented in the 2018 explanatory statement, specifically in chapter 13, which covered the potential issues if the rate of return is set too low or too high, because this could have an impact on whether our legislative objectives are being met.[49] After consideration of stakeholder viewpoints and submissions in 2018, our assessment of the risk-cost trade-off found that the application of a bias toward a higher or lower rate of return is not supported by available evidence. Reasonable points were made in support of both directions.[50]

Further consideration was given to this topic as part of the 2022 RoRI process, when we considered the term of the rate of return, and rate of return and cashflows in a low interest rate environment.[51] The working paper considered discussion by stakeholders on several topics related to the risk-cost trade-off, including discussion on:

- an upward bias of the return on equity to provide positive investment in the AEMO's 2020 ISP projects, to which we restated our position that the best possible estimate of the expected rate of return is to be neither upwardly or downwardly biased[52]
- a focus on the promotion of investment efficiency, to which we reiterated that our approach of establishing an allowed rate of return that is neither upwardly or downwardly biased was necessary to achieve our statutory objectives to promote efficiency in the investment in, and operation and use of, energy services for the long-term interests of consumers.[53]

This latter point was expanded on in our 2021 position paper on rate of return and assessing the long-term interests of consumers, in addition to additional coverage of the risks and costs of a biased estimate. Setting the RoRI is guided by the NEO and NGO and our understanding of consumer interests, and how the RoRI may serve both to the greatest degree.[54] This understanding of consumer interests has been developed through continued engagement with our CRG and ENA, whose additional perspectives have assisted us in developing our guiding principle. The guiding principle, which will be used in developing the 2022 RoRI, is to set an unbiased estimate of the expected efficient return, consistent with the relevant risks involved in providing regulated network services.

For the 2022 RoRI review, there was limited discussion by stakeholders in March 2022 submissions on the risk-cost trade-off topic. As such, our approach remains unchanged.

2.3.2 CRG consumer principles

A set of consumer-oriented principles, first outlined in a CRG submission in October 2020 were developed by the CRG to provide a direct link between our decision and the efficient

49 AER, *2018 Draft rate of return guideline explanatory statement*, pp 406-415.

50 AER, *2018 Draft rate of return guideline explanatory statement*, p 415.

51 AER, *Rate of return, Term of the rate of return and Rate of return and cashflows in a low interest rate environment*, Final working paper

52 AER, *Rate of return, Term of the rate of return and Rate of return and cashflows in a low interest rate environment,* Final working paper, p.67.

53 AER, *Rate of return, Term of the rate of return and Rate of return and cashflows in a low interest rate environment*, Final working paper, p.68.

54 AER, *Rate of return, Assessing the long term interests of consumers*, Position paper, May 2021, pp 8-9

operation and use of electricity or gas as set out in the NEO and NGO.[55] As such, these principles are viewed by the CRG as integral to us achieving our statutory objectives. The principles are:

- Principle 1 — A regulatory framework serving the long-term interests of consumers must promote behaviours that engender consumer confidence in the framework.
- Principle 2 — Any change to the regulatory model must be tested against detrimental consumer impacts in relation to absolute prices and price changes.
- Principle 3 — Any change to the regulatory model must be tested against acceptable consumer impacts in relation to service standards.
- Principle 4 — Risks should be borne by the party best placed to manage them.
- Principle 5 — There should be a high bar for change.

The CRG noted that consumers and consumer representatives support the consumer-oriented principles.[56] Engagement with consumers on the principles involved various engagement methods, such as:

- surveys of residential and commercial energy consumers
- interviews and workshops with consumer representatives.

Primarily, support for the principles was established through Consumer Survey 1, which demonstrated that both residential and commercial energy customers broadly agree with the substance of each principle. Support from consumer representatives is also noted, though a similar survey to serve as a reference point is not available. However, the CRG's engagement with consumer representatives included interviews from July to October 2020, workshops from June to August 2021, and additional interviews from January to February 2022.[57]

Consequently, the CRG considered that the AER must give weight to consumer-oriented principles when exercising its judgement.

The CRG noted that, in addition to giving weight to consumer-oriented principles, the AER should consider a number of points of interest for consumers when exercising judgement. These are detailed in Table 2.4.

Table 2.4 CRG findings on consumer views on key points

Key point	CRG findings
Consumers support a focus on the long term	The CRG found that: [58] • consumers generally believe 'long term' to be a period of 10 years or more

55 Consumer Reference Group, *Submission to the AER Return on equity*, 9 Oct 2020, pp 20-22.

56 CRG, *Response to the AER's July 2021 Draft Working Papers: The Overall rate of return, Debt omnibus and Equity omnibus papers*, Volume 2: Engagement, 7 Sep 2021, p. 4.

57 CRG, *Response to the AER's December 2021 Information paper*, March 2022, pp. 143-158

58 CRG, *Response to the AER's December 2021 Information paper*, March 2022, pp. 31-33.

Key point	CRG findings
	• consumers, consumer representatives and independent investors consider a 'long term', and associated benefits, to be beyond a 5-year regulatory period • independent investors consider investment in a regulated network as a long-term proposition.
Consumers are generally satisfied with current service levels	The CRG pointed to findings of the ECA Consumer Sentiment Survey to note that consumers are satisfied with current electricity and gas services, with proportions of satisfied customer being consistently high.[59]
Consumers value a stability of process	The CRG suggested that stability of frameworks is critical because it enhances consumer confidence through:[60] • certainty • reduced risk of gaming by networks • reduced regulatory capture • reduced requirements for debate with networks, given resource and capacity constraints.
Consumers are sensitive to price changes	On consumer sensitivity to price changes, the CRG noted that even small changes to prices could create behavioural changes in residential and commercial consumers, primarily in attempting to use less energy. This is especially true for vulnerable customers.[61] The CRG also found that residential and commercial consumers generally favour affordable energy over a highly reliable supply, though commercial customers are more balanced in viewing both as critical.[62]
Consumers value a stability of approach	The CRG posited that there should be a high bar for change with a requirement for strong justification and demonstration that it is in consumers' interests.[63] A stable regulatory framework is in customers' long-term interests.[64] According to the CRG, a long-term approach is also aligned with the interest of long-term investors (pension funds, private equity and governments) that increasingly dominate the sector, and is promotive for investor confidence.[65]

2.3.2.1 Other submissions that mention how we should exercise judgment

In addition to the submissions of the CRG, other submissions that touched on how we should exercise our regulatory judgment included submissions from:

- APA, which submitted that the AER should put more emphasis on substance over process.[66]

59 CRG, *Response to the AER's December 2021 Information paper*, March 2022, pp. 33-34.

60 CRG, *Response to the AER's December 2021 Information paper*, March 2022, p. 34.

61 CRG, *Response to the AER's December 2021 Information paper*, March 2022, p. p35.

62 CRG, *Response to the AER's December 2021 Information paper*, March 2022, p. 38.

63 CRG, *Response to the AER's December 2021 Information paper*, March 2022, p. 30.

64 CRG, *Response to the AER's December 2021 Information paper*, March 2022, p. 10.

65 CRG, *Response to the AER's December 2021 Information paper*, March 2022, p. 10.

66 APA, *Submission on Pathway to 2022 Rate of Return instrument*, 17 Jan 2022, p. 1.

- AusGrid, which submitted that the most critical element to the success of the process is that the AER demonstrate a balanced evaluation of all the evidence in reaching its conclusions.[67]
- AGIG, which submitted: the concurrent evidence should be run with more rigour to distinguish between evidence and opinion; expert reports by the AER should be obtained before the concurrent evidence sessions; the AER should develop a standard by which evidence is assessed and transparently explain why the AER has taken a view by reference to that standard.[68]
- APGA, which submitted: crosschecks if implemented assuming an equal role to each crosscheck does not mean that they have equal weight with the primary estimate. Crosschecks would still only be a check on the judgement that the AER has used to choose a point within the range that its data and application of its foundation model suggest is reasonable.[69]
- ENA, which submitted that scenario testing could be used to assist in providing information relevant to judgements the AER is considering or makes against its assessment criteria.[70]
- Endeavour Energy, which submitted with respect to crosschecks that the approach of international regulators provides useful insight into the types of data and methods that other regulators use to estimate parameters and the way in which they exercise their regulatory judgement.[71]
- QTC, which submitted that an unintended bias against the Wright approach has been created due to the way the AER has applied its assessment criteria.[72]

We have considered all stakeholder submissions in making the draft Rate of Return Instrument that we consider will best achieve the NEO and NGO.

2.4 Risk and return

In section 2.1 we set out the legislative objectives that guide our decision-making. The revenue and pricing principles provide that, among other things:[73]

- a price or charge for the provision of a regulated service should allow for a return commensurate with the regulatory and commercial risks involved in providing the service

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67 AusGrid, *Submission on AER's 2022 RoR instrument pathway consultation*, 17 Jan 2022, p. 1.

68 AGIG, *Submission to consultation on 2022 instrument process*, 17 Jan 2022, pp. 1-2.

69 APGA, *Submission - AER rate of return information paper*, 11 Mar 2022, pp. 19-20.

70 ENA, *Rate of Return Instrument Review Response to AER's Final Omnibus and information papers*, 11 Mar 2022, pp. 141-142.

71 Endeavour Energy, *Rate of Return information paper Submission*, 11 March 2022, p. 5.

72 QTC, *Submission AER Rate of Return information paper and final working papers*, 11 March 2022, p. 2.

73 NEL, s7A cl(5-7);

- regard should be had to the economic costs and risks of the potential for under and overinvestment by a regulated service provider in the relevant system
- regard should be had to the economic costs and risks of the potential for under and over-utilisation of the relevant system.

Risk is the degree of uncertainty about an event – such as, the uncertainty around the expectation of the return on an investment.[74] It is strictly a forward-looking concept because no event is uncertain after it has occurred. The risk-return trade-off in finance theory provides that a risk averse investor will want a higher expected return when faced with a higher risk.[75]

When considering an efficient return for risk, it is important to differentiate between risks that are efficiently compensated through the allowed rate of return. In finance, there are 2 distinct types of risk – systematic risk (market risk or non-diversifiable risk) and non-systematic risk (firm-specific risk or diversifiable risk).[76] Systematic risk affects the entire market and cannot be avoided, while non-systematic risk is unique to the individual investment and can be reduced by holding a diversified portfolio. Since investors can eliminate non-systematic risk, it is unlikely that investors require compensation for these risks and it would be inefficient to compensate for non-systematic risk in the allowed rate of return. Therefore, assuming that investors hold the fully diversified 'efficient' market portfolio, only an investment's systematic risk is relevant.

In setting the allowed return on equity, we provide compensation for the systematic risk that an efficient firm in the supply of regulated energy services would face through the equity beta. In setting the allowed return on debt, we provide efficient compensation for the risks that an investor in the service provider's debt faces, as they are reflected in the promised returns we observe using our debt data sources.

Importantly, the principles set out in this paper about the efficient compensation of risk through the allowed rate of return should be applied consistently in the estimation of all rate of return parameters. However, while agreed principles should be applied consistently, the availability of particular data may mean that the consistent application of these principles may result in different datasets being used for different parameters.

In the next sections we consider the following risk related topics:

- In section 2.4.1, we consider the framework for which we analyse whether a risk is compensable.
- In section 2.4.2, we discuss whether gas and electricity businesses face different risk environments and whether different benchmarks are warranted.
- In section 2.4.3 we consider the impact of regulation on risk.

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74 Bishop, S., Faff, R., Oliver, B., Twite, G., *Corporate Finance, Ed. 5 Pearson Prentice Hall*, 2004, p. 577.

75 Handley, J., *Advice on the return on equity: report prepared for the AER*, 16 October 2014, p. 4.

76 Refer to AER, *Draft Rate of return guideline – explanatory statement*, July 2018, page 87 for a detailed discussion on systematic and unsystematic risk.

- In section 2.4.4 we consider interrelationship between financial parameters.

2.4.1 Compensation for risk

In setting the allowed return on equity, we provide compensation for the systematic risk of an efficient firm in the supply of regulated energy services.

During this review process there have been limited submissions on how systematic risk has changed over time, or on the role and impact of technological, regulatory and catastrophic risks. However, the NSG did submit that our current approach to estimating beta mutes the impact of increases in systematic risk over time and the CRG submitted that stranding risk is not systematic and so should not be compensated under our approach to equity beta.[77] In concurrent evidence session 1 there was some agreement that stranding risk was likely primarily a non-systematic risk, although there appeared acceptance there could be some systematic component.[78]

We consider that any stranding risk is primarily non-systematic in Australia and it would be inappropriate to adjust equity beta to compensate for potential stranding risk. This is discussed further in section 8.2. We also remain of the view expressed when we made the current Rate of Return Instrument in 2018 that technological, regulatory and catastrophic risk should not be compensated through the rate of return and that an efficient rate of return compensates only for systematic risk.[79]

Our updated analysis of equity beta in section 8.2 suggests a single beta for gas and electricity networks in the range of 0.5 to 0.6. Our own estimates also found that the longest period estimates tend to be relatively stable over time. Given the limitations of the evidence, we consider the appropriate approach is to maintain our current value of 0.6. We consider this is consistent with our principle of promoting stability and predictability.

2.4.2 Gas and electricity

We extensively considered the potential differences in risk between gas and electricity network businesses in making the current Rate of Return Instrument in 2018.[80] At that time we formed the view that the likely differences were not material enough to justify different benchmarks. We considered this again in our 2021 draft equity omnibus working paper, proposing to continue to use a single beta estimate for gas and electricity businesses.[81] Both Jemena and APGA raised concerns that systematic risk for gas could exceed electricity for a number of reasons, including due to different user characteristics and as a result of stranding

[77] NSG, *AER Rate of Return information paper and Omnibus final working paper - Submission*, 11 Arch 2022, pp. 108-109; CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, p. 81.

[78] Concurrent Evidence Session 1, 10 Feb 2022, pp 79-83.

[79] AER, *2018 Rate of Return Instrument - Explanatory Statement*, Dec 2018, pp. 43-46.

[80] AER, *Rate of return instrument - Explanatory statement*, Dec 2018, pp. 51-56.

[81] AER, *Rate of return Equity Omnibus Draft working paper*, July 2021, p. 49.

risk due to various government policies.[82] However, we have found no clear evidence of material differences in systematic risk between gas and electricity networks.[83]

These issues are discussed in section 8.2 on beta.

We note that ENA, APGA and Jemena have suggested that existing evidence from domestic comparators does not allow an adequate comparison of beta between gas and electricity networks, and that further analysis is needed with a larger sample of firms, such as international firms.[84] We have formed the view that there are challenges in comparing the beta of gas and electricity firms using international energy firms, as some experts and stakeholders suggested. As discussed in section 8.2, we found that many international energy firms have unrelated business segments and/or are vertically integrated. Very few firms can be considered ‘pure play’ regulated energy network businesses.

We also disagree with APA’s conclusion that gas networks have higher betas by comparing the beta of APA against AusNet and Spark.[85] APA derives a significant proportion of its revenue from non-regulated pipeline activities, such as gas storage and processing, energy generation, and asset management services.[86]

For these reasons we have adopted a single rate of return for the gas and electricity networks.

2.4.3 Impact of regulation on risk

As we noted when making our 2018 draft Rate of Return Instrument decision, we have concluded in past decisions that an entity providing unregulated services in a competitive market is likely to have a higher risk and more variable expected returns than a monopoly business, such as the service providers of regulated services.[87] This is because regulation:[88]

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82 Jemena, *Submission on rate of return omnibus papers*, September 2021, p. 6.; APGA, APGA *Submission to the AER Rate of return omnibus papers*, September 2021, p13.

83 AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, pp114-115.

84 ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.105; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, pp.13, 14, 15; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.51; Jemena, *AER information paper – Submission,* 11 March 2022, p.4.

85 APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.51.

86 APA, *Annual Report* 2021, p.64.

87 For example see: AER, *Better regulation explanatory statement rate of return guideline*, December 2013, pp. 36–46; AER, *Final decision APA VTS gas access arrangement 2018 to 2022*, *Attachment 3–Rate of return*, November 2017, p. 24.

88 For example see: AER, *Better regulation explanatory statement rate of return guideline,* December 2013, pp. 36–46; AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return,* November 2017, p. 24.

- mitigates monopolies from being able to extract monopoly rents, thereby constraining potential profits
- increases the certainty of the revenue stream, thereby reducing risk.

This gave us insight into the equity beta for a benchmark efficient entity relative to the average equity beta across all firms in the market, which is 1.0 by definition.[89]

We maintain the view expressed in making our 2018 Rate of Return Instrument and in earlier decisions that incentive regulation allows service providers to earn more stable cashflows with periodic resets of revenues reflecting changes in actual expenditure.[90] As most unregulated businesses do not have the same protections or restrictions, they are likely to face different risk environments.[91]

Frontier has also recognised the role of regulation in affecting risk in advising:[92]

> The form and nature of regulation applicable to Australian energy networks mitigates most of the business risks they face as compared to the business risks faced by other types of firms in the economy. Regulated revenues are set on a periodic basis and changes in volumes may only affect the timing of revenues (under a revenue cap). Even where revenues fall short of expectations due to lower volumes (as under a price cap), the lower volumes imply that costs would probably also have been lower than expected. Unanticipated or poorly managed changes in costs are partly borne by customers and only partly by the network business through the building block form of incentive regulation that applies. Stranding and optimisation risks are minimal for energy networks, a complete contrast to businesses operating in other sectors.

For clarity, regulation of the kind embodied in the national electricity and gas legislation reduces risks compensated through the rate of return (for example, demand risk). Regulation

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89 More precisely, the value weighted average equity beta across all firms in the market is 1.0. As pointed out by McKenzie and Partington, the equal weighted average may not be 1.0, since larger firms may be unevenly distributed above or below 1.0. See: McKenzie and Partington, *Estimation of the equity beta (conceptual and econometric issues) for a gas regulatory process in 2012*, April 2012, p. 21. (McKenzie and Partington, *Estimation of equity beta*, April 2012)

90 AER, *2018 Draft Rate of return guideline explanatory statement*, June 2018, p. 105; For example see: AER, *Better regulation explanatory statement rate of return guideline*, December 2013, pp. 36–46; AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return,* November 2017, p. 25.

91 For example see: AER, *Better regulation explanatory statement rate of return guideline*, December 2013, pp. 36–46; AER, *Better regulation explanatory statement rate of return guideline (appendices)*, December 2013, pp. 39–46; AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 25.

92 Frontier Economics, *Assessing risk when determining the appropriate rate of return for regulated energy networks in Australia*, July 2013, p. 4.

also reduces uncompensated risks by allowing cost pass throughs for non-systematic risks, such as industry-specific tax changes or geographic-specific natural disasters.

As we noted in making our 2018 draft Instrument, we have previously determined that regulation of energy network services reduces compensable risks such as:[93]

- Demand risk: The revenue or price setting mechanism mitigates demand risk. Under a price cap, service providers may mitigate the risk of forecast error by restructuring tariffs, such that higher fixed charges are set to offset falls in demand. Under a revenue cap, where forecast quantity demanded differs from actual quantity demanded, service providers have the possibility to recover for variation through price adjustments in subsequent years.
- Inflation risk: Service providers of regulated energy network services face less inflation risk than unregulated businesses because movements in actual inflation are reflected in the CPI-X mechanism. We reviewed our treatment of inflation in 2017, after receiving stakeholder submissions on the issue.
- Interest rate risk: The regulatory framework effectively moves risk of interest rate movements affecting financing costs onto customers. Service providers may further limit their exposure to this risk by raising capital during the averaging periods they know in advance. To the extent they are unable to raise capital over the averaging periods, they can still materially reduce their exposure to interest rate risk by hedging the base rate.

Table 2.5 summarises a selection of provisions in the NER and NGR that we consider likely to mitigate various systematic and non-systematic risks. Our views on these clauses have not changed since we made our draft 2018 Rate of Return Instrument.[94]

Table 2.5 Key clauses in the NGR and NER that mitigate systematic risk

NER clause	NGR clause	Effect on risk
6.3.2(b)	50	The term of each regulatory control period is at least 5 years, providing a fixed duration in which a service provider has a regulated return on its assets, cashflow certainty and fixed terms of access for its services.
6.2.6, 6.5.9	92	This control mechanism automatically accounts for indexation and annual increases in efficient costs. It smooths cashflows from year to year to provide stable level of cashflow, reducing risks of short-term revenue.
6.18	97(5)	The prices service providers may charge annually are certain.
6.4.3(a)(1)–(3), 6.5.1, 6.5.2, 6.5.5, S6.2.1, S6.2.2B, S6.2.3,	76, 77, 78, 87(1), 90	The cashflow that the AER determines incorporates a return on and of the service provider’s asset base. The historical asset base rolls forward from one regulatory control period to the next and from year to year within each regulatory control period. This guarantees recovery of historical asset costs through depreciation, the earning of a return on the asset base, indexation and recovery of future efficient capex. This substantially lessens risks in capital investment that might otherwise apply to a business operating in a workably competitive market.

93 AER, *2018 Draft Rate of return guideline explanatory statement*, June 2018, p. 106.

94 AER, *2018 Draft Rate of return guideline explanatory statement*, June 2018, p. 108.

NER clause	NGR clause	Effect on risk
6.5.2	87	The AER sets the rate of return on the asset base by reference to the risks faced by the service provider. The AER updates this each regulatory control period to account for changed market conditions.
6.5.3	87A	Provision for tax in determining total revenue is required regardless of whether the service provider pays tax.
6.5.6, 6.5.7	79, 91	The AER assesses expenditure requirements for each service provider by reference to the amount necessary to meet a set of standards and objectives. These include the need to meet the expected demand for services and to meet quality, reliability, security and safety standards. The AER does not assess expenditure by reference to the capacity of consumers to pay. This removes risks that could otherwise arise in providing a reliable and safe service. The AER reassesses the requirements of service providers for each regulatory period to account for changes in market conditions and trends.
6.5.10	97 (1)(c)	Allows service providers to pass through certain costs to consumers in circumstances where this might not be possible in a workably competitive market. For instance, the pass through provisions provide for a pass through of costs that arise through regulatory change.
6.5.7(f), 6.6A, chapter 5	80–86, and 103–104	Assists in appropriate planning for changes in the commercial environment, including provision for new projects during a regulatory period.
6.20, 6.21, 6.6.1(a1)(d), and RoLR provisions	Parts 19–21	Provides for a statutory billing and settlements framework with prudential requirements (and other similar provisions) to minimise financial risk associated with providing and charging for services. There is also provision for dealing with potential risks associated with retailer insolvency.
6.6.5, 6A.7.1	–	Provides an opportunity to apply for a reopening of a determination for capital expenditure if an event that is beyond reasonable control of the service provider and the occurrence of the event could not have reasonably been foreseen by the service provider at the time of making the determination.

Source: NER & NGR; AER analysis.

2.4.4 Interrelationships

In publishing explanatory information for the Rate of Return Instrument, the AER must explain how it considered any interrelationships between estimates of financial parameters used, or to be used, to decide the rate or value.[95]

We have had regard to interrelationships between financial parameters when determining these. For example, we have determined different MRP estimates for different regulatory control periods to ensure these are not inconsistent with the risk-free rate used within the SL CAPM.

[95] NEL s18F(e)(v); NGL s30A(e)(v)

3 Form and structure of the rate of return guidelines

In this section we set out how we will estimate a rate of return that achieves the legislative objectives set out in section 2.

We set out how the allowed rate of return will be calculated under the Rate of Return Instrument and the components required to be estimated. This is discussed in section 3.1. Further detail on this approach for the return on equity components of the rate of return is discussed in section 5.

We also set out the choice on how each component is estimated – whether as a value that is estimated in this decision and applied in the Instrument, or as a formula that is set out in the Instrument and implemented automatically using pre-defined input data. This is discussed in section 3.2.

3.1 A nominal, vanilla, weighted average cost of capital

Our decision is to determine the benchmark allowed rate of return for a regulatory year as a weighted average of the return on equity for the regulatory period in which that regulatory year occurs and the return on debt for that regulatory year, weighted by our benchmark gearing ratio. The rate of return is calculated as follows:

$$WACC = (ke).(1 - G) + E(kd).G$$

Where:

- E(ke) is the expected return on equity
- E(kd) is the expected return on debt
- G is the proportion of debt in total financing, otherwise referred to as the gearing ratio.

Our allowed rate of return is determined on a nominal vanilla basis that is consistent with our estimate of the value of imputation credits.

We consider that a nominal, vanilla, weighted average of the return on equity and return on debt, without adjustment for capital raising costs, would best contribute to achieving the legislative objectives, for the following reasons:

- The use of a weighted average of the returns on equity and debt allow for the relative risks involved in investing as an equity holder or debt holder to be reflected in the overall rate of return.
- A nominal, vanilla rate of return provides for a simpler rate of return estimation and a more transparent and detailed modelling of the impacts of inflation and tax costs on regulated cashflows. The vanilla formulation reflects expected returns to debt holders pre-tax and expected returns to equity holders post company tax.
- This has been our longstanding approach that we have applied consistently over a number of years. We have not received any submissions suggesting that we should change any of these aspects of our rate of return estimation approach.

We also estimate an allowed rate of return that does not include the transaction costs involved in raising debt and equity capital. Instead, we will continue to assess efficient compensation of these costs through expenditure allowances at each regulatory determination. Similar to the treatment of inflation and tax, this approach is consistent with our current approach, provides for a simpler estimate of the allowed rate of return, and a more transparent and detailed modelling of capital raising transaction costs.

3.2 Automatic application

Amendments to the National Electricity Law and National Gas Law were passed by the South Australian Parliament in November 2018 and proclaimed in December 2018.

These amendments require us to make a binding rate of return instrument that states:

- for the rate of return on capital – the way to calculate the rate
- for the value for imputation credits – the value or the way to calculate the value.

Where the instrument states a way to calculate the rate of return or value for imputation credits, it must provide for the same methodology to apply for all regulated NSPs. Further, the methodology must be capable of being automatically applied during the life of the rate of return instrument, without any exercise of discretion. We cannot set different methodologies or a band of values from which we can choose at the time of applying the rate of return instrument in a regulatory determination.

Implementing this approach, our decision is to make an instrument that sets:

- the way to calculate the rate of return as a formula, being the weighted average of the return on debt and return on equity, weighted by the gearing ratio. For each input into this formula, we set:
  - the return on equity as a formula, being the Sharpe-Lintner Capital Asset Pricing Model (SL CAPM) formula
  - the return on debt as a formula, being the trailing average portfolio approach, with a transition from an on-the-day approach to a trailing average, and based on third party debt data
  - a fixed value for the benchmark gearing ratio
- a fixed value of imputation credits (gamma).

This is a similar approach to that used for the 2018 Instrument, which we consider has supported efficient investment. As we did in 2018, in deciding on whether to set a fixed value or a fixed formula we have considered whether a formula will reliably reflect the relationship between the true value of the parameter being estimated by the formula and the variables used as inputs into the formula. If the formula does not reliably reflect the relationship between the true parameter and its dependent variables, then changes in input variables may cause the parameter value resulting from the formula to change in a manner that is inconsistent with movements in the true parameter value. This has been a particular concern in estimating the market risk premium and considering the extent of any relationship between the market risk premium and the risk-free rate.

We have considered combining the use of a dividend growth model in combination with the Historical Excess Returns (HER) method to set the MRP during application of the 2022

Instrument. This would have allowed the market risk premium that impacts the return on equity to vary with market conditions. However, we have decided on balance that it is preferable to fix the market risk premium for the duration of the 2022 Instrument for several reasons, including:

- the uncertainty with the dividend growth model outputs and how well it will reflect true changes in the conditional MRP
- the application of the Instrument will only apply to any business for 5 years
- there is difficulty in estimating the conditional MRP. As seen in the expert session, there was no consensus among the experts on how to estimate the conditional MRP which captures variations in the MRP.
- this fixed MRP approach has been consistently applied by both the AER and the ACCC since the commencement of regulation in Australia.

Table 3.1 Choice of fixed value of formula for rate of return parameters

Parameter	Fixed value or formula	Decision
Rate of return	Formula	Our decision is to set the rate of return as a nominal vanilla weighted average of the return on equity and return on debt, weighted by the gearing ratio.
Gearing ratio	Fixed value	Observed values may change over time, but we consider that changes in target gearing ratios are likely to be infrequent and we see no reason to expect movement up or down. We continue to agree with the view expressed by the experts in 2018 that conceptually the capital structure of companies is stable. We also agree that gearing should not be determined based on spot values during the life of the instrument because short-term gearing data can be distorted by market fluctuations in share prices.[96] Therefore, it is appropriate to fix a value for the life of the rate of return instrument.
Risk-free rate	Formula	It is widely agreed among stakeholders and experts that the risk-free rate should be set as a formula because it fluctuates over time with changes in market conditions.
Equity beta	Fixed value	We consider that setting a fixed value for equity beta in the rate of return instrument will best contribute to the legislative objectives and we have not received any submissions that hold a contrary view. We consider equity beta for a benchmark regulated network is likely to be stable over long periods.
Market risk premium	Fixed value	The experts at our third concurrent expert evidence session this year considered how the market risk premium might vary with time and if this could be modelled.[97] There were also different views on whether there was a genuine negative relationship between the risk rate and the market risk premium.

96 Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, section 3.06, p.30. Dr. Martin Lally noted that the optimum historical averaging period is unclear but getting it ‘wrong’ and consequential over or under forecasting gearing would not materially affect gearing.

97 AER, Concurrent evidence session 3, 17 Feb 2022.

Parameter	Fixed value or formula	Decision
		We consider that the market risk premium may vary over time but we remain of the view we held in 2018 that its movement is not clearly linked to the risk-free rate. . We have not been persuaded by the evidence of a genuine and stable relationship between the risk-free rate and the market risk premium that can be reliably estimated. While we have considered using the dividend growth model to partially determine the MRP over the life of the instrument, we remain of the view a fixed MRP based on HER estimation is preferable. The lack of an acceptable robust method to calculate a market risk premium leads us to set a fixed value for the market risk premium rather than a fixed formula. This is the same approach as used in the current 2018 Instrument. This issue is discussed in more detail in section 7.2.
Return on debt	Formula	The return on debt fluctuates over time with changes in market conditions. Our decision is to set a formula that calculates the return on debt based on data from third party data providers for a particular benchmark credit rating and term to maturity.
Credit rating	Fixed value	Observed values may change over time, but we consider that change is infrequent because service providers take time to adjust to target levels, address legacy debt arrangements and manage transaction costs. We see no reason to expect movement up or down. Therefore, it is appropriate to fix a value for the life of the rate of return instrument.
Term to maturity	Fixed value	Observed values may change over time, but we consider that change is infrequent because service providers take time to adjust to target levels, address legacy debt arrangements and manage transaction costs. We see no reason to expect movement up or down. Therefore, it is appropriate to fix a value for the life of the rate of return instrument.
Value of imputation credits	Fixed value	Our approach to estimating the value for imputation credits (gamma) is set as the product of the distribution rate (the proportion of imputation credits generated by an efficient service provider that are distributed to investors) and the utilisation rate (the extent to which investors can use the imputation credits they receive to reduce their personal tax).

Where a fixed value will be used, the precise value will be specified in the rate of return instrument. The instrument will specify the value to a certain degree of place accuracy (that is, number of decimal places). In determining these fixed values, we consider the relative merits of the relevant evidence used to estimate the value and the degree of uncertainty in the estimation.

Where a formula will be used to determine a value, the instrument provides that 'all calculations made pursuant to this instrument must be done in Microsoft Excel or a software program that undertakes equivalent calculations, and must be unrounded'. This is the same approach taken in the current Instrument.

4 Benchmark gearing ratio

In section 3.1 we considered that the allowed rate of return should be calculated as the weighted average of the return on debt and return on equity (the weighted average cost of capital or WACC).[98] The gearing ratio is used to weight the required returns on debt and equity to derive the WACC. The level of gearing is interrelated with the equity beta and credit rating due to the effect of leverage risk on these parameters. There are also interrelationships between gearing and tax expense.

4.1 Draft decision

Our decision is to maintain a gearing ratio of 60% to derive the WACC for the 2022 Instrument. This decision is based on a benchmarking approach and examining relevant empirical evidence, primarily based on the market data of our comparator set of listed Australian service providers over the short and longer term. We are satisfied that a 60% gearing ratio, and our benchmarking approach to estimating this ratio, will contribute to the achievement of the legislative objectives to the greatest degree. We have also considered the robustness of the empirical estimates and the impact of changes to the gearing ratio on the overall rate of return in deciding whether a change to the current value is required.

We consider a benchmarking approach will contribute to the achievement of the legislative objectives because it both provides an incentive for service providers to adopt efficient gearing structures and prevents exposing consumers to different gearing levels adopted by individual service providers.[99] Empirically estimating the benchmark gearing ratio is also consistent with our estimation of equity beta and credit rating.[100] Section 4.2 discusses the key issues in estimating a benchmark gearing ratio and our consideration of these issues.

Taking into account all the evidence, particularly updated empirical estimates, we consider that a change from the current benchmark gearing ratio of 60% is not required. We recognise that evidence from our comparator set shows average market gearing over the last 5 and 10-year periods below 60%. However, we don't see a material gap between the updated data and the current 60% ratio. We also see some variability in the data and note that our approach – which uses historical book values of debt as a proxy for market values – may underestimate the true market gearing ratio as interest rates have been declining. The materiality of a proposed change and sustainability of new arrangements are also 2 key elements of our assessment criteria. Our expert report from Partington and Satchel noted

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98 NEL, s18I(4); NGL, s30D(4).

99 All else equal, variabilities in gearing levels lead to different rates of return and consequently different prices across service providers.

100 In addition to weighting the returns on debt and equity to form a WACC, the gearing ratio can affect the leverage risk of a firm. We expect leverage risk to have an effect on equity beta and be a factor in the considerations of credit rating agencies.

that small changes in gearing are likely to have little appreciable effect on the overall WACC, and regulatory action may only be justified at the extremes (gearing close to 0 or 1).[101]

This is due to 2 effects that gearing has on the overall rate of return:

- the ratio of return on debt to return on equity
- the re-leveraged equity beta applied to the return on equity.

In theory, these effects mostly offset each other.[102] This is consistent with advice from our expert Dr Lally in 2018 that an 8% change in benchmark gearing would have minimal impact on the allowed rate of return (around 0.1%).[103] Combining these considerations with our assessment of the updated empirical estimates, we do not think the data provides a sufficient foundation to change from our current approach.

4.2 Issues and considerations

Our empirical estimation of a benchmark gearing ratio is primarily based on market evidence from a comparator set of listed Australian service providers over the short term (last 5 years) and longer term. This includes consideration of the treatment of certain 'hybrid' securities and their impact on estimation of the benchmark gearing ratio.

We consider that the gearing ratios of Australian service providers will most closely reflect the regulatory and commercial risks involved in providing regulated services. Benchmarking against listed service providers allows us to consider market gearing values and is consistent with our approach to estimating the benchmark credit rating and equity beta parameters. Updated estimates of the gearing ratios for our comparator set of service providers are presented in section 4.2.1.[104]

Our updated analysis shows that the average gearing level of our comparator set over the past 5, 10 and 16 years are 52%, 55% and 60%, respectively. Considering both short and longer historical averages allows us to take into account more recent data as well as the larger comparator set available from older data.

Market values have been accepted by our experts as being more appropriate than book values in our assessment of gearing.[105] The use of market and book values, and of the appropriate comparator set and sample period, are further considered in section 4.2.2.

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[101] Partington and Satchell, *Report to the AER: WACC and Leverage*, May 2021, pp. 27–28.

[102] Return on equity is generally higher than return on debt, therefore a lower gearing will increase the overall return (before accounting for the impact on beta). However, a lower gearing also generally lowers the equity beta applied to the return on equity, in turn reducing the overall rate of return.

[103] Dr Martin Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, pp. 11–13.

[104] Our empirical evidence was based on the financial reports of closely related comparators along with the data provided by Bloomberg. The estimates from Bloomberg were broadly consistent with our estimates.

[105] CEPA, *Expert Joint Report*, April 2018, p.27.

4.2.1 Updated empirical estimates

Table 4.1 presents gearing estimates for 5 comparator businesses since 2006 using market values of equity and book value of debt (book value of debt is used as a proxy for the market value of debt).[106] It shows a declining trend in the market value gearing estimates. For the 2018 Instrument the 5-year and 10-year averages (to 2017) were 54% and 61%, respectively. The 5, 10 and 16-year averages updated to 2021 are 52%, 55% and 60%, respectively.

Table 4.1 AER gearing estimates based on market values of equity and book values of debt

Year	ENV	APA	DUE	AST	SKI	Average
2012	63%	47%	72%	59%	59%	**60%**
2013	53%	46%	71%	57%	62%	**58%**
2014	47%	45%	64%	58%	55%	**54%**
2015	n/a	50%	62%	59%	56%	**57%**
2016	n/a	49%	51%	54%	54%	**52%**
2017	n/a	49%	n/a	50%	52%	**50%**
2018	n/a	45%	n/a	53%	57%	**52%**
2019	n/a	45%	n/a	53%	59%	**52%**
2020	n/a	45%	n/a	57%	59%	**54%**
2021	n/a	49%	n/a	49%	58%	**52%**
5-year average	**n/a**	**47%**	**n/a**	**52%**	**57%**	**52%**
10-year average	**54%**	**47%**	**64%**	**55%**	**57%**	**55%**
Average since 2006	**65%**	**52%**	**71%**	**57%**	**60%**	**60%**

Source: Annual reports, AER analysis
Notes: ENV is Envestra Limited, APA is APA Group, DUE is DUET Group, AST is AusNet Services, and SKI is Spark Infrastructure. SKI estimates are as at 31 December each year (except 2021 which represent 30 June estimates due to availability of data). AST estimates are as at 31 March each year. All other estimates are as at 30 June each year. Average represents the average for all firms in a year and does not make any adjustment for these timing differences.
The estimates presented reflect our decision to exclude all hybrid securities from analysis, which may result in discrepancies with values presented in 2018 and annual updates.

For completeness, in Table 4.2 we present gearing estimates for 5 comparator businesses over the past 16 years using book values of both equity and debt. The average gearing level of our comparator set is 72% over the 16 years to 2021, 70% for the 10 years to 2021 and 72% in the last 5 years to 2021. The 5-year and 10-year estimates have increased slightly from 68% and 70% since the 2018 Instrument estimates to 2017.

Table 4.2 AER gearing estimates based on book values of equity and debt

Year	ENV	APA	DUE	AST	SKI	Average
2012	78%	64%	77%	61%	68%	**70%**

[106] Choice of the comparator set is discussed in section 4.2.2.

Year	ENV	APA	DUE	AST	SKI	Average
2013	71%	63%	79%	61%	68%	**68%**
2014	71%	65%	76%	64%	67%	**69%**
2015	n/a	68%	74%	69%	66%	**69%**
2016	n/a	71%	65%	64%	69%	**67%**
2017	n/a	71%	n/a	62%	69%	**67%**
2018	n/a	70%	n/a	66%	73%	**70%**
2019	n/a	74%	n/a	69%	76%	**73%**
2020	n/a	77%	n/a	74%	77%	**76%**
2021	n/a	77%	n/a	66%	76%	**73%**
5-year average	**n/a**	**74%**	**n/a**	**67%**	**74%**	**72%**
10-year average	**73%**	**70%**	**74%**	**65%**	**71%**	**70%**
Average since 2006	**80%**	**69%**	**76%**	**64%**	**74%**	**72%**

Source: Annual reports, AER analysis

4.2.2 Estimation approach

The approach to estimating a benchmark gearing ratio set out in our 2018 Instrument was discussed in our *Overall rate of return draft working paper* in July 2021.[107] In this draft decision we have largely maintained this estimation approach. In response to our draft working paper and final working paper, there was a high degree of agreement among stakeholders that this approach to estimating gearing remains appropriate.[108] Although we did not focus on gearing in our recent concurrent evidence sessions, experts participating in the concurrent expert evidence sessions in 2018 supported this approach to estimating gearing.[109]

4.2.2.1 Market and book values of equity

A gearing ratio requires estimates of the value of a business's debt and equity.[110] These values can be obtained from book values and market values. Book values are derived from

[107] AER, *Rate of return - Overall rate of return draft working paper*, July 2021, pp. 29–38.

[108] AGPA, *Rate of Return Instrument information paper - Submission*, 11 March 2022, p. 26; APA, *2022 Rate of Return Instrument information paper and final Omnibus paper - Submission*, 11 March 2022, pp. 73-74; CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, pp. 123-124; (2021) - ENA, *Submission - Overall rate of return*, 3 September 2021, p. 27; Ausgrid, *Submission - Overall rate of return*, 3 September 2021, pp. 3-4; Energy Queensland, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 1; Endeavour Energy, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 4; AEC, *Overall rate of return, Equity and Debt*, 3 September 2021, p. 1; NSG, *Overall rate of return, Equity and Debt*, 3 September 2021, p. 5

[109] AER, *Concurrent Evidence Session 1 - Proofed Transcript*, 15 March 2018, pp. 76-99

[110] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p. 69.

financial statements, whereas market values are obtained from market prices of debt and equity securities.

In 2018, we placed primary weight on estimates from market values and secondary weight on book values of the same listed firms to estimate the benchmark level of gearing. Our review of domestic regulators also indicates that 4 of the 7 regulators use market value estimates only, while Brattle's review of international regulators indicates that a range of approaches are used when estimating gearing and 2 regulators explicitly use market value estimates.[111] A report we commissioned from Partington and Satchell also considered that market values should be used when estimating gearing where possible.[112]

The market value of debt is not typically available because corporate debt is not as frequently traded as market equity.[113] Hence, we considered book value of debt an acceptable proxy for market value and use book value of debt to estimate gearing.

However, using the historical book value of debt is not a perfect proxy and may underestimate gearing where interest rates have been declining. Networks have a combination of fixed rate and floating rate debt instruments. The market value of fixed rate debt tends to have a negative relationship with the interest rate because as interest rates fall, demand for fixed rate bonds – and the price of those bonds – increases. Since around 2009, interest rates – including yields on 10-year non-financial corporate bonds – have trended down, suggesting that the historical book value of debt taken out during our sample period might underestimate the current market value of debt. In turn, the gearing estimated using historical book values of debt may underestimate true market gearing.

Submissions from APA, AusGrid, ENA, Energy Queensland and Endeavour Energy following our draft working paper agreed with continuing to primarily use market values to estimate gearing.[114] CRG's submission to the draft working paper recommended revisiting the estimation of gearing based on book values.[115] This is due to the divergence in market value and book value, which CRG submits should be examined before coming to a decision. In its submission to the Information paper, CRG noted the limitations of market gearing and noted

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[111] Brattle, *A review of international approaches to regulated rates of return*, June 2020. We reviewed 7 domestic regulators: Economic Regulation Authority in West Australia (ERAWA), Queensland Competition Authority (QCA), Essential Services Commission of South Australia (ESCOSA), and Independent Pricing and Regulatory Tribunal (IPART) in New South Wales use market values. Independent Competition and Regulatory Commission (ICRC) in Canberra, Essential Services Commission (ESC) in Victoria and Australian Competition and Consumer Commission (ACCC) are not determinative.

[112] Partington and Satchell, *Report to the AER: WACC and leverage*, 19 May 2021, p. 20.

[113] Lally, M., *Review of the AER's views on gearing and gamma*, 7 May 2018, pp. 7-8.

[114] APA, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 1; AusGrid, *Submission - Overall rate of return*, 3 September 2021, pp. 3-4; ENA, *Submission - Overall rate of return*, 3 September 2021, pp. 22-23; Energy Queensland, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 1; Endeavour Energy, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 4.

[115] CRG, *Submission - Overall rate of return, Equity and Debt - Volume 1*, 3 September 2021, pp. 35-47.

the stability of book gearing over the period as evidence that the case for changing overall gearing based on market value estimation was low.[116]

We maintain that primary weight should be placed on gearing estimates from market values. We consider that they better reflect current market current information on the efficient financing of the benchmark entity. As market value of debt is not readily available, we use book value of debt as a proxy for market value of debt. However, this may cause discrepancies between our gearing estimation and true market gearing through the interest rate cycle and may underestimate (overestimate) the true market gearing when interest are falling (rising).

The use of market values promotes consistency between our benchmark gearing ratio and other rate of return parameters that are typically informed by market data. We consider this important given the relationship between leverage risk and equity beta, and the estimation of equity beta from returns data of listed equity.

4.2.2.2 Comparator set

Our comparator set for gearing estimation includes 5 listed Australian service providers with data back to 2006. However, for the most recent 5-year period the number of listed firms has dropped from 5 to 3, consisting of APA, AST and SKI. The firms in our comparator set have varying degrees of unregulated activities, which we must take into account when exercising our regulatory judgement. APA has around 90% unregulated revenue, so its inclusion may be less representative of the risks involved in providing regulated services.[117]

In its submission to our draft working paper ENA states that the change in the average gearing estimate is partially the result of the change in the comparator set, thus the support for any change in gearing is weak.[118] We agree with this view. CRG also submitted that we should consider excluding firms that have been delisted for 5 or more years from our analysis. We do not consider that this is required because historical information from firms that have been delisted can still be useful in our consideration of benchmark gearing, noting the limitations of this data.

We consider that our current comparator set and sample period remains appropriate for estimating the benchmark gearing. We do not consider that adding gearing estimates from other sectors or countries is required for this review. We do not consider there is sufficient evidence to suggest that any of these options would provide a significant improvement to our existing comparator set. As the overall level of risk of providing regulated services may differ between sectors and countries, we consider it appropriate to place greater weight on gearing estimates from Australian listed service providers. This is consistent with our comparator set used to estimate equity beta. If we maintain our current comparator set for the next Instrument, we may only have one listed comparator firm (APA) for the 2022–26 period.[119] As

[116] CRG, *Submission - Rate of Return Instrument information paper*, 11 March 2022, p. 124.

[117] APA Group, *Annual Report 2021*, August 2021, p. 18.

[118] ENA, *Submission - Overall rate of return*, 3 September 2021, p. 28.

[119] AST and SKI were both delisted in the 2021–22 financial year.

such, we recognise that our current approach may not best satisfy the criteria for sustainability and flexibility for changing market conditions in the future. We aim to further explore ways to use other comparators for estimating gearing in future reviews.

4.2.2.3 Sample period

In 2013 and 2018 we considered gearing estimates from comparable businesses over a historical 10-year period, taking account of both the 10-year and 5-year average gearing levels.[120] For the 2022 Instrument, we have also considered the longer-term gearing average levels, consistent with our approach to estimating equity beta. This is also appropriate because share price movements and changes in the market capitalisation of a listed company can distort shorter-term gearing estimates.[121]

The majority of submissions received from stakeholders on our draft working paper noted that the downward trend in market value gearing is likely a result of short-term movements in market data for a small number of firms.[122] ENA and AusGrid suggest solely using the 10-year average to calculate gearing to reduce the volatility from these short-term movements, while CRG recommends focusing on the 5-year average to better reflect the declining trend in market value for gearing.[123] The CRG also submitted that maintaining the current 60% gearing ratio was appropriate.

We consider that gearing choices typically reflect a long-term investment strategy. As such, we should continue to consider averages over both the shorter and longer terms when deciding on the benchmark gearing. Our empirical analysis of equity beta and credit ratings involves consideration of data over a relatively long time period of 5 to 10 or more years. We consider it is generally desirable to have a consistent approach to estimating rate of return parameters (where possible). We recognise that there is a trade-off between the stability of the longer-term estimates based on a larger dataset, and the timeliness and relevancy of the shorter-term estimates based on a small dataset. As such, we recognise that there is some regulatory judgement required in the weight to apply to each estimate.

4.2.2.4 Hybrid securities

Hybrid securities are securities that have characteristics of both debt and equity. They often do not have simple debt characteristics like simple senior debt bond issuances or bank debt and it is important to understand the terms and conditions of each security.

[120] AER, *Explanatory Statement - Draft rate of return guideline*, August 2013, pp. 179-180; AER, *Explanatory Statement - Draft rate of return guideline*, July 2018, pp. 168–169.

[121] CEPA, *Evidence session 1 & 2 – Expert Joint Report*, April 2018, p. 30.

[122] ENA, *Submission - Overall rate of return*, 3 September 2021, p. 18-19; Endeavour Energy, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 4; AEC, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 1; NSG, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 5.

[123] ENA, *Submission - Overall rate of return*, 3 September 2021, p. 23-24; AusGrid, *Submission - Overall rate of return*, 3 September 2021, p. 3-4; CRG, *Overall rate of return, Equity and Debt - Volume 1*, 3 September 2021, p. 37-38.

Our 2018 Instrument adopted different approaches to account for these securities in estimating gearing, depending on the characteristics of the securities. We did not include hybrid securities from Envestra and Spark Infrastructure in our gearing calculation because they were not sufficiently similar to debt. Hybrid securities from AusNet Services were included but were unlikely to be material when estimating gearing.

We have observed an increased use of hybrid securities by regulated businesses in 2020 and 2021.[124] Our *Overall rate of return draft working paper* explored further the impacts of including and excluding hybrid securities as well as a sensitivity analysis of different options.[125] This previous analysis did not include post-2018 issued hybrid securities, as these were issued after the 2020 annual reports were published. For this explanatory statement we have updated the sensitivity analysis for the information that became available since the release of the *Overall rate of return draft working paper.*

We have conducted a sensitivity analysis on the inclusion of hybrid securities on our gearing estimates using the following scenarios:

- 2018 approach (AusNet included pre-2018, others excluded)
- Hybrids included as 100% debt
- Hybrids included as 100% equity
- All hybrids excluded for all businesses (alternatively, hybrids included as 50% debt/equity).

Table 4.3 displays the results from our sensitivity analysis.

Table 4.3 AER hybrid securities gearing sensitivity analysis

Value	2018 approach	100% hybrids as debt	100% hybrids as equity	Hybrids excluded from debt and equity [50% share]
Market value				
5-year industry average estimates	53%	55%	49%	52% [52%]
10-year industry average estimates	55%	56%	52%	55% [54%]
Average since 2006	60%	62%	57%	60% [59%]
Book value				
5-year industry average estimates	72%	74%	66%	72% [70%]
10-year industry average estimates	70%	71%	66%	70% [69%

124 AusNet Services issued 2 60-year hybrid security in the form of non-convertible subordinated notes in 2020 and 2021, and TransGrid (15% owned by Spark Infrastructure) secured a hybrid security in the form of subordinated notes from the Clean Energy Finance Corporation (CEFC) in 2021.

125 AER, Overall rate of return – Draft working paper, July 2021, p. 37.

Average since 2006	72%	73%	67%	72% [70%]

Source: Hybrid securities sensitivity analysis, AER analysis

Our draft working paper also sought submissions from stakeholders on the appropriate treatment of hybrid securities for our assessment of gearing. ENA, Ausgrid, Energy Queensland, AusNet and NSG stated that hybrid securities should be included in gearing and also be used to inform cost of debt for consistency.[126] The MEU suggested considering hybrid securities as debt until they are converted to equity.[127] APGA stated that hybrid securities should not be included in benchmark gearing due to limited issues and different characteristics across current hybrids.[128] APA and CRG also submitted that they do not consider the use of hybrid securities forms part of the portfolio of financing instruments used by a benchmark service provider.[129] However, CRG noted that the inclusion of hybrid securities should be revisited in the next review if they become more prevalent.

Our draft decision is to exclude hybrid securities for our empirical estimates of gearing. However, in exercising our regulatory judgement when determining the benchmark gearing ratio, we will also have regard to the results of our sensitivity analysis on the treatment of hybrid securities. We consider that excluding hybrids from gearing estimation is almost equivalent to treating hybrids as 50% debt and 50% equity – a common approach used by credit rating agencies in their assessments. ENA noted in its submission to our *Debt draft working paper* that this favourable treatment by credit rating agencies is the reason that AusNet's 'hybrid' instruments are classified as hybrids, even though they cannot be converted into equity.[130]

It is not clear that the use of hybrid securities is reflective of the practice of a benchmark service provider. Furthermore, our updated hybrid sensitivity analysis shows that the difference between excluding these values and treating them as 100% debt does not have a material impact on the overall gearing level. However, should hybrid securities become more prevalent and material in the future we will investigate the appropriate treatment and allocation of securities for estimating the benchmark gearing ratio.

We consider that maintaining our 60% benchmark gearing ratio for the 2022 Instrument remains appropriate. We do not consider that there is sufficient evidence to adopt a different

[126] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper - submission*, 11 March 2022, p. 32; ENA, *Submission - Overall rate of return*, 3 September 2021, pp. 24-27; Ausgrid, *Submission - Overall rate of return*, 3 September 2021, p. 4; Energy Queensland, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 1; AusNet, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 4; NSG, *Submission - Overall rate of return, Equity and Debt*, 3 September 2021, p. 5.

[127] MEU, Submission - *Overall rate of return, Equity and Debt*, 3 September 2021, pp. 3-5.

[128] APGA, *2022 Rate of Return Instrument information paper - Submission*, 11 March 2022, p. 26

[129] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper - Submission*, 11 March 2022, p. 73; CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, pp. 124-125.

[130] ENA, *Submission - Debt*, 3 September 2021, p. 24.

ratio. The evidence indicates that gearing remains close to 60% when primarily focusing on market value estimates in our available comparator set with a longer-term outlook. The shorter-term outlook suggests gearing may be slightly lower than 60%, but if we made a small change to the gearing ratio to reflect this, it will have little appreciable effect on the overall rate of return due to the two offsetting effects of gearing on the overall rate of return. We recognise that using the historical book value of debt as a proxy for market value may underestimate current market value of debt and, in turn, underestimate the actual market gearing level. This means that the actual shorter-term gearing level might not be as low as out estimates indicate.

4.2.3 Assessment criteria

As discussed above, our consideration of issues show that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. In this regard, where necessary we have applied our assessment criteria to assist us exercise our judgement. Table 4.4 sets out our assessment criteria and key areas where they have assisted us make our decision.

Table 4.4 Criteria of draft decision benchmark gearing ratio assessment

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data.	Empirical estimates underlying decision reflect updated market information and well-accepted economic and finance principles. We maintain a preference for market values over book values as more reflective of market information.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose (b) promote simple over complex approaches where appropriate.	Draft decision is primarily based on market data and a comparator set of listed Australian service providers gearing levels over the short and longer term using a simple estimation method.
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Estimation approach based on robust, transparent and replicable market-based analysis in accordance with good practice. Have had regard to deficiencies in data as evident.
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale.	Models underlying analysis of benchmark gearing are based on robust quantitative modelling and avoid arbitrary adjustments without sound rationale. Have had regard to deficiencies and biases in data where relevant.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	Market data used in gearing estimation is sourced from verifiable financial statements and reflects latest data available at the time.

6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	Estimation approach includes latest information and has regard to shorter-term outcomes to the extent they reflect changing market conditions.
7	The materiality of any proposed change.	Our approach is to only implement a change to overall gearing if material and likely to be persistent. Small changes to benchmark gearing not likely to be material.
8	The longevity or sustainability of new arrangements.	Consider the gearing ratio likely to be stable. Estimation approach may need adjustment in future due to declining comparator set. Unless clear change required, we have a preference to maintain current benchmark gearing ratio.

5 Overall approach to return on equity

We estimate the expected return on equity using the approach we developed in our 2013 guidelines and continued in our 2018 Instrument. This approach is described as the foundation model approach. This chapter explains our draft decision under each step of the foundation model approach for estimating the final equity risk premium (ERP). The ERP is then added to the risk-free rate to determine the expected return on equity.

The critical allowance for an equity investor in an efficient firm in the supply of Australian regulated energy network services is the allowed equity risk premium over and above the estimated risk-free rate at a given time. Under the standard application of the SL CAPM, this equals the MRP multiplied by the equity beta.

5.1 Draft decision

Our draft decision is to maintain our current approach to estimate the expected return on equity by using the foundation model approach, which is a 6-step process:

- Step 1 – Identify relevant material.
- Step 2 – Determine role and how best to employ relevant material, including determining the foundation model (SL CAPM).
- Step 3 – Implement foundation model. Determine SL CAPM input parameter ranges and point estimates.
- Step 4 – Other relevant information. Estimate other relevant information used to inform overall return on equity.
- Step 5 – Evaluate information from steps 3 and 4.
- Step 6 – Distil return on equity point estimate. Use SL CAPM point estimate as a starting point and select final return on equity value, taking into account information from steps 4 and 5.

Our draft decision under step 2 is to calculate the return on equity using the Sharpe-Lintner CAPM (SL CAPM). Under step 3 our input parameters for the SL CAPM are a market risk premium of 6.8% and an equity beta of 0.6, resulting in an ERP of 4.08%. We combine this ERP with the risk-free rate using a term that matches the length of the regulatory period (typically 5 years), observed at the time the 2022 Instrument is applied. Having considered the information under steps 4 and 5, our draft decision is to adopt the ERP estimate derived under step 3 without revisiting the SL CAPM input parameters.

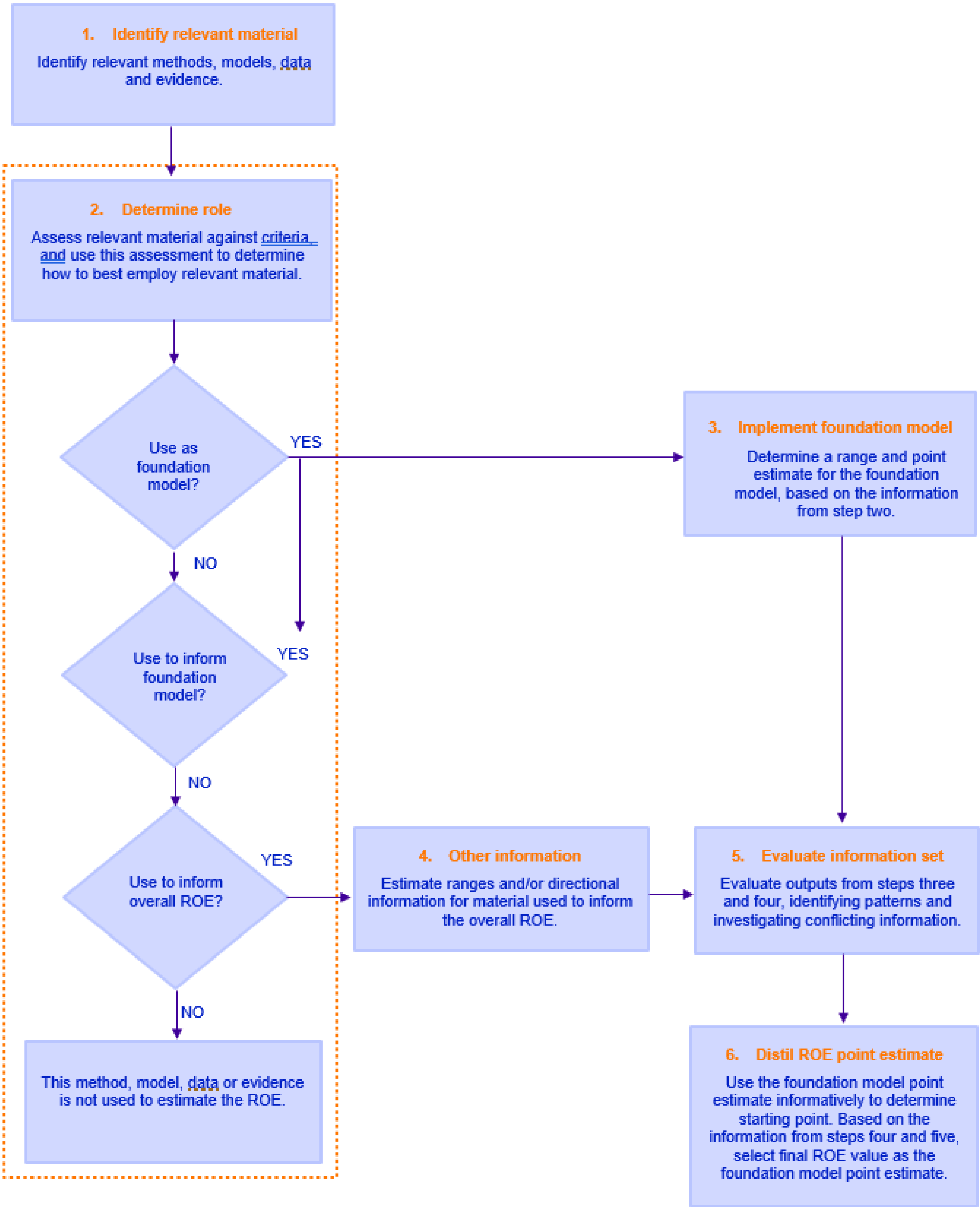
Combining our ERP of 4.08% with a placeholder risk-free rate of 1.82% results in an expected return on equity of 5.90%.[131] We consider this estimate resulting from applying our foundation model approach will, or is most likely to, contribute to the achievement of our legislative objectives. We explain the reasons supporting this conclusion in detail in sections

[131] The 5-year term risk free rate has been calculated over 20 days at the end of February 2022.

6, 7 and 8 which relate to our return on equity parameter estimates (risk-free rate, MRP and beta), and in section 11, where we evaluate other relevant information to inform our overall return on equity point estimate.

Figure 5.1 presents the 6 steps graphically.

Figure 5.1 Foundation model approach flowchart



5.2 Issues and considerations

The foundation model approach provides a framework for systematically considering relevant information and then exercising our judgement on the appropriate regulated return on equity. It does not require all information to be used if it did not satisfy our assessment criteria. Our approach is to assess all information and employ it according to its merits.

We consider that our 6-step process (foundation model approach):

- provides opportunity to evaluate the merits of relevant evidence
- applies appropriate weight to the relevant evidence at the most suitable point in the assessment
- uses a well-established forward-looking asset pricing model to compensate for systematic risk populated with parameter value estimates that:
  - are consistent with good finance theory
  - are based on market data and developed using robust empirical methods
  - recognise and allow for inherent uncertainties in the data.

In response to our information paper,[132] networks stakeholders raised concerns about steps 4 to 6 of our foundation model approach – namely, how we select a final return on equity value in step 6 while also considering information from steps 4 and 5. APGA submitted that return on equity crosschecks can and should play an important role but that the foundation model would still have primacy because the crosschecks are only capable of choosing a point within the confidence interval associated with applying that model. In their view, crosschecks are only a check on the judgement that the AER has used to choose a point within the range that its data and foundation model suggest is reasonable.[133] ENA submitted that return on equity crosschecks should not mechanically feed back into the revision of the allowed return or of any particular parameter but rather it should highlight a divergence between the AER's approach and that of other comparable regulators – something for the AER to consider.[134] APA also considered that the AER's approach to rate of return on equity estimation limits the scope for subsequent crosschecks.[135] Consumer groups on the other hand submitted that the AER should endeavour to explain how it has considered these crosschecks (or not) in influencing its estimates, and the reasons.[136]

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[132] AER, *Rate of return – Information paper and call for submissions*, December 2021.

[133] APGA, *APGA Submission to the AER: Rate of return final omnibus paper and information paper*, 11 March 2022, pp. 19-20.

[134] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers,* 11 March 2022, pp. 136.

[135] APA, *APA submission on the Rate of Return Information Paper, Omnibus Paper, and Expert Evidence*, 11 March 2022, p. 78.

[136] CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper,* March 2022, pp. 126-127.

In our view, steps 4 to 6 are an integral part of our return on equity approach, although we acknowledge their limitations. These steps – in conjunction with the use of a foundation model – provide an appropriate balance between a relatively replicable and transparent process and providing flexibility to consider market circumstances. We consider this provides scope for more openness and flexibility to test the reasonableness of the final return on equity point estimate. This recognises that ultimately our rate of return must meet legislative objectives and requires the exercise of judgement. Any potential adjustments will be reasoned against our legislative objectives. Based on the evidence in step 4 and our evaluation under step 5, we may reconsider the foundation model input parameter estimates, or more fundamentally, we may also reconsider the foundation model itself. That said, we consider it reasonable to expect our final return on equity estimate to be within a reasonable range in most market circumstances.

We now discuss each of the 6 steps in our foundation model and our consideration of the evidence.

5.2.1 Steps 1 and 2 – Identify relevant material and determine role

Overall, we have not identified any additional classes of material that we did not consider when preparing our 2018 Instrument. Therefore, the list of material we employed in 2018 remains appropriate for our 2022 Instrument.

In 2020 we consulted with stakeholders on alternative equity models through our 'CAPM and alternative return on equity models' working paper[137] to settle our position early in the process.

In August 2020 we published a consultation paper[138] along with an expert report from Graham Partington and Stephen Satchell, who provided expert advice on alternative models.[139] A report by Brattle Group also provided relevant information on the use of equity models by international regulators.[140]

Having considered submissions on our discussion paper and the material in the expert reports, our final position set out in December 2020 is to maintain the use of the standard SL CAPM as the foundation model in our 2022 Instrument.[141] There was general support from all stakeholders for the use of the SL CAPM as the foundation model, but some noted the importance of how the SL CAPM is implemented. We note the importance of the calculation of the input parameters of the SL CAPM. Sections 6, 7 and 8 discuss the risk-free rate, MRP and equity beta parameters respectively.

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137 AER, Final working paper, *CAPM and alternative return on equity models, December 2020.*

138 AER, Draft working paper, *CAPM and alternative return on equity models, December 2020.*

139 Partington and Satchell, *Report to the AER, Alternative asset pricing models*, 30 June 2020.

140 Brattle, *A review of international approaches to regulated rates of return, Prepared for the AER*, 30 June 2020

141 AER, Final working paper, *CAPM and alternative return on equity models,* December 2020, p. 24.

Table 5.1 sets out all of the relevant material and the role we have applied to it, if any, within our overall framework.

Table 5.1 Relevant material and role

Material (Step 1)	Role in 2018 (Step 2)	Role in 2022 and relevant merit
Sharpe-Lintner Capital Asset Pricing Model (SL CAPM)	Foundation model.	Foundation model.[142]
Black CAPM	Related to the overall return on equity. However, at the time of finalising the 2018 Instrument we had diminished confidence in the robustness of the Black CAPM. We were not persuaded to adjust the Sharpe-Lintner CAPM estimate for the theory of the Black CAPM.	No role.
Dividend growth models (DGMs)	Can be used to inform the market risk premium. However, at the time of finalising the 2018 Instrument we had diminished confidence in the robustness of the DGMs. We were not persuaded to select a market risk premium toward the top of the observed empirical estimates of historical excess returns.	We have explored DGMs extensively and the information they can provide in setting the MRP. We include an outline of how the DGM could be given meaningful weight in setting the MRP as an alternative approach to our draft decision. We consider historical excess returns provide the best estimate of the MRP at this time because we are not confident that the conditional MRP can be accurately modelled using the DGM (see section 7).
Fama-French 3-factor model	No role.	No role.
Wright approach (TMR approach)	We have diminished confidence in the robustness of the Wright approach, leading us to place no reliance on it.	Having evaluated the theoretical basis and empirical evidence of the TMR approach, we have determined that the TMR approach should not play a role in our MRP estimation process (see section 7).
Commonwealth Government Securities	Inform foundation model parameter estimates (risk-free rate).	Inform foundation model parameter estimates (risk-free rate – see section 6).
Observed equity beta estimates	Inform foundation model parameter estimates (equity beta).	Inform foundation model parameter (equity beta – see section 8).
Historical excess returns	Inform foundation model parameter estimates (MRP).	Inform foundation model parameter estimates (MRP – see section 7).
Survey evidence of the MRP	Inform foundation model parameter estimates (MRP).	Inform foundation model parameter estimates (MRP – see section 7).
Implied volatility	Inform foundation model parameter estimates (MRP).	Inform foundation model parameter estimates (MRP – see section 7).
Other regulators' MRP estimates	Inform foundation model parameter estimates (MRP).	Inform foundation model parameter estimates (MRP – see section 7).
Debt spreads	Inform foundation model parameter estimates (MRP).	Inform foundation model parameter estimates (MRP – see section 7).

142 AER, *CAPM and alternative return on equity models, December 2020.*

Material (Step 1)	Role in 2018 (Step 2)	Role in 2022 and relevant merit
Dividend yields	Inform foundation model parameter estimates (MRP).	Inform foundation model parameter estimates (MRP – see section 7).
Other Australian regulators' return on equity estimates	Inform the overall return on equity.	Inform the overall return on equity (see section 5.2.4).
Takeover/valuation reports	Inform the overall return on equity.	Inform the overall return on equity (see section 5.2.4).
Brokers' return on equity estimates	Inform the overall return on equity.	Inform the overall return on equity (see section 5.2.4).
Comparison with return on debt	Inform the overall return on equity.	Inform the overall return on equity (see section 5.2.4).

Source: AER, *Rate of return instrument, Explanatory Statement*, December 2018, pp. 82–83.

5.2.2 Step 3 – Implement the foundation model

Implementing the foundation model is a key step in our 6-step approach and has stood the test of time. After assessing the relevant evidence, we consider the best estimates for the SL CAPM parameters are:

- a formula for calculating the risk-free rate based on yields on Commonwealth Government Securities (CGS) matching the length of the regulatory period
- a value of 0.6 for equity beta
- a value of 6.8% for market risk premium.

These parameter input point estimates and reasons are discussed in sections 6, 7 and 8.

5.2.3 Step 4 – Other information

Under step 4, we set out the form of the other relevant information that will inform the overall return on equity estimate. The additional information we will consider under step 4 is in Table 5.2 and is consistent with our 2018 Instrument.

Table 5.2 Other relevant information

Other relevant information	Form of information
Other Australian regulators' return on equity estimates	Can inform point in time estimate if they are sufficiently comparable
Brokers' return on equity estimates	Point in time and directional
Takeover/valuation reports	Directional
Comparison with return on debt	Relative

Source: AER analysis

We have considered international regulators' return on equity estimates in section 11. We did not receive any other submissions from stakeholders to consider additional classes of other relevant information that we have not already considered.

5.2.4 Step 5 – Evaluation of information

Under step 5, we evaluate the outputs from steps 3 and 4. We evaluate the strengths and weaknesses of the relative merits of the other relevant information in forming a view as to whether, overall, they persuade us to adjust our equity risk premium. In undertaking this evaluation, we may consider matters including:

- patterns shown in the other relevant information
- the strengths and limitations of the other relevant information
- the magnitude by which the other relevant information suggests that the foundation model point estimate underestimates or overestimates the equity risk premium (if at all).

Since our overall rate of return crosschecks section is also evaluating the suitability of our return on equity, we have discussed our evaluation of other relevant information in chapter 11.

5.2.5 Step 6 – Select point estimate

We have considered the reasons for our input parameter point estimates using our foundation model approach calculated via the SL CAPM in sections 6, 7 and 8 and our evaluation of other relevant information in chapter 11. As a result, we are satisfied that an expected return on equity using a market risk premium of 6.8%, an equity beta of 0.6 and a risk-free rate observed at the time the Instrument is applied, will contribute to achieving our legislative objectives. That is, using a well-established forward-looking asset pricing model to compensate for systematic risk and populating it with parameter value estimates based on market data reflects a good estimate of expected market cost of capital. When capital is priced via a competitive market, the opportunity to beat the benchmark creates incentives to seek efficiencies. In a similar manner, providing a benchmark return on equity for service providers, reflecting a market rate of return for the risk of providing regulated services, furthers the revenue and pricing principles and is in the long-term interests of energy users.

5.2.6 Assessment criteria

As discussed above, our consideration of issues shows that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. Where necessary we have applied our assessment criteria to assist us to exercise our judgement. Table 5.3 sets out our assessment criteria and key areas where they have assisted us to make our decision.

Table 5.3 Criteria of draft decision assessment about the foundation model approach

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data.	The foundation model approach provides a framework for systematically considering all relevant material (the foundation model and other relevant information) as shown in Table 5.1. We consider material to be relevant if it is based on information, methods and models that are reflective of economics and finance principles and market information. However, using the foundation model and other relevant information informatively, as opposed to determinately, acknowledges the need for regulatory judgement in estimating the expected

Assessment criteria		Draft decision
		return on equity. Given the breadth of material and range of values that may represent reasonable estimates of the expected return on equity, the use of judgement is unavoidable.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and consider the limitations of that purpose (b) promote simple over complex approaches where appropriate.	The foundation model approach provides a framework for systematically considering all relevant material (the foundation model and other relevant information) to estimate the expected return on equity. As such, it is fit for purpose. Using a foundation model approach is also relatively simple to implement, particularly in comparison with combining different estimates of multiple models. For example, our foundation model, the SL CAPM, is a model that stakeholders are familiar with already given its widespread use among market practitioners and other regulators.
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Using our foundation model, the SL CAPM, to determine the expected return on equity, provides relatively replicable and transparent process. It allows stakeholders to make reasonable estimates of the returns expected to be determined in advance of a determination.
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling that avoids arbitrary filtering or adjustment of data that does not have a sound rationale.	Our foundation model approach uses the SL CAPM as the foundation model for the return on equity. In our 'CAPM and alternative return on equity models' working paper,[143] we considered that the SL CAPM was found to be robust with a clear theoretical foundation based on finance and economic principles. Australian data, which is used for the SL CAPM, is easily obtained for its estimation and calculations are easy to replicate. It is a model that is most likely to give estimates that have the least error and are unbiased.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	The foundation model approach provides a framework for systematically considering all relevant material as shown in Table 5.1. We consider material to be relevant if it is supported by market data or information that is credible, verifiable, comparable, timely and clearly sourced.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	Using the foundation model and drawing on other relevant information informatively, as opposed to determinately, to determine a final estimate of the expected return on equity, provides an appropriate balance between a relatively replicable and transparent process and providing flexibility in changing market circumstances.
7	The materiality of any proposed change.	Our draft decision is to maintain our foundation model approach that we have implemented in the 2018 Instrument. As such, there is no proposed change.
8	The longevity or sustainability of new arrangements.	We consider that the foundation model approach is sustainable because it assists us in achieving our regulatory objectives by providing a framework to

[143] AER, Draft working paper, *CAPM and alternative return on equity models, December 2020,* p. 14

Assessment criteria		Draft decision
		estimate the expected return on equity while systematically considering all relevant material available to us.

6 Risk-free rate

The risk-free rate is a key parameter in the Sharpe-Lintner CAPM, our foundation model for estimating 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 must choose a proxy for the riskless investment. In choosing the proxy security, we need to consider the risk associated with the proxy and the appropriate term for calculating returns. We refer to the term as the benchmark term of the risk-free rate (or interchangeably the benchmark term of the return on equity). We also have to consider the appropriate period over which to observe the returns on this proxy security to calculate the risk-free rate. We call this length of time the averaging period – the period we average the returns on the proxy investment.

6.1 Draft decision

Our decision is to use the return on Commonwealth Government Securities (CGS) with a term matching the term of the access arrangement period or regulatory control period (typically 5 years) as our proxy for a risk-free rate.[144] This is a change from our current approach of using a 10-year benchmark term of the risk-free rate (equity term).

We have also decided to continue to allow regulated businesses to nominate an averaging period over which we will observe the CGS yields to calculate the risk-free rate. The averaging period will need to be nominated in accordance with the following requirements:

- starts no earlier than 8 months prior to the commencement of the regulatory period
- ends no later than 4 months prior to the commencement of the regulatory period
- has between 20 and 60 consecutive business days in the period between the nominated start and end date
- is nominated prior to the start of the averaging period and contained in the initial proposal by the regulated business.

We have also added in a clause providing a default averaging period if a regulated business does not nominate an averaging period in accordance with the above criteria.

In this chapter, the key issue is the term of the risk-free rate (equity term). In coming to our decision to match the equity term to the length of the regulatory control period, we have considered:

- Our task is to set a revenue allowance for the regulatory period for an efficient benchmark. At the start of each regulatory period, the revenue allowance (and therefore prices and cashflows) is reset using updated market data.

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[144] In the discussion that follows we refer to both these terms as 'regulatory control period'.

- Our practice of resetting the allowed rate of return on equity at each regulatory determination affects the profile and riskiness of regulatory cash flows. In turn this impacts the expected return investors require.
- Matching the term of the allowed return on equity to the length of the regulatory period better aligns our regulatory allowance with the efficient costs of providing regulated services and risks borne by the investors.
- Matching the equity term to the length of the regulatory period is consistent with how we set the term of expected inflation. The same mathematics we relied on in determining the term of expected inflation applies in the case of return on equity.
- Market practitioners value assets into perpetuity and therefore tend to use long-term estimates. By contrast we are undertaking a different task. We are determining a return on equity that will typically last for 5 years and then will be reset and then be applied to the residual value of the accumulated regulatory asset base going forward. In these circumstances, if we use anything other than the term of the regulatory period, then the NPV=0 condition is not met, and investors are not correctly compensated for risk. An efficient network would not have an expectation of achieving a normal return.
- We consider this change will both better achieve the NPV=0 condition and also bring consistency to our approach. With respect to consistency, our revenue allowance including our approach to estimating inflation will be set consistently following this change. Without this change to term, we consider our approach will not best achieve the NEO and NGO and there is a risk of material economic distortions.

We acknowledge that arguments have been put forward to maintain our current approach (10-year benchmark equity term). Key points include:

- It has been our regulatory practice to use a term of 10 years for considerable time. Regulatory stability is promoted by continuing this approach.
- Most other regulators employ a 10-year term.
- Investors typically use a 10-year discount rate when making their investment decisions on infrastructure investments. If we change to a shorter term our revenue allowance would not meet investor expectations.

6.2 Issues and considerations

Our draft decision is based on our consideration of the key factors discussed in the following sections:

- the term of the return on equity
- the choice of the proxy for the risk-free rate
- the averaging period length
- the length of the nomination window.

6.2.1 Term of the return on equity

The following discussion explores the evidence before us about the benchmark term of the return on equity (benchmark equity term), starting with its definition and its role in our regulatory framework.

6.2.1.1 Benchmark term of return on equity

In a commercial context, the term of the required rate of return on an asset relates to the expected investment time horizon for a physical asset or holding period of a corresponding security. In a regulatory context, the term of the allowed rate of return is related to the time period of the allowance (such as the length of a regulatory control period, where the rate of return will be reset at the commencement of each new regulatory control period).

The 2018 Instrument set the term of the rate of return at 10 years for both the return on equity and return on debt and we previously determined a 10-year estimate of the expected inflation rate. However, in the 2020 Inflation review we decided to match our estimate of expected inflation to the length of the regulatory control period (typically 5 years).[145] We indicated that, because of this, we would review the term of the rate of return as part of our 2022 Instrument review.[146]

We calculate the allowed return on equity using the Sharpe-Lintner Capital Asset Pricing Model (SL CAPM). SL CAPM describes the relationship between systematic risk and expected return on investments over a single period. The expected return on equity is calculated as a sum of the risk-free rate and an equity risk premium (which is a product of the market risk premium and equity beta). The risk-free rate is the expected return on a riskless investment. It characterises investors' time value (opportunity cost) of money.[147] That is, it reflects how investors value a unit of money at the end of a given period relative to the beginning of the same period.

To calculate the allowed return on equity, we must choose a proxy for the riskless investment. In Australia, Commonwealth Government Securities (CGS) are often used as such a proxy by both market practitioners and government agencies. We have used the yield on the Commonwealth Government Securities in the 2018 Instrument, as well as our 2013 Rate of return guideline.[148] See section 6.2.2 for further discussion.

Returns on the CGS tend to have an upward sloping term structure. That is, the returns tend to be higher when the term to maturity of these securities is longer.[149] To calculate the

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[145] AER, *Final Position*, *Regulatory treatment of inflation*, December 2020, p. 35.

[146] AER, *Final Position*, *Regulatory treatment of inflation*, December 2020, p. 23.

[147] Sharpe (1964). *Capital asset prices: a theory of market equilibrium under conditions of risk*. The Journal of Finance 19(3), p. 425.

[148] AER, *Rate of return instrument, Explanatory statement*, December 2018, p. 125; AER, *Better regulation, Explanatory statement, Rate of return guideline*, December 2013, p. 73.

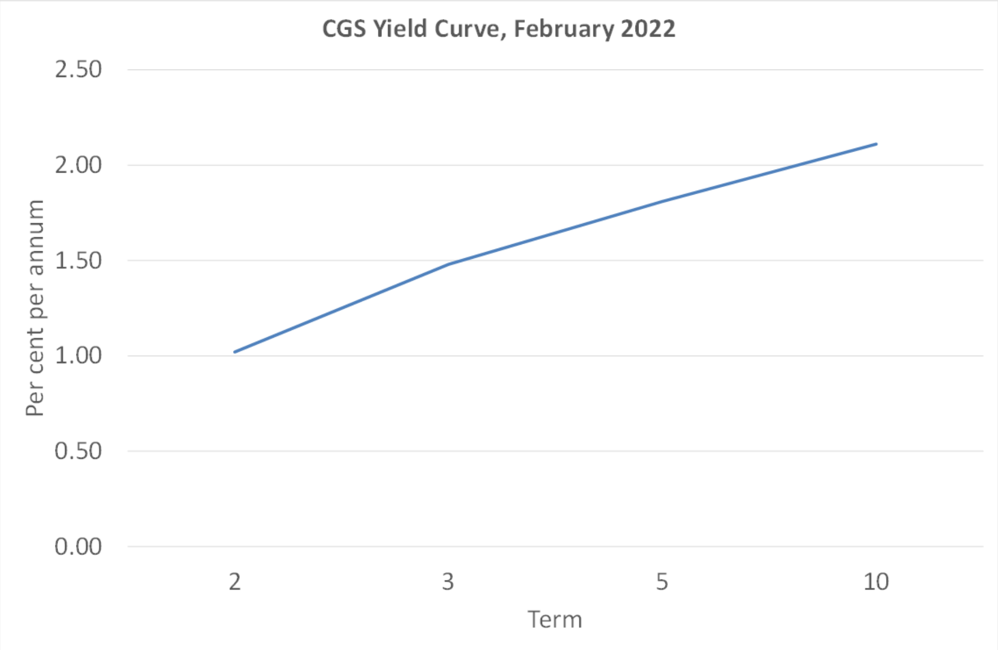
[149] The term structure of interest rates is the relationship between the short- and long- term interest rates.

allowed return on equity, we must specify the term to maturity of the CGS we will use. We call it the benchmark term of the return on equity, or the benchmark term of the risk-free rate.

6.2.1.2 Term premium

Figure 6.1 presents an example of a typical, upward sloping CGS term structure.

Figure 6.1 CGS yield curve, February 2022



Source: RBA statistical tables, AER calculations.

There are several explanations for a non-flat term structure. Expectations theory of the term structure suggests that investment in a series of short-maturity bonds must offer the same expected return as an investment in a single long-maturity bond. Therefore, the only reason for an upward sloping (downward sloping) term structure is that investors expect short-term interest rates to rise (fall).[150]

Other, more modern theories suggest that, in addition to reflecting expectations of future short-term rates, longer-term rates also include compensation for risk borne by investors (a term premium).[151] A term premium is compensation that investors receive/pay for locking in an interest rate for a long period, rather than rolling over short-dated securities.[152]

150 R. Brealey, S. Myers, F. Allen, *Corporate Finance*, 12th ed., McGrawHill Education, New York, p. 59.

151 R. Brealey, S. Myers, F. Allen, *Corporate Finance*, 12th ed., McGrawHill Education, New York, pp. 59-67. Other explanations of the difference also exist, e.g., those due to bond yields' convexity and difference between yields on non-zero coupon bonds and zero coupon rates.

152 J. Hambur, R. Finlay, *Affine Endeavour: Estimating a Joint model of the Nominal and Real Term Structures of Interest Rates in Australia*, RBA Research Discussions paper 2018-2, February 2018, p. 3.

Three types of risk are associated with the term premium: interest rate risk, credit default risk and liquidity risk.[153] In the case of the CGS, it appears likely that, out of these 3 types of risk, term premium (if any) would primarily arise due to (nominal) interest rate risk – that is, risk arising due to uncertainty of the future interest rates and future inflation.

Figure 6.2 illustrates the movement of CGS yields with 5 and 10 years to maturity. The difference between these yields can be positive, negative or zero but it tends to be positive on average. Positive difference means that the 10-year CGS yield is higher than the corresponding 5-year CGS yield. For example, for the period of January 1988 to February 2022 the average difference between 5-year and 10-year CGS was 28 basis points (bps), with a maximum of 125 and minimum of −95 bps.

Figure 6.2 5-year and 10-year CGS yields (January 1988 to February 2022)

Source: RBA statistical tables, AER calculations.

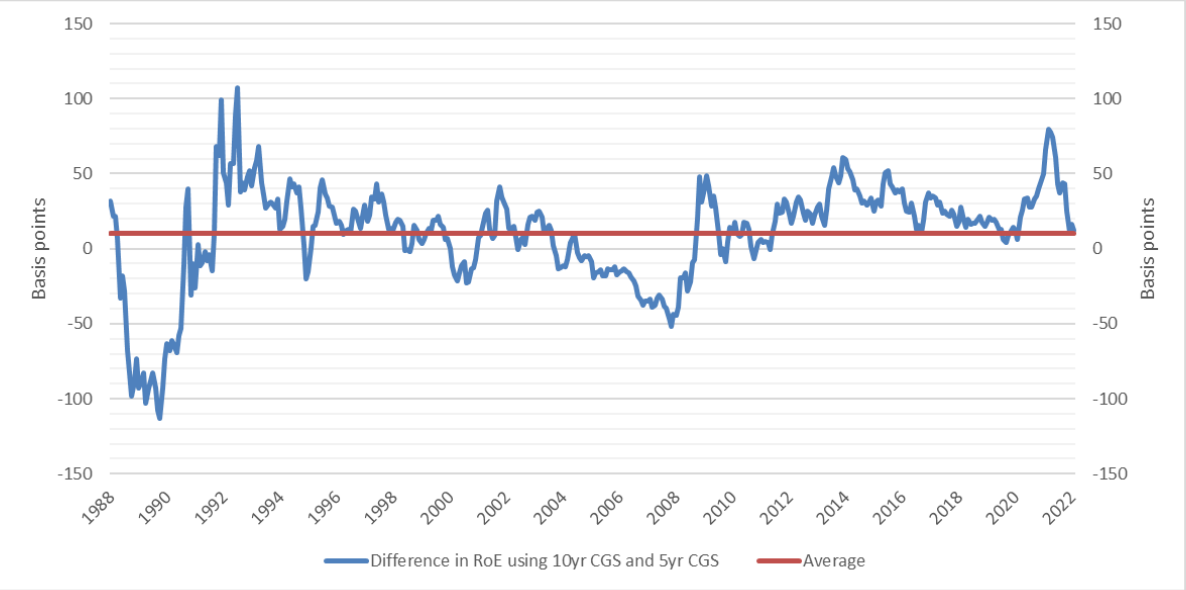
6.2.1.3 Whether the choice of benchmark term makes a difference

The benchmark term of the return on equity affects the resulting value of the allowed rate of return on equity in 2 ways – firstly, through the direct effect on the value of the risk-free rate, and secondly, through the (indirect) effect on the estimate of the MRP. In the case of the MRP, the nature of the effect depends on the method used to estimate the MRP. For example, when we use the historical excess returns (HER) approach, the estimate of the MRP would generally depend on a sequence of historical risk-free rates. If we use a dividend growth model (DGM), the MRP estimate would primarily depend on the prevailing risk-free rate. The 2 ways in which the risk-free rate enters the allowed return on equity calculations partially offset each other, with the overall result depending on the value of the equity beta and the MRP estimation method.

153 F. Geiger, *The Yield Curve and Financial Risk Premia*, *Implications for Monetary Policy*, Lecture Notes in Economics and Mathematical Systems, Springer-Verlag Berlin Heidelberg, 2011, p. 86.

Figure 6.3 illustrates the difference between the allowed return on equity computed using 5-year and 10-year CGS yields over the period 1988 to 2022.[154] The regulatory allowance is computed using an equity beta of 0.6 and MRP of 6.509% (10 years) and 6.810% (5 years) estimated using the HER approach for the period of January 1988 to December 2021 and CGS yields with the relevant term. While the difference can be positive, negative or zero, it tends to be positive on average. For example, for the period of January 1988 to February 2022 10-year CGS yields were on average 10 bps higher than 5-year CGS yields, with a maximum difference of 107 bps and minimum difference of −113 bps. For the shorter, post-GFC period, the average difference was 27 bps, with a maximum of 80 bps and minimum of −6 bps.[155]

Figure 6.3 Difference between return on equity based on 5-year and 10-year CGS yields, 1988 to 2022



Source: RBA; ASX; Brailsford, T., Handley, J. C., & Maheswaran, K. (2012). The historical equity risk premium in Australia: Post-GFC and 128 years of data. *Accounting and Finance*, 52(1), 237-247; AER calculations.

Table 6.1 Difference between return on equity based on 5-year and 10-year CGS yields, 1988 to 2022

Statistic	10-year return on equity	5-year return on equity	Difference (bps)
Average (1988 to 2022)	9.84%	9.74%	10
Minimum (1988 to 2022)	4.73%	4.38%	−113
Maximum (1988 to 2022)	17.81%	18.74%	107
Average (2010 to 2022)	6.83%	6.56%	27

154 This example is an illustration. The exact result depends on the modelling assumptions, such as the values of beta and MRP. For this example, we have assumed that beta and MRP do not vary throughout the observation period. These may generally differ from the regulatory parameters that historically applied.

155 A positive difference refers to a situation when a 10-year yield is above a 5-year yield.

Statistic	10-year return on equity	5-year return on equity	Difference (bps)
Minimum (2010 to 2022)	4.73%	4.38%	−6
Maximum (2010 to 2022)	9.70%	9.62%	80
Current (February 2022)	6.02%	5.90%	12

Note: MRP HER estimation is based on monthly data for the period of January 1988 to December 2021. The statistics (minimum, maximum, average) are computed using monthly data for the periods of January 1988 to February 2022 and January 2010 to February 2022). A positive difference means a 10-year return is higher than a 5-year return. The computations are performed under the assumption that the CGS yields in the RBA statistical tables F2 and F2.1 are presented as effective annual rates.
Source: RBA; ASX; Brailsford, T., Handley, J. C., & Maheswaran, K. (2012). The historical equity risk premium in Australia: Post-GFC and 128 years of data. *Accounting and Finance*, 52(1), 237-247; AER calculations.

As illustrated, the choice of the equity term affects the allowed return on equity and, therefore, consumer prices. This effect may be more or less material, depending on the difference between the prevailing longer-term and shorter-term rates (10-year and 5-year rates in our example).

We typically consider 2 options for setting the benchmark term of return on equity:

- match it to the length of the regulatory control period (typically 5 years)
- match it to the long asset lives associated with electricity and gas network infrastructure (typically 10 years because it is considered to better reflect long asset lives).

In the next sections we review arguments in favour of each option, including those based on economic and finance theory, consultant reports, stakeholder submissions and expert advice at the concurrent evidence sessions.

6.2.1.4 Case for a 5-year term based on the reset frequency

Our task is to set a revenue allowance for the regulatory control period. Under our current approach, the allowed rate of return on equity is fixed for the duration of the regulatory control period and then reset at the beginning of the next regulatory control period using updated market data.

While nearly all regulatory periods are 5 years in length, the current legislation allows for longer regulatory control periods to be proposed by electricity distribution and transmission and does not place any restrictions on the length of the proposed access arrangement periods for gas transmission and distribution.[156] We have some historical examples of regulatory periods other than 5 years in length. For example, the AEMC transitional rules separated TransGrid's 2014–19 regulatory control period into 2 periods: a one-year transitional regulatory control period from 1 July 2014 to 30 June 2015 and a subsequent regulatory control period covering the remaining 4 years, which commenced 1 July 2015 and

[156] For electricity, the regulatory control period must be at least 5 years. See NER ss. 6.3.2(4)(b), 6.1.3(13), 6A.4.2(c), 6A.1.3(9). The current NGR do not place any restrictions on the length of the access arrangement period. The AER must approve the proposed period if it is satisfied that those dates are consistent with the NGO and the revenue and pricing principles, see NGR, rule 50(2).

ended 30 June 2019.[157] The first regulatory control period for Directlink spanned 10 years (1 July 2005 to 30 June 2015).[158] For simplicity, we use 5 years in the discussion below as a shorthand for the length of the regulatory control period. We then separately consider the implications of allowing for regulatory control periods of varying length.

The reset frequency of the return on equity affects the profile of the regulatory cashflows. It may also affect the associated level of risk equity holders are exposed to and the expected return on equity investors require for investing in similar regulated assets. For this reason, the return on equity we allow regulated businesses to recover may vary with its reset frequency.

Above we noted that current 5-year CGS yields may differ from current 10-year CGS yields for two reasons.[159] The same logic applies to the difference between 5-year and 10-year returns on equity.

First, as suggested by the expectations theory, 5-year returns 5 years into the future may be expected to be higher (lower) than the prevailing 5-year returns. Under the expectations theory, current 10-year returns can be thought of as a geometric average of the current and expected future 5-year returns. Therefore, if the expected future 5-year returns are higher (lower) than the current 5-year returns, so would be the current 10-year returns. In this case, allowing investors to recover 5-year returns over every 5-year period, in expectation, would also deliver the required 10-year return over any 2 consecutive regulatory control periods. On the contrary, allowing investors to recover their required 10-year returns only for the next 5 years and then resetting the allowed returns to a new 10-year rate, would not generally deliver the required 10-year returns over any 2 consecutive regulatory control periods. We illustrate this in a worked example in Box 6.1.

Second, 10-year returns may also contain a term premium to compensate for risks of locking in rates for an extra 5 years. These risks include inflation and interest rate risks. In this case, a 10-year return may be higher (lower) than a geometric average of the prevailing and expected future 5-year returns for 2 consecutive regulatory control periods. However, it does not follow that the use of a 10-year, rather than a 5-year, equity term is warranted when the allowed revenues are reset every 5 years. With 5-year resets, investors in regulated assets do not bear the risks associated with locking in the rate of return beyond a 5-year regulatory control period. Therefore, compensation for these risks is not part of the opportunity cost of equity capital and would not be necessary to attract investors.

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[157] TransGrid, *Framework and Approach*, January 2014, p. iii.

[158] AER, *Directlink Joint Venturers' Application for Conversion and Revenue Cap*, Decision, 3 March 2006, p. vii.

[159] Conceptually, yields on non-zero coupon bonds are different from the yields on otherwise identical zero-coupon bonds. Zero-coupon rates are also referred to as a spot rate or returns (discount rates) over the term of the bonds. Empirically, the difference between yields on coupon-bearing CGS and zero-coupon (spot) rates is usually small and unlikely to affect the discussion in any material way.

In 2003 Prof Kevin Davis considered the relationship between the regulated cashflows, interest rate risk and reset frequency, and also concluded that ‘using a maturity for the risk free asset which exceeds the regulatory horizon, provides excess returns for the regulated asset if it is believed that there typically is a positive term premium in the yield curve which is unrelated to interest rate expectations’.[160]

Box 6.1 Worked example: Term structure under the expectation theory

Assume that:

- the current 5-year required rate of return on equity is 4.5%
- the current 10-year required rate of return on equity is 4.0%
- the expected 5-year required rate of return on equity 5 years from now is 3.5%
- the expected 10-year required rate of return on equity 5 years from now is 4.5%.

<table>
<tr><th>now</th><th>5 years later</th><th>10 years later</th></tr>
<tr><td>4.50%</td><td>3.50%</td><td>…</td></tr>
<tr><td colspan="2">4.00%</td><td>…</td></tr>
<tr><td>…</td><td colspan="2">4.50%</td></tr>
</table>

According to the expectation theory, the current 10-year return is a geometric average of the current 5-year return and expected 5-year return 5 years from now, that is:

$$(1 + current\ 5yr\ ROE)^5 * (1 + expected\ 5yr\ ROE\ in\ 5\ yrs)^5 = (1 + current\ 10yr\ ROE)^{10}$$

Indeed, we chose the values consistent with the expectation theory for this example: $(1.045)^5 * (1.035)^5 \approx 1.480 \approx (1.04)^{10}$.

The above equation also illustrates that if investors expect to recover 4.50% per year over the next 5 years and 3.50% per year over the subsequent 5 years, then they also can expect to recover 4.00% per year over the next 10 years.

If investors are allowed to recover 4.00% per year (that is, the current 10-year required return) over the next 5 years and then their allowance is reset to the 10-year required return at that time (currently expected to be 4.50% per year), they would expect to recover a return of approximately 4.25% per year over the next 10 years, as $(1.040)^5 * (1.045)^5 \approx (1.0425)^{10}$.

This value is clearly different from the current 10-year required rate of return of 4.00% per year. On this occasion, setting the allowed return equal to the current 10-year rate and then resetting it 5 years later would lead to expected overcompensation (as 4.25% > 4.00%).

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[160] K. Davis, *Risk Free Interest Rate and Equity and Debt Beta Determination in the WACC*, report for the ACCC, August 2003, p. 10. We note that APA submitted that this 2003 analysis was flawed, as the term of the bond used to estimate the risk free rate was indeterminate. However, APA fails to consider that return on equity allowance is regularly reset (in Davis's example, every 2 years). Therefore, APA's conclusion is erroneous. See APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p. 12.

No overcompensation or undercompensation would be expected in this scenario if the reset instead occurred after 10 years, rather than 5 – that is, when the term of the allowed rate of return matches the reset frequency.

When we consider the allowed return on equity from the perspective of efficient costs of providing regulated services, we also reach a similar conclusion.

In a past submission, the NSG suggested that any estimate of costs expected to be incurred in future periods is irrelevant for the estimate of efficient costs over the regulatory period, since the costs and revenue are reset in the next regulatory period.[161] While the comment was made about the term of expected inflation, we consider this reasoning equally applies to all cost categories, including cost of capital. That is, estimates of required return on equity expected over future regulatory control periods should not be relevant to the estimate of efficient costs (and hence the allowed revenue) over the current regulatory control period.

The difference between 5-year and 10-year CGS relates to compensation for uncertainty occurring beyond the immediate 5-year regulatory control period. As such, this difference would not appear to be attributable to the efficient costs of providing regulated services within the current regulatory control period. When the yields on 5-year CGS are below (above) the yields on 10-year CGS, using the benchmark equity term of 10 years would likely result in NSPs recovering above (below) the efficient costs of providing regulated services, assuming other things are equal.

We consider the above arguments support using a 5-year benchmark term when the allowed return on equity is reset every 5 years. They also support using a one-year benchmark term of return on equity when the allowed return on equity is reset every year, a 10-year benchmark equity term when the allowed return on equity is reset every 10 years, or more generally a benchmark equity term of *N* years, if the allowed return on equity is reset every *N* years.

6.2.1.5 Re-examining the evidence related to the NPV=0 principle

In our ‘Term of the rate of return final working paper’ we observed that one of the merits of matching the equity term to the length of the regulatory control period is that, unlike the 10-year equity term, it satisfies the NPV=0 principle.[162] The NPV=0 principle is central to our rate of return work (including the term of the rate of return) because it contributes to the achievement of the NEO and NGO.[163]

In the 2020 Inflation review and our ‘Term of the rate of return final working paper’ we have relied on Dr Lally’s modelling to consider the implications of the NPV=0 condition for the term

[161] NSG*, Re: Draft position on the regulatory treatment of inflation*, November 2020, p. 2.

[162] AER, *Term of the rate of return & Rate of return and cashflows in a low interest rate environment*, Final working paper, September 2021, p. 18.

[163] 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. 19–21.

of the expected inflation and the term of return on equity.[164] Although we found his analysis compelling, many stakeholders and some experts questioned the assumptions behind Dr Lally's model and conclusions one can draw from it.[165] Below we re-examine Dr Lally's logic and conclusions, then explore what conclusions can be drawn about the NPV=0 condition if we do not rely on Dr Lally's framework.

In his 2021 paper, Dr Lally expressed the value of the regulated business at the start of a regulatory period recursively as a present value of the cashflows in the current regulatory period and the value of the business at the start of the next regulatory period.[166] He made several simplifying assumptions and established that to satisfy the NPV=0 principle, the allowed rate of return on equity should be set equal to the relevant discount rate – that is, to the required return on equity investors expect to receive over the regulatory period.[167] Dr Lally then concluded that the appropriate term for the allowed rate of return on equity should match the regulatory cycle (of 5 years).[168] We first consider his mathematical derivations and then his assumptions.

Dr Lally's recursive formula for the value of the assets is based on the standard corporate finance mathematics underlying discounted cashflow modelling. For example, expected return on a share of common stock over a period is usually defined as a ratio of the cash payoff (including capital gain) in this period and the starting price of the stock.[169] Applying a similar approach to the entire stock of a 100% equity-financed regulated business, the expected return on equity over a period, $E[r_1]$, can be expressed as follows:

$$E[r_1] = \frac{E[V_1] - V_0 + E[CF_1]}{V_0}$$

[164] Dr Martin Lally (Capital Financial Consultants), *Review of the AER's inflation forecasting methodology*, July 2020 pp. 4-9; Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital, April 2021*, pp. 3-55.

[165] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper –* Submission, 11 March 2022, pp. 7–14; CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, pp. 49-58; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp. 58-64; NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p. 7; QTC, *Submission - AER Rate of Return information paper and final working papers*, March 2022, pp. 30-32.

[166] Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, April 2021, pp. 7–8.

[167] Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, April 2021, pp. 7-21; Dr Martin Lally, *Notes for the expert sessions 10 February 2022: Term of the rate of return,* February 2022, pp. 2-5.

[168] Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, April 2021, p. 3.

[169] R. Brealey, S. Myers, F. Allen, *Corporate Finance*, 12th ed., McGrawHill Education, New York, pp. 81–99.

Here V_0 stands for the market value of regulated assets (present value of future cashflows) in the beginning of a period, $E[V_1]$ is the expected market value of assets at the end of the period and $E[CF_1]$ is the expected free cashflows over the period.

Rearranging the above formula, we obtain:

$$V_0 = \frac{E[CF_1] + E[V_1]}{1 + E[r_1]} \quad (1)$$

This formula is similar to formulas (1) and (2) used by Dr Lally.[170] It is also similar to formulas examined by Sapere during the 2020 Inflation review.[171] The main assumptions used to derive equation (1) are that that the law of one price holds over the relevant period and the business is 100% equity financed.[172] The former is a standard assumption in corporate finance. The latter is done for simplicity and without loss of generality.[173]

Equation (1) holds regardless of any further simplifying assumptions made by Dr Lally. Dr Lally used those further assumptions to establish how the allowed return on equity should be set to satisfy the NPV=0 principle. In particular, the following implicit and explicit simplifying assumptions appear to have been made in Dr Lally's paper:

- 2-year asset life and regulatory period of one year
- no capital expenditure, operating expenditure or taxes
- no RAB indexation by inflation – alternatively, zero expected and realised inflation in each regulatory period
- zero expected revenue adjustments.

A further important assumption is that the regulator would set the allowed rate of return at the start of each regulatory period to satisfy the NPV=0 condition.

When the above assumptions hold, the free cashflow to equity holders is just equal to the allowed return on and of capital, while the asset value at the start of a regulatory period is equal to that period's opening RAB. Then Dr Lally's conclusions naturally follow.

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[170] Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, pp. 7–8.

[171] Sapere, *Target return and inflation*, *Input to the AER Inflation Review 2020*, June 2020, pp. 35–36.

[172] *The law of one price* says that two identical cashflows or commodities must sell for the same price in a competitive market. R. Brealey, S. Myers, F. Allen, *Corporate Finance*, 12th ed., McGrawHill Education, New York, p. G-10.

[173] Lally relaxes it later in his paper. See Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, pp. 21–44; Dr Martin Lally, Expert session 1: Further notes, 14 February 2022, pp. 2–4.

The CRG suggested that Dr Lally assumed that the discount rate ($E[r_1]$ in our notation) is a 5-year rate, instead of demonstrating it is indeed the case.[174] We do not consider such demonstration is required. By definition, the expected return is linked to the period over which it is expected to be received. To re-establish Dr Lally's result, we would start by using the above formulas to evaluate the expected return over a regulatory control period. If the length of the regulatory control period is 5 years, then the discount rate in formula (1) is the expected return over the 5-year regulatory control period.

In his model, Dr Lally assumed that a regulated business did not have any operating expenditure, did not pay any taxes, and had zero revenue adjustments. We consider that these assumptions do not limit the generality of his conclusions.

6.2.1.6 Whether a 10-year equity term is consistent with market practice and academic literature

Investor and network stakeholder submissions expressed strong support for maintaining the status quo, 10-year equity term.[175] One of the main arguments put forward in favour of the 10-year term relies on a standard commercial practice and runs as follows. The NPV=0 principle requires that the regulatory allowance should match the return that is required by investors; no more and no less. This criterion is centred around the returns that real-world investors might reasonably require on the capital they invest.[176] Investments in regulated infrastructure are long term, and the standard practice of valuation professionals and market practitioners is to use a 10-year risk-free rate as an input to the CAPM when valuing such investment projects.[177] Therefore, the return real-world investors require is based on a

[174] CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, pp. 48-57. ENA made a similar submission, see ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp. 8, 39, 58–60.

[175] AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, p. 3; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, pp. 6–13; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, pp. 6–9; Ausgrid, *Rate of Return 2022 information paper – Submission,* 11 March 2022, p. 2; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp. 38–40; Endeavour Energy, *Rate of Return information paper – Submission,* 11 March 2022, p. 3. GIIA, *AER final omnibus paper – Submission*, 11 March 2022, pp. 2–3; Jemena, *AER information paper – Submission*, 11 March 2022, p. 2; NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, pp. 2–3; QTC, *Submission - AER Rate of Return information paper and final working papers*, March 2022, p. 3; TransGrid, *AER Rate of Return final Omnibus paper – Submission*, 11 March 2022, p. 7.

[176] ENA, *Rate of Return Instrument Review,* Response to AER's Final Omnibus and Information papers, March 2022, p. 26; TransGrid, *AER Rate of Return final Omnibus paper – Submission*, 11 March 2022, p. 7; NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p. 5.

[177] ENA, *Rate of Return Instrument Review*, *Response to AER's Final Omnibus and Information papers*, March 2022, pp. 7, 40, 42, 47–50; AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, p. 3, QTC, *Submission - AER Rate of Return information paper and final working papers*, p. 3, *Rate of Return - Submission attachment A - Expert report - Grant Thornton*, 11 March 2022, p. 13.

10-year term. A similar argument was explored by experts during our concurrent evidence sessions.[178]

The majority of domestic regulators that we reviewed adopted a 10-year term for the return on equity, with the rationale generally to reflect the long economic lives and investment horizons of regulated assets. Comparable to arguments put forward in stakeholder submissions, QCA noted that "a 10-year bond term…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."[179]

We have previously referred to a similar line of argument in the 2018 Instrument explanatory statement, where we stated that the 10-year term reflected the actual investor valuation practices and academic works and was consistent with the theory of the SL CAPM.[180] Most recently, we have reviewed this argument in our 'Term of the rate of return final working paper'.[181] Two academic references we used in the 2013 and 2018 rate of return reviews are excerpts from an academic article and a popular finance textbook.[182] Both extracts discuss practical considerations of selecting discount rates (and their risk-free components) – in particular, in the context of business valuations.

They suggest that it is a common market practice to use the same rate to discount expected net cashflows for different years in business valuations. This is a 'practical compromise' rather than the 'purist' (theoretically more accurate) solution of matching the rate to the timing of the cashflow. It is a pragmatic solution, since refining rates to make them year-specific 'may not be worth the effort' when performing business valuations.[183] In the context of valuing going-concern businesses and long-term investments, use of long-term government bonds as the risk-free security and estimating the equity risk premium in relation to those 'represents a realistic, simplifying assumption and is consistent with the CAPM'.[184]

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178 See, for example, Dinesh Kumareswaran, *Concurrent evidence sessions – Session 2 – Term presentation*, February 2022; D. Kumareswaran, *Issues for discussion at the Concurrent Evidence Sessions*, 7 February 2022, pp. 1–5; AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, pp. 10–13, 18–19, 33–39.

179 QCA, *Final report - Rate of return review*, November 2021, p. 83.

180 AER, *Rate of return instrument*, *Explanatory statement*, December 2018, p. 126.

181 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. 51–52.

182 Aswath Damodaran, *What is the risk free rate? A search for the basic building block*, December 2008; Shannon Pratt and Roger Grabowski, *Cost of Capital: Applications and Examples*, 4th ed. Hoboken: Wiley, 2010.

183 Aswath Damodaran, *What is the risk free rate? A search for the basic building block*, December 2008, pp. 6–10.

184 Shannon Pratt and Roger Grabowski, *Cost of capital: Applications and examples*, 4th Ed. Hoboken: Wiley, 2010, p. 120.

Actual investor valuation practices appear to be consistent with using long-term government bonds.[185] In the case of Australia these are 10-year CGS.[186]

However, we do not estimate the allowed rate of return to be used as a discount rate for a business valuation over a long investment horizon. In our building block model, by construction, the market value of a regulated business is equal to its book value, RAB, as long as we ensure NPV=0. We estimate the allowed rate of return to be able to evaluate the return on capital building block and then the maximum allowed revenue of a regulated business. Further, at any regulatory determination we only estimate a 'snapshot' of cashflows – revenue allowances for a single regulatory control period (typically, 5 years) – rather than cashflows for an entire asset life.

That is, our exercise is different from that faced by a market practitioner performing a business valuation. While using 10-year CGS yields in market valuations may be supported by both academic works and market evidence, it is not clear that the same evidence provides support for using a 10-year term for the allowed return on equity in our regulatory context.

Market practitioners and valuation professionals may use the same discount rate to discount all cashflows, regardless of the timing of the cashflows. This appears to suggest that infrastructure investors expect to receive the same (10-year) rate of return, independently of the holding period of the investment. However, the 10-year rate is used as a proxy, rather than because investors are indifferent between investing for a shorter or a longer period. A more theoretically correct approach would be to match the discount rates to the period in which cashflows arise. As pointed out by one of our concurrent evidence session experts, Dr Glenn Boyle:[187]

> … the anecdotal observation that some practitioners claim to use the 10-year rate in their CAPM applications isn't very persuasive at all; corporate finance research has repeatedly demonstrated that firms regularly use simplified heuristics as an approximation to a more complex approach. So even if the claims are to be taken at face value, all it tells us is that practitioners sometimes apply a 10-year rate to all future cashflows (including those off in the distant future) as **an approximation** to using (mostly unobservable) matched-year rates**. It certainly doesn't imply that a set of year 1-5 cashflows alone should be discounted at a 10-year rate**.

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185 AER, *Rate of return instrument, Explanatory statement*, December 2018, p. 127; Grant Thornton, *Rate of Return - ENA Submission attachment A - Expert report*, 11 March 2022, pp. 12-14; NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p. 3.

186 AER, *Rate of return instrument, Explanatory statement*, December 2018, p. 127; Grant Thornton, *Rate of Return - ENA Submission attachment A - Expert report*, 11 March 2022, pp. 12-14; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper* – Submission, 11 March 2022, p. 4.

187 Dr Glenn Boyle, *Some comments on the notes circulated by Dinesh Kumareswaran and Graham Partington*, 9 February 2022, p. 1. Emphasis added.

Similarly, Dr Lally observed:[188]

> Whenever you are doing a discounting exercise over many, many future years with a standard capital budgeting project, whenever you use a single discount rate you are averaging ... And that is common practice.
>
> And so long as your weights that contribute to that average are right, you'll get the same answer. But it is still true … that that average embodies within it discounting the cashflows for the first year at the first-year rate, the second year at the second-year rate and so forth. Just because … people use an average, doesn't mean effectively they are discounting the first few years' cashflows at the 10-year rate. **They are just doing an averaging process**.

Valuation professionals also recognise that the 10-year rate is used only as a proxy:[189]

> Theoretically, the risk-free rate used should be an estimate of the risk-free rate in each future period … In practice, the long-term Australian Commonwealth Government Bond rate is used as the most practical estimate … However, it should be recognised that **the yield to maturity of a long-term bond is only an average rate** and where the yield curve is strongly positive (i.e. longer-term rates are significantly above short-term rates) the adoption of a single long-term bond rate has the effect of reducing the net present value where the major positive cashflows are in the initial years. The long-term bond rate is therefore only an approximation.

Further, evidence does not appear to show that investors would in practice require the same (per year) return over a one-year or 5-year period as they do over 10 years or 50 years. KPMG's valuation report for Spark Infrastructure used different 'blended' risk-free rates for SAPN, VPN and Transgrid and for Bomen Solar Farm to account for a shorter asset life of the solar farm.[190] In the same report KPMG pointed out that the yields on 10-year bonds represent opportunity costs over a 10-year (rather than a 5-year or a 30-year) period:[191]

> … the current yield on government [10 year] bonds represents the best indicator of the risk free opportunity cost of the assets **for the forthcoming 10 year period** at any particular point in time.

In its recent valuation report, Grant Samuel used different rates to discount cashflows arising in different time periods:[192]

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188 AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, p. 38. Emphasis added.

189 Grant Samuel, *AusNet Services Ltd Independent Expert's Report*, 2021, Appendix 3, p. 4. Emphasis added.

190 KPMG, *Independent expert report for Spark Infrastructure*, October 2021, p. 101.

191 KPMG, *Independent expert report for Spark Infrastructure*, October 2021, p. 101. Emphasis added.

192 Grant Samuel, *AusNet Services Ltd Independent Expert's Report*, 2021, Appendix 3, p. 15.

> … risk free rates are assumed to be lower (around 1.2%) in the first ten years of the projections before reverting to long term historical averages by 2040.

Finally, Dr Boyle observed that discounting the first 5 years of cashflows at the 10-year rate 'contradicts basic finance theory and would allow for limitless arbitrage opportunities'.[193]

To summarise, based on both corporate finance theory and commercial evidence, it appears unlikely that the investors' required return would be invariant to the length of the period over which this return is expected to be recovered.

Further, it appears unlikely that the best estimate of the required return on equity over a regulatory control period (typically, 5 years) would be that based on a 10-year CGS yield.

6.2.1.7 Example: Whether a 10-year equity term satisfies the NPV=0 condition

The NPV=0 condition is central to our rate of return work. We now use a stylised example to illustrate that using a term of the allowed rate of return on equity different from the reset frequency of the allowance would not satisfy the NPV=0 condition.

For this purpose, we make the following simplifying assumptions:

- The regulatory asset has an opening value of $100.
- It fully depreciates over 2 periods with $50 depreciation in each period.
- There is no new capital expenditure, no operating expenditure, no tax and no revenue adjustments, no inflation or expected inflation.
- The business is financed by 40% equity and 60% debt.
- Investors use a common valuation practice of evaluating discounted levered free cashflows to equity holders.
- Investors discount all cashflows using the same long-term discount rate, which is the required return on equity over 2 periods.[194] This rate is 5% at the start of the first period.
- Regulatory return on debt allowance completely offsets the debt servicing costs.

Under the above assumptions, for the NPV=0 principle to be satisfied at the start of the first period, the market value of equity ($40) should be equal to the present value of the expected future levered cashflows. Given the above assumptions, the only net cashflows are the equity portion of the allowed return on and return of capital. The latter is $20 in each period and the former is the product of the allowed return on equity (k_1 and k_2) and the equity portion of the RAB, so that:

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[193] Dr Glenn Boyle, *Some comments on the notes circulated by Dinesh Kumareswaran and Graham Partington*, 9 February 2022, p. 1. A similar observation was made in AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, p. 26.

[194] This assumption is made for illustrative purposes and does not imply that we endorse this discounting approach.

$$40 = \frac{40 * k_1 + 20}{1.05} + \frac{20 * E[k_2] + 20}{(1.05)^2}$$

If the allowed return on equity is never reset, that is $k_1 = k_2 = k$, then it is straightforward to demonstrate that setting $k = 5\%$ would result in NPV=0 at the beginning of the first period:

$$40 = \frac{40 * 0.05 + 20}{1.05} + \frac{20 * 0.05 + 20}{(1.05)^2}$$

Assume instead that the allowed return on equity is originally set to match the long-term return on equity of 5% – that is $k_1 = 5\%$ – but then it is reset at the beginning of the second period to be equal to the long-term return on equity at that point of time. Then the NPV=0 condition at the beginning of the first period is as follows:

$$40 = \frac{40 * 0.05 + 20}{1.05} + \frac{20 * E[k_2] + 20}{(1.05)^2}$$

Rearranging:

$$20 = \frac{20 * E[k_2] + 20}{1.05}$$

Clearly, the above condition would only hold if the second period allowed return on equity is expected to be reset at 5% – that is, the long-term return on equity at the start of the first period. Therefore, if the long-term required return on equity is expected to change over time, resetting the allowed return on equity equal to the prevailing long-term required return would not result in NPV=0.

The above example is not based on Dr Lally's modelling approach and instead assumes the modelling assumptions consistent with the valuation practices described in stakeholder submissions.[195] The example demonstrates that, even under those assumptions, setting the allowed rate of return on equity to the expected return required by investors over a longer period than the time between resets would not generally satisfy the NPV=0 condition.

We made a number of simplifying assumptions in the above example. However, this does not limit the generality of our conclusions. To prove a result, one would generally test its robustness to underlying assumptions, but to overturn a result, one only needs to find one counterexample.

6.2.1.8 The length of regulatory control period other than 5 years

While we focused on the length of a regulatory control period of 5 years in the earlier sections, we also noted that the current legislation allows for longer regulatory control periods to be proposed by electricity distribution and transmission and does not place any restrictions on the length of the proposed access arrangement periods for gas transmission

[195] See, for example, ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp. 47–50.

and distribution.[196] Further, it is possible that the relevant legislation may change during the period covered by the 2022 Instrument. Therefore, we should consider the implications, if any, of having a regulatory control period shorter or longer than 5 years.

Endeavour Energy submitted that a 5-year equity term is inconsistent with the regulatory framework that it is open to a network to propose, and the AER to determine, a control period of differing length.[197] We acknowledge this point. As discussed in section 6.2.1.4, we consider that the reset frequency of regulatory allowance is linked to the benchmark term. That is, if the allowed return on equity is reset every 5 years, then our reasoning, based on the NPV=0 principle, supports the benchmark equity term of 5 years. If the allowed return on equity is reset every *N* years, then our reasoning favours the benchmark equity term of *N* years.

Similar lines of argument lead to a 5-year term of expected inflation if it is reset every 5 years and to a one-year term of expected inflation if it were to be reset annually. We previously considered the importance of aligning the term of expected inflation with the 'method we use for setting regulated revenues' in our 2020 Inflation review.[198] At the time, we also observed that Dr Lally proposed resetting inflation annually using one-year expected inflation over each of the next 5 years – although the average over 5 years was our preference.[199]

Further, each of the 10 tranches of the return on debt allowance is reset once in 10 years – that is, the benchmark debt term of 10 years also follows the same principle.

We discuss the implementation issues related to the differing length of regulatory control periods in section 6.2.1.11.

6.2.1.9 Benchmark equity term and relevance of the CAPM

In 2018 we said that a 10-year term was consistent with the theory of the SL CAPM, which is a single period equilibrium model, estimating the returns an investor requires over a long-term investment horizon.[200] Several submissions recalled this statement and suggested that we should continue to use yields on CGS with maturity of 10 years or possibly longer as the proxy for the risk-free rate to be consistent with the SL CAPM.[201]

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[196] For electricity, the regulatory control period must be at least 5 years. See NER ss. 6.3.2(4)(b), 6.1.3(13), 6A.4.2(c), 6A.1.3(9). The current NGR do not place any restrictions on the length of the access arrangement period. The AER must approve the proposed period if it is satisfied that those dates are consistent with the NGO and the revenue and pricing principles, see NGR, rule 50(2).

[197] Endeavour Energy, *Rate of Return information paper – Submission*, 11 March 2022, p. 3.

[198] AER, *Final Position*, *Regulatory treatment of inflation*, December 2020, p. 7.

[199] AER, *Final Position*, *Regulatory treatment of inflation*, December 2020, p. 28.

[200] AER, *Rate of return instrument, Explanatory statement*, December 2018, p. 126.

[201] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, pp. 2, 5–14; Jemena, *AER information paper – Submission*, 11 March 2022, p. 2; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp. 39, 42, 46–47, 64–65, 68.

For instance, ENA submitted that multi-period projects cannot be valued by applying the SL CAPM sequentially to each period and 'applying the single-period CAPM to value the first five years of cashflows generated by a long-lived asset, independent of all subsequent cashflows, is inconsistent with finance theory'.[202] Mr Kumareswaran made a similar statement during the concurrent evidence sessions.[203] Dr Hird also pointed to the related limitations of the SL CAPM.[204]

ENA's submission might be taken to imply that the SL CAPM can be used to estimate investors' expected return on equity over a 10-year period, but not over a 5-year period. However, as Dr Boyle pointed out, there is not a complete dichotomy between CAPM and multi-period valuation.[205] Further, a well-regarded corporate finance textbook calls the CAPM 'a short-term model' and suggests the proxy for the risk-free rate should be chosen, keeping in mind how far into the future one wants to discount cashflows.[206] Having considered the submissions and evidence before us, we consider it reasonable to use 5-year CGS yields to estimate the discount rate for the cashflows arising within a 5-year regulatory control period and to use 10-year (or longer) CGS yields to estimate the discount rate for the cashflows arising in the long term.

Further, the arguments in favour of a 5-year benchmark equity term rely on such concepts as the time value of money and asset valuation by means of discounting uncertain cashflows. These concepts pre-date the development of the SL CAPM. That is, the case for a 5-year equity term does not depend on whether or not we use the SL CAPM to estimate the discount rates.[207] However, if the SL CAPM could not be used to estimate the expected return on equity over any holding period shorter than 10 years, then, rather than fixing this by adjusting the benchmark term, we may need to consider a different model that is capable of doing so, as suggested by Dr Boyle.[208]

In a note prepared for the concurrent evidence sessions, Prof Partington also raised another point about the use of the SL CAPM.[209] We are ultimately interested in the term structure for equity returns, rather than CGS yields. Those may not be the same and 'to accept that the equity term structure follows the term structure of government bonds is a strong assumption'. We acknowledge this point and note that the equity term structure would only exactly follow the CGS term structure if we do not re-estimate the MRP when moving from one term to

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[202] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp. 66, 68.

[203] AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, p. 18.

[204] AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, pp. 15, 1742.

[205] AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, pp. 24–25.

[206] R. Brealey, S. Myers, F. Allen, *Corporate Finance*, 12th ed., McGrawHill Education, New York, p. 228.

[207] Dr Lally made a similar point in AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, p. 23.

[208] AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, pp. 24–25.

[209] Prof Graham Partington, *Concurrent Evidence Session: Commentary on Lally's Term Analysis*, 7 February 2022, pp. 3–4.

another. As we discuss below, we consider that we need to be consistent when estimating the CAPM parameters. As we decided to adopt a shorter benchmark equity term, we need to re-estimate the MRP using the relevant shorter-term CGS yields.

6.2.1.10 Consistency with other WACC parameters and expected inflation

We have received several submissions commenting on the importance of using a consistent conceptual framework with respect to the WACC parameters. NSG suggested that market practitioners consider the parameters in the CAPM as a package and take a long-term view.[210] The CRG also emphasised the importance of a clear and consistent conceptual framework.[211] However, the CRG focused more on the consistency between the equity term and the term of expected inflation and noted that the decision on term of the risk-free rate had no obvious bearing on how other WACC inputs should be estimated (except for the HER approach to estimating the MRP).[212]

We agree that it is important to ensure consistency of our conceptual framework.

In terms of the CAPM parameters, we need to ensure that the MRP is estimated consistently with our assumptions about the benchmark term of return on equity. We do not consider that a change to the estimation method of equity beta is required. This view is consistent with the views of our experts and the CRG's submission.[213]

In broader terms, we consider that the NPV=0 condition is central to our framework. Therefore, following the NPV=0 principle and matching the equity term to the length of a regulatory control period would promote consistency with our decision on the term of the expected inflation.

ENA submitted that Dr Lally's advice was that a 5-year term should be used for expected inflation regardless of the term adopted for the allowed return on capital.[214] ENA further suggested that there was no link between the efficient cost of capital in financial markets and the mechanics of the AER's treatment of regulatory inflation within the PTRM and RFM, and therefore the term for regulatory inflation and the allowed return on equity are independent.[215]

While we consider the decision on inflation was separate to the decision on the rate of return, we consider the underlying logic across our decisions should be consistent. We relied on Dr

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210 NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, pp. 2–3; see also *Rate of Return - Submission attachment A - Expert report - Grant Thornton*, 11 March 2022, p. 33.

211 CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 14.

212 CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, pp. 60-–61.

213 AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, pp. 9–10; CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, pp. 60-–61.

214 *ENA, Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p. 24.

215 *ENA, Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p. 24.

Lally's advice to arrive at our decision on expected inflation.[216] Dr Lally's advice on the term of expected inflation was premised on his mathematical interpretation of the NPV=0 principle. We consider Dr Lally's analytical framework is based on fundamentals of corporate finance and his conclusions are not driven by a narrow set of assumptions (see section 6.2.1.5). Dr Lally said that his conclusion on the equity term and the term of expected inflation are separable consequences of the NPV=0 principle.[217] However, if we questioned his conclusions on the equity term, this may also lead us to question his conclusions on the term of expected inflation.

Further, we consider that aligning the term of return on equity and the term of expected inflation would mitigate the mismatch between the inflation expectations embedded in the allowed (nominal) return on equity and the expected inflation in the PTRM.

According to the Fisher equation, a 10-year nominal return on equity comprises a 10-year real return on equity and an expected inflation over a 10-year horizon.[218] Our move to a 5-year expected inflation has mitigated the mismatch between the inflation adjustment in the PTRM and RAB indexation by actual inflation in the RFM. However, this created a mismatch between the inflation expectations embedded in the nominal allowed rate of return on capital.[219] By adopting the term of return on equity matching the length of the regulatory control period, we can both mitigate this mismatch and better satisfy the NPV=0 principle.

While the CRG was not convinced by the case we made in our 'Term of the rate of return working paper' for the term of equity matching the length of the regulatory control period, the CRG was supportive of the consistency argument based on the Fisher equation. The CRG submitted that since we decided to shorten the term of the expected inflation, we should now align the equity term with the term of expected inflation.[220]

Another issue of consistency was discussed by the experts at the concurrent evidence sessions. Mr Kumareswaran questioned whether an inconsistency arises when we combine a 10-year benchmark debt term with a 5-year equity term (or more generally, a term matching the length of a regulatory control period).[221] As we explained earlier, satisfying the NPV=0 condition implies matching the reset frequency of the return on equity, return on debt or the expected inflation to the corresponding term. In the case of equity and expected inflation, the reset frequency is currently matched to the length of the regulatory control

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216 AER, *Final Position*, *Regulatory treatment of inflation*, December 2020, pp. 25, 28–30, 41, 48.

217 Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, April 2021, p. 3.

218 According to the Fisher equation: 1+nominal interest rate = (1+real interest rate)*(1+expected inflation rate). See, for example, R. Brealey, S. Myers, F. Allen, *Corporate Finance*, 12th ed., McGrawHill Education, New York, p. 64; AER, *Final Position*, *Regulatory treatment of inflation*, December 2020, p. 36.

219 AER, *Final Position*, *Regulatory treatment of inflation*, December 2020, p. 6.

220 CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, pp. 42–62.

221 AER, *Concurrent evidence session 2 – Proofed transcript*, February 2022, pp. 78–80; Dinesh Kumareswaran, *Follow-up to issues in relation to appropriate term of the allowed return on equity raised at the first Concurrent Evidence Session*, 15 February 2022, pp. 3–5.

period (typically, 5 years). In the case of debt, each of the 10 tranches is reset once in 10 years, which is consistent with the benchmark debt term of 10 years.[222] Dr Lally provided a more formal, mathematical illustration that using a 10-year debt term and using a 5-year equity term are both consistent with the NPV=0 principle.[223]

Mr Kumareswaran presented a follow-up argument, supported by mathematical derivations.[224] His derivations appear to consider a situation where an on-the-day approach to return on debt is used and the return on debt is reset with the same frequency as the return on equity. In that case, Mr Kumareswaran's mathematics show that the debt and equity term should match each other to satisfy the NPV=0 principle. Further, if we assumed the discount rates matched the cashflow timing (consistent with the corporate finance theory), his derivations would also suggest that both equity and debt term should match the length of a regulatory control period (the reset frequency). These inferences seem reasonable to us. However, they shed no light on what the debt term should be if the return on debt allowance is set using a trailing average approach.

6.2.1.11 Implementation issues

As discussed above, we consider that the MRP estimation should be consistent with the benchmark term of return on equity. When the MRP is estimated using the HER approach, this entails ensuring the historical excess returns are computed with respect to the historical CGS yields of the relevant term. Consistent with this principle, we have estimated the MRP reflecting a 5-year benchmark term.

While most of our regulatory control periods are 5 years in length, we need to account for a possibility of a longer or a shorter regulatory control period. To limit the risk of NSPs with a longer regulatory control period than 5 years being undercompensated, we have determined to vary the benchmark term of the risk-free rate (equity term) and MRP (or application of the CAPM) with the regulatory control period length. The MRP has been varied with the changes to the benchmark equity term to ensure internal consistency within the CAPM.

We propose to directly estimate the risk-free rate for different benchmark terms using the CGS yields with maturities within given ranges. We consider that CGS turnover volumes are likely to be sufficiently high for all the affected maturities (see Figure 6.4). We further propose to linearly interpolate between the 5-year and 10-year MRP values to set the MRP where the term varies between 5 years and one month and 9 years or less. For our purposes, and given we rarely expect regulatory control periods to be more than 5 years, we consider this linear interpolation sufficiently accurate. The calculation of the MRP for different expected regulatory control period lengths is set out in section 7.2.1 on MRP.

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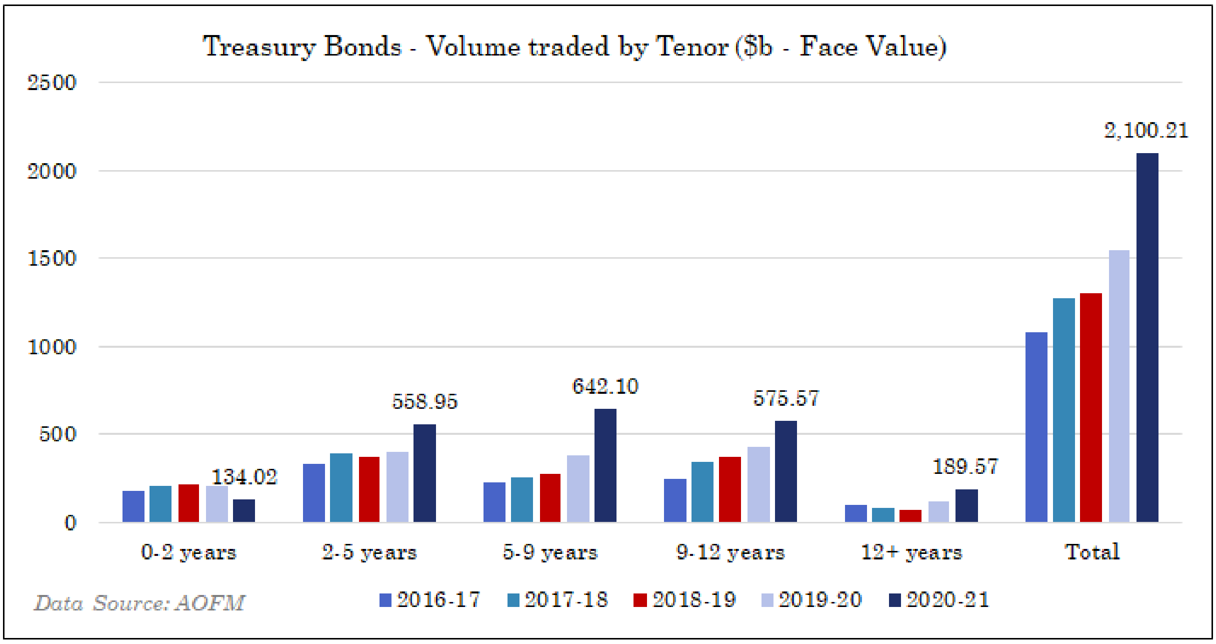
[222] We note that Mr Kumareswaran's suggestion that the debt reset frequency is one year is erroneous.

[223] Dr Martin Lally, *Expert Session 1: Further Notes*, 14 February, pp. 2–4.

[224] Dinesh Kumareswaran, *Follow-up to issues in relation to appropriate term of the allowed return on equity raised at the first Concurrent Evidence Session*, 15 February 2022, pp. 3–5.

Figure 6.4 CGS annual trading volumes, $ billion, 2016–21



Source: AOFM, https://afma.com.au/market-data.

6.2.1.12 Regulatory precedent

We received submissions from both the network and investor stakeholders in support of the status quo 10-year term, saying that we have applied a 10-year term in our past reviews and the evidence has not changed since then.[225] In addition, the stakeholders said that a 10-year (or longer) risk-free rate is a standard regulatory practice.[226]

We have several considerations in response to these submissions.

We make decisions based on the evidence before us at the time and our regulatory judgement about the merits of a case. Our past decisions and the approaches taken by other regulators are relevant to the extent they inform our judgement – for example, by providing evidence or a line of argument in support of a particular position. As we assess the available evidence and exercise regulatory judgement, our positions may evolve over time. A recent

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[225] Ausgrid, *Rate of Return 2022 information paper – Submission, 11 March 2022, pp. 1–2; GIIA, AER final omnibus paper – Submission*, 11 March 2022, pp. 2–3; Transgrid, *AER Rate of Return final Omnibus paper – Submission*, 11 March 2022, p. 7; Jemena, *AER information paper – Submission*, 11 March 2022, p. 2; QTC, *Submission - AER Rate of Return information paper and final working papers*, March 2022, p. 29; AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, p.3; Endeavour Energy, *Rate of Return information paper – Submission*, 11 March 2022, p. 3; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p. 39.

[226] AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, p.3; QTC, *Submission - AER Rate of Return information paper and final working papers*, March 2022, p. 3; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp. 7, 40, 42, 47–54.

example of such evolution in our views is our 2020 decision on the term of the expected inflation.

Further, when reviewing our past practices, the submissions have focused only on a subset of those. The ACCC considered matching the government bond term to the length of a regulatory period a ‘preferred measure’ in 1999.[227] The 2002 Powerlink decision stated:[228]

> … a relevant factor influencing the selection of the risk-free rate is the frequency of regulatory determinations to which the WACC is applied … Thus, an appropriate term for calculating the risk-free interest rate in the present context is the term between regulatory reviews, in the case of Powerlink, five and a half years.

It also said:[229]

> … using a bond rate corresponding to the regulatory review period is the appropriate measure of the risk-free rate because the asset owner’s inflation risk is compensated exactly by an inflation risk premium implicit in the yield on the corresponding government bond.

As far as decisions of other regulators are concerned, we agree with Dr Lally that ‘it is not the practices of other regulators that are important but the merits of the arguments offered in support of those practices’.[230] In this explanatory statement, we have reviewed the main arguments in favour of both maintaining the status quo and matching the benchmark equity term to the length of a regulatory control period.

6.2.1.13 Response to other issues raised in submissions

A few submissions offered short comments on specific points made in our ‘Term of the rate of return working paper’ and Dr Lally’s 2021 report. We address these comments in turn below.

Submissions on limitations of Dr Lally’s analysis

CRG submitted that if Dr Lally’s analysis is correct, then we have been systematically overpricing the cost of capital over multiple rounds of regulatory resets. If so, it should be possible to identify some telltale signs of this mispricing. CRG said that the AER has not attempted this analysis.[231] We consider such analysis would only be possible if we could conduct an event study tracing changes in an observable indicator, such as a RAB multiple, back to a change in the benchmark equity term. Given that it is not possible to conduct an experiment where we hold other things constant and vary the benchmark equity term, and

[227] ACCC, *Draft Statement of Principles for the Regulation of Transmission Revenues*, May 1999, p. 78.

[228] ACCC, *Queensland Transmission Network Revenue Cap 2002-2006/07*, November 2001, p. 14.

[229] ACCC, *Queensland Transmission Network Revenue Cap 2002-2006/07*, November 2001, p. 17.

[230] Dr Martin Lally (Capital Financial Consultants Ltd), *The Appropriate Term for the Allowed Cost of Equity*, 20 April 2022, p. 20.

[231] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 56.

given that money is fungible, such analysis does not appear feasible to undertake. Instead, we can monitor a set of crosschecks for signs of the overall effectiveness of the regulatory framework – and we already do so.

We have received further submissions on Dr Lally's assumptions and analysis, which we consider below.

APGA submitted that there is no evidence that says investors only care about cashflows until the end of the regulatory period or assume that cashflows after that period will be sufficient to cover their investment.[232] Dr Lally's analysis does implicitly assume that investors expect the regulator would set the allowed revenue in a manner consistent with the NPV=0 principle at every future reset. However, as we have discussed in section 6.2.1.5, this does not limit the generality of his conclusions. Even when regulatory risk of investors not recovering their investment exists, adding a term premium to the return equity would not be an adequate way to address it. Regarding the first part of the APGA's submission, neither our, nor Dr Lally's analysis, assumes that investors only care about cashflows until the end of the regulatory period.

Further, APGA and Jemena submitted that the AER PTRM does not assume that RAB is returned to the investors and then re-invested.[233] Neither Dr Lally's nor our analysis relies on such an assumption.

Endeavour Energy submitted that a 5-year term ignored the opportunity to earn incentive revenues in future years and asset pricing theory, which assumes investors consider reinvestment opportunities when developing their investment portfolios.[234] As we explained in section 6.2.1.5, the conclusion about the 5-year term relies on the standard corporate finance mathematics underlying discounted cashflow modelling and several assumptions. None of this appears inconsistent with having regard to reinvestment opportunities of investors.

6.2.2 Choice of the proxy for the risk-free rate

In 2021 we consulted with stakeholders on the suitability of CGS as an appropriate proxy for the risk-free rate in our 'Rate of return and cashflows in a low interest rate environment' working paper.[235]

The ENA questioned whether the CGS is an appropriate proxy for the risk-free rate.[236] ENA submitted there is regulatory precedent to adjust the CGS and that academic literature, market practice and standard textbooks suggest that the CGS is not an appropriate proxy for

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232 APGA*, 2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 9.

233 APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, pp. 9–10; Jemena, *AER information paper – Submission*, 11 March 2022, p. 2.

234 Endeavour Energy, *Rate of Return information paper – Submission*, 11 March 2022, p. 3.

235 AER, *Term of the rate of return & Rate of return and cashflows in a low interest rate environment – Final working paper*, September 2021

236 AER, *Term of the rate of return & Rate of return and cashflows in a low interest rate environment – Final working paper*, September 2021, p. 102.

the risk-free rate. The ENA explained that government bonds tend to contain a convenience yield, which is not relevant to the SL CAPM risk-free rate. Thus, they proposed we adjust for the convenience yield or adopt an alternative proxy for the risk-free rate. On the other hand, consumer groups such as the CRG and NICE submitted that CGS yields remain the best proxy for the risk-free rate.[237] They did not consider CGS rates to be artificial because the risk-free rate is still determined by market forces such as supply and demand characteristics.

We considered stakeholder submissions and expert advice we received from ACCC's Regulatory Economic Unit (REU).[238] Based on our assessment of the material before us, our preferred position set out in September 2021 was that CGS are an appropriate proxy for the riskless investment for our purposes. We also decided that we should not adjust for an estimated convenience yield. Key reasons for this are:

- The literature is far from settled and it is not a well-established practice to adjust the CGS rate for an estimated convenience yield.
- The risk-free asset in the SL CAPM possesses the safety property. Standard practice in applying the SL CAPM is to use the yields on government bonds as a proxy for the risk-free rate.
- Any convenience yield is very difficult to estimate. The estimate of a convenience yield is only as accurate and robust as the proxy for the alternative and 'true' risk-free rate.
- It is not supported by robust analysis that convenience yields exist in Australia, or that they can be reliably estimated. Recent evidence suggests there might be an inconvenience yield since 2015.
- It is common practice to use the CGS as a proxy for the risk-free rate. We are not aware of another Australian regulator using a proxy other than the CGS for the risk-free rate.

In response to our information paper, stakeholders did not raise issues about the suitability of the CGS as a proxy for the risk-free rate. Our draft decision is to maintain that the CGS remains an appropriate proxy for the risk-free rate, and that we should not adjust for an estimated convenience yield.

6.2.3 Averaging period length

The averaging period is the length of time during which we observe the yields on CGS, with a term matching the length of the regulatory period (typically 5 years) to derive our estimate of the risk-free rate. In choosing the appropriate length for the averaging period the objective is to ensure that the estimate is relevant to the on-the-day rate but also that the estimate is not unduly biased by short-term volatility in the CGS yields.

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[237] AER, *Term of the rate of return & Rate of return and cashflows in a low interest rate environment – Final working paper*, September 2021, p. 90.

[238] AER, *Term of the rate of return & Rate of return and cashflows in a low interest rate environment – Final working paper*, September 2021, p. 161.

We recognise that the SL CAPM does not say how the risk-free rate should be estimated. For instance, some market practitioners use the historical risk-free rate because they expect the risk-free rate to increase in the future. However, our preference is to adopt a rate that is closer to the on-the-day rate because we are looking to set a forward-looking rate over the regulatory period. As explained in our 'Rate of return final omnibus paper', the valuation problem facing a regulator with a 5-year regulatory cycle is different from that of market participants valuing an unregulated business.[239]

We have not adopted an on-the-day rate because these estimates may be unduly sensitive to short-term volatility. Therefore, we propose to set an averaging period between 20 and 60 business days, which in our view provides a pragmatic alternative to the on-the-day rate.

This would provide the businesses with flexibility because they could choose a longer averaging period, which would reduce the volatility in the estimate but also reduce the relevance to current rates in the market. Conversely, a shorter averaging period would be more relevant but also more volatile. This approach is consistent with the approach we adopted in 2018.[240]

NSPs are required to nominate the period in advance of the period commencing, which reduces the possibility of picking an averaging period that upwardly biases the risk-free rate.

Figure 6.5 shows the impact of different averaging period lengths on volatility compared with the on-the-day rate.

Figure 6.5 Impact of different lengths of averaging CGS yields

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

[239] AER, Rate of return – *Final omnibus paper*, December 2021, p. 65.

[240] AER, *Rate of return instrument – Explanatory statement*, December 2018, p. 131.

The 20-day averaging period reduces the impact of individual days in the on-the-day rate. However, it does not remove short-term fluctuations in the on-the-day rate. In comparison, the 60-day averaging period reduces the impact of short-term fluctuations but still follows the underlying trends of the on-the-day rate. In contrast, the 250-day average departs significantly from the on-the-day rate.

6.2.4 Length of the nomination window

The nomination window sets out the period of time over which a regulated business can nominate their averaging period. We need to specify the nomination window length to ensure that the rate of return instrument is capable of automatic application. [241] This is a result of the instrument being binding, which reduces our ability to select the nomination window for each determination.

Since our 2018 Instrument, we have found that the nomination window for the risk-free rate averaging period ending 3 months before the start of the next regulatory control period creates practical difficulties for finalising regulatory determinations, which are required to be finalised 2 months prior to the next regulatory control period. We have found that a period of one month between the end of the averaging period and making our final decision creates practical difficulties.

We raised this issue in our 'Equity omnibus draft working paper'.[242] In response, stakeholders submitted that they do not oppose changing the nomination window and accept the practical reasons that necessitate a shift in the nomination window.[243]

As a result, we require that a nominated averaging period must start and end between 8 months and 4 months prior to the commencement of the regulatory control period.

Some NSPs are affected by a "timing issue" that arises because the date that the AER must publish the rate of return instrument occurs during some reset processes.[244] For service providers affected by the timing issue, they will be required to nominate their averaging periods prior to the commencement of the 2022 Rate of Return Instrument even though the AER will make a final regulatory decision[245] for them after the commencement of the 2022 Rate of Return Instrument. For NSPs in this situation, the permitted averaging periods are unchanged from those permitted under the 2018 Rate of Return Instrument.

The reason we have made this change for these NSPs is because these NSPs were required to nominate average periods consistent with clauses 7, 8, 23 and 24 of the 2018 Rate of Return Instrument before they were aware of the requirements for averaging periods

[241] NEL, s. 18J(2)(b), NGL, s. 30E(2)(b).

[242] AER, *Equity omnibus draft working paper*, July 2021, pp. 52-53

[243] Endeavour Energy, *Overall rate of return, Equity and Debt*, 3 September 2021, p. 9; Ausgrid, *Overall rate of return, Equity and Debt*, 3 September 2021, pp. 7-8.

[244] The AER is required to publish the rate of return instrument on the fourth anniversary of publishing the previous rate of return instrument: NEL, s. 18U(2)(a); NGL, s. 30P(s)(a).

[245] NER, cll. 6.11.1, 6A.13.1; NGR, r 62.

under the 2022 Rate of Return Instrument. This change ensures that if these service providers lodged compliant averaging periods with their regulatory proposals (under the 2018 Instrument) they will not be penalised irrespective of the clauses in the 2022 Instrument.

Clauses 8 and 24 are amended in this Draft Instrument to deal with this by specifying NSPs that are impacted by the above timing issue have their nominated averaging periods assessed using the same permitted averaging period timing as exists in the 2018 Instrument.

We have taken a slightly different approach to the carve out clauses in the 2018 Instrument[246] where specified NSPs in clause 25 of that Instrument were able to nominate their return on equity and debt averaging periods prior to the start of the risk-free rate and return on debt averaging periods, instead of at or before the lodgement of their regulatory proposals. The reason for this changed approach is we consider it does not penalise service providers if they lodged compliant regulatory proposals.

If the final decision is delayed

We have considered how delays in a final network regulatory decision or a remittal interact with our risk-free rate methodology. We do not see it necessary to require a business to nominate a revised risk-free rate averaging period. We make delayed determinations and access arrangements as if they were in effect from the original commencement of the regulatory control period or revision commencement date. Therefore, the nominated averaging period would remain appropriate and we would not require a revised nomination.

Nominated averaging periods that don’t meet the criteria

We have included a mechanism for addressing circumstances where service providers fail to meet the nominated averaging period criteria (this includes failing to nominate a period). We will use a default averaging period of 20 days, ending 4 months prior to the commencement of the regulatory control period or revision commencement date. We will not reveal whether the service provider has failed to meet the averaging period criteria until after the default averaging period has ended. If the service provider fails to meet the nominated averaging period criteria, then we will calculate the risk-free rate using the default averaging period.

Situation where the number of business days change

We have considered how changes to public holidays may cause nominated averaging periods to fail to meet the criteria. We consider it appropriate that the nominated averaging period merely meet the criteria at the time of the proposal. This will avoid forcing service providers to use the default averaging period due to unforeseeable changes in the number of business days. To clarify, this does not include public holidays that are public knowledge at the time of the proposal. Public holidays are determined according to the state of New South Wales (NSW).

[246] 2018 Rate of Return Instrument clauses 8(d)(ii) and 24(f)(ii) in conjunction with clause 25.

6.2.5 Assessment criteria

As discussed above, our consideration of issues shows that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. Where necessary we have applied our assessment criteria to assist us exercise our judgement. Table 6.2 sets out our assessment criteria and key areas where they have assisted us to make our decision.

Table 6.2 Criteria of draft decision benchmark term of return on equity assessment

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and are informed by sound empirical analysis and robust data.	Matching the equity term to the length of the regulatory control period is consistent with principles of the corporate finance theory and regulatory economics. Using an averaging period is consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose (b) promote simple over complex approaches where appropriate.	Matching the equity term to the length of the regulatory control period is consistent with the purpose of calculating the regulatory allowance that is regularly reset. Use of averaging periods is consistent with the purpose of smoothing day-to-day volatility in market data.
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	The presented analysis is robust, transparent, and replicable, and is in accordance with good practice.
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale.	Models underlying the analysis are based on robust quantitative modelling and avoid arbitrary adjustments without sound rationale.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	Market data used is sourced from publicly available sources and reflects latest data available at the time.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	The approaches to both benchmark equity term and averaging periods are sufficiently flexible and allow to reflect the changing market conditions.
7	The materiality of any proposed change.	The materiality of the choice of the benchmark equity term and averaging periods varies depending on the prevailing market conditions, such as interest rate cycle.
8	The longevity or sustainability of new arrangements.	As the approach is consistent with principles of the corporate finance theory and regulatory economics, it is likely sustainable.

7 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. The MRP 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.

Our regulatory task is to determine an overall rate of return (or WACC) for a benchmark business supplying regulated energy network services commensurate with its efficient financing costs. Because we use an Australian domestic Sharpe-Lintner Capital Asset Pricing Model (SL CAPM), the relevant MRP is the expected Australian dollar return on the Australian market portfolio less the return on the Australian dollar risk-free asset.

The MRP estimate we use in the SL CAPM needs to be a good estimate of the expected Australian domestic MRP. However, the expected MRP is not directly observable. As a result, stakeholders have suggested several different methods for us to use to estimate the expected MRP. These include using the historical excess returns (HER), dividend growth models (DGMs), the total market returns or Wright approach and surveys.

7.1 Draft decision

Our draft decision is to maintain our current approach (consistent with our 2018 Instrument), which is to set the MRP based on estimates of historical excess returns. We have also decided to set the MRP consistent with the term of the regulatory period (typically this is 5 years). We think this is the best approach that meets our objectives. We set out our reasons for this view in section 7.2.1.

Our draft decision is to set a fixed MRP value that will be added to the yield to maturity on Australian Commonwealth Government Securities (CGS). The value of the MRP and the corresponding CGS will depend on the length of the regulatory period. We expect the majority of our regulatory decisions will have a regulatory control period of 5 years:

- 6.8% for expected regulatory control periods with a length of less than or equal to 5 years and 1 month
- 6.7% for expected regulatory control periods with a length greater than 5 years and 1 month and less than or equal to 7 years
- 6.6% for expected regulatory control periods with a length greater than 7 years and less than or equal to 9 years
- 6.5% for expected regulatory control periods with a length greater than 9 years.

The way these values are calculated is explained in section 7.2.1.

In estimating the MRP we have considered all relevant evidence available to us from the review, including evidence from historical excess return data and other potential methods of estimating the MRP. We have also carefully considered each of the submissions put to us.

We acknowledge there are differences of view on the best way to set the MRP in our context. We outlined alternative options for setting the MRP in our Rate of return final omnibus paper.[247] In reaching this draft decision we have explored the different views in detail. We have also examined how alternative options might be implemented.

Out of the options we looked at in our working paper, we think the alternative to our current approach that has the most merit is a mechanical approach updated throughout the life of the 2022 Instrument (also known as option 3b) as described in section 7.2.2.3. This approach has some desirable characteristics because it may capture market information at any given time. Under option 3b we would set the MRP equal to the average of HER and an MRP value derived from a dividend growth model. We would undertake this calculation before a final regulatory determination.

While we have settled on continuing our current approach in this draft decision, there is still additional consultation to take place before our final decision. We think it would be helpful for stakeholders to see how we would implement option 3b if we were persuaded that it is superior to our current approach. By setting out this detail, stakeholders will be able to see how the approach would operate, develop more informed views on the option and provide us with suggestions for refining or improving the approach if we were to adopt it in the final decision. We set out this detail in section 7.2.2.3 on how this could be formulaically applied. We have also compared our proposed approach to option 3b in our sensitivity and scenario testing section in chapter 11.

7.2 Issues and considerations

In 2018 we stated that the MRP is not stationary and is likely to vary under different economic conditions. However, we did not identify a sound theoretical basis for determining how the MRP might vary with the risk-free rate (RFR).[248] In addition, we did not consider we had a sufficiently robust method to estimate genuine variations in the MRP over time.[249] Therefore, we considered that the best regulatory approach was to fix the MRP and have the return on equity vary with the risk-free rate.[250]

NSPs and investors raised concerns over our 2018 approach to estimating the MRP and proposed that a more forward-looking approach such as the DGM should be considered.[251] Consumer groups submitted that our current approach to MRP estimation remained

[247] AER, *Overall Rate of Return, Equity and Debt omnibus working paper*, December 2021 pp. 32–33.

[248] AER, *Rate of Return Instrument Explanatory Statement*, December 2018, p. 61

[249] AER, *Draft rate of return guidelines explanatory statement, July 2018*, p. 130.

[250] AER, *Rate of Return Instrument Explanatory Statement,* December *2018*, p. 61

[251] ENA, *Best practice framework for setting the allowed return on equity*, 9 October 2020, pp.35, 43; APGA, APGA Submission to the AER: *Draft working papers on return on equity models and international approaches to the rate of return*, 9 October 2020, p.9; NSG, *Response to the 2022 Rate of return instrument working paper on return on equity*, 9 October 2020, pp.3–5; QTC, *Pathway to the 2022 rate of return instrument*, 12 October 2020, pp.2–9; APA, *APA submission on CAPM and alternative return on equity models*, 12 October 2020, p.4.

appropriate.[252] Additionally, the Retailer Reference Group suggested that we consider surveys and historical excess returns.[253] We engaged consultants for expert advice on this issue. These consultants were:[254]

- The Brattle Group
- Professor Graham Partington and Stephen Satchell
- Cambridge Economic Policy Associates (CEPA).

The consultants offered contrasting views on the role of the DGM to estimate an MRP and the existence of a relationship between the risk-free rate and the MRP.

The Brattle Group's report recommended the use of a DGM to estimate a 'forward-looking' MRP because this was done by some international regulators.[255]

The CEPA report suggested we consider 3 options for calculating the MRP from historical data:

- fixed MRP approach
- fixed total market return (TMR) approach
- hybrid approach.[256]

CEPA concluded that the TMR approach and the hybrid approach cannot be ruled out and may provide better estimates of the forward looking MRP consistent with the AER's duty.[257]

In contrast, the most recent Partington and Satchell report to the AER pointed out that widely divergent results can be obtained when using the DGM and recommended that it should not be used for determining the MRP.[258]

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[252] CRG, *Submission to AER: Return on equity*, 9 October 2020, pp. 39–45; EUAA, *Submission, CAPM and alternative return on equity models*, 9 October 2020, p.2

[253] AEC, Presentation: *AER Retailer reference group, International approaches and equity models*, 16 September 2020, p.3.

[254] The Brattle Group, *A review of international approaches to regulated rates of return*: Prepared for the AER, 1 June 2020; G Partington and S Satchell, *Report to the AER: Alternative asset pricing models*, 30 June 2020; CEPA, *Relationship between RFR and MRP*, 16 June 2021.

[255] The Brattle Group, *A review of international approaches to regulated rates of return*: Prepared for the AER, 1 June 2020, p. 58.

[256] This approach would place weight on both of the above approaches. It relies on an assumption that there is a negative correlation between the risk-free rate and the MRP but this correlation is not perfect, so that a fall (/rise) in the risk- free rate would lead to a rise (/fall) in the MRP, but the change in the MRP would be smaller than that of the risk-free rate. Analysis of historical data or alternative approaches could be used to calibrate the model.

[257] CEPA, *Relationship between RFR and MRP*, 16 June 2021, p. 44.

[258] G Partington and S Satchell, Report to the AER: *Alternative Asset Pricing Models,* 30 June 2020, p.23.

Having considered stakeholder submissions and expert reports submitted to us since the 2018 Instrument, our Rate of return final omnibus paper proposed to keep an open position on the best method to estimate a forward-looking MRP. We outlined 3 broad options:

- Option 1 – Maintain our current approach to inform our estimates of the MRP (consistent with our 2018 Instrument).
  - Under this approach, the HER method plays a primary role and we look at both arithmetic and geometric averages to develop our MRP estimates range.
  - When exercising our regulatory judgment, we rank the utility of different types of evidence at the time and then qualitatively consider whether to move our initial MRP estimates up or down.
  - We give most weight to the HER results and less weight to other relevant evidence (such as DGMs, surveys and conditioning variables).
- Option 2 – Use estimates from the DGM to inform our point estimates of the MRP, within the range observed by our current approach.
  - That is, exercising our judgement to pick a point estimate from the HER range using the information from the DGMs in a directional sense.
  - Where there is an increasing/decreasing trend in DGM estimates relative to their long-term averages, we may pick a point estimate that is higher or lower within the range of HER estimates, respectively (we consider this as option 2a).
  - Alternatively, we could set a value for the MRP having considered both HER and DGM estimates and any other relevant evidence (we consider this as option 2b).
- Option 3 – Provide more weight to the DGM alongside our current approach (a mechanical approach).
  - Apply weights to the HER and DGM and set a MRP point estimate at the start of the 2022 Instrument (option 3a).
    - This would require us to determine how the HER estimate(s) and DGM(s) are weighted as well as the specification of the DGM(s) inputs.
  - Alternatively, given the 2022 Instrument must be applied without any discretion, we could set a method that will mechanically update throughout the life of the 2022 Instrument (option 3b).

In section 7.2.1, we outline our reasons for continuing option 1 in this draft decision. We then set out how the approach will be implemented, including the calculation of the MRP value.

We also step through alternative approaches to estimating the MRP, including how they might be implemented in section 7.2.2.3.

We consider 5 questions that have assisted us in deciding our approach:

1) Does the MRP vary through time, and can it be modelled?
2) Is there a quantifiable relationship between the risk-free rate and MRP?
3) Is the DGM likely to be a better estimator of a forward-looking MRP than the HER approach and what is the best way to apply the DGM in our regulatory framework?
4) What is the role of surveys in informing our MRP?

5) What is the role of conditioning variables in informing our MRP?

7.2.1 The HER as a forward-looking estimate

To date, our approach has been to rely on HER as the best indicator of future values of the MRP. This approach is based on the view that (on average) past realised returns are the best indicator of investor expectations. It has several desirable characteristics for estimating the MRP in a regulatory setting:

- Investor expectations of future returns are informed by past realised returns.
- The method is easily replicable, transparent and widely used in both regulation and by market practitioners.
- Using a fixed MRP will result in the total return on equity moving in line with the risk-free rate. The risk-free rate moves in line with economic conditions, meaning our return on equity will also tend to move with the base cost of money because it varies with changing market conditions.
- The Consumer Reference Group (CRG) submits that applying this approach consistently over time will ride through short-term economic cycles and promote stability and predictability.

In response to our Rate of return final omnibus paper, the NSPs questioned our approach for setting the MRP on the basis of the HER evidence alone because this approach embeds the strong assumption that the MRP is effectively constant over time. They stated that this would be inconsistent with the evidence and advice before the AER – that the MRP varies through time.[259]

In contrast, the CRG submitted that while they accept the HER method is not perfect, we should still retain our current approach that puts most weight on long-run HER data. This is due to the absence of empirical evidence that the prevailing approach has had a detrimental impact. The CRG further stated that the HER method is the most appropriate for long-lived assets with long-term investors.[260]

At the concurrent evidence session, some experts argued that the historical averaging methodology gives a false sense of precision in its MRP point estimates in Australia due to the associated confidence intervals. These experts concluded that exclusive use of the HER is not likely to provide a good estimate of the prevailing market risk premium (except in exceptional circumstances).[261]

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[259] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 89, 91; Australian Gas Infrastructure Group, SA Power Networks, CitiPower and Powercor and United Energy, *Response to AER Rate of Return Final Working Papers*, 11 March 2022, p. 5.

[260] CRG, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers,* p.11, 69, 76.

[261] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, p. 68.

Other experts argued that historical averaging will give the best estimate of the unconditional risk premium if the longest available data is used and passes the tests for stationarity and ergodicity.[262] In their view, we should continue with the unconditional MRP because we do not know how to estimate the conditional risk premium with any precision and trying to do so could introduce more noise and error in the process.[263] They also argued that, although the HER is not perfect, there is no reliable alternative to track MRP changes.[264]

In our view, the unconditional MRP is most relevant to our regulatory task as there is difficulty in estimating the conditional MRP. As seen in the expert session, there was no consensus among the experts on how to estimate the conditional MRP which captures variations in the MRP. Therefore, we rely on the HER data for our estimate of the unconditional MRP.

Using historical excess returns does not mean an MRP estimate is backward-looking. Historical excess returns data is commonly used by both regulators and market practitioners to inform their estimates of the market risk premium within a forward-looking rate of return. This view was recognised by the Tribunal in the Dampier to Bunbury Natural Gas Pipeline (DBNGP) matter.[265]

We recognise that by maintaining our current approach of fixing the MRP it will result in a 1:1 positive relationship between changes in the risk-free rate and changes in the return on equity. However, government securities are the common proxy used for a risk-free asset and their yield reflects the required return in view of market conditions at the time. Consequently, fixing a forward-looking MRP estimate for 4 years, to be combined with a current risk-free rate selected close to the start of the regulatory period (each time the Instrument is applied), reflects the risks (and required return on equity capital) faced by firms in the supply of Australian regulated energy network services in an unbiased manner.

Having considered all the relevant evidence available to us, we consider that an average of historical realised excess returns may be the best available predictor of the current MRP. Therefore, we have decided to set the MRP based on the HER, consistent with past practice.

We will use the HER series data used by Brailsford, Handley and Maheswaran (BHM). The BHM data set contains an ASX adjustment to address potential problems with the realised Australian market (All Ordinaries) return data series before 1958. (We have set this out in Appendix C.)

We also recognise that in our Rate of return final omnibus paper, we stated that we are considering the use of the new RBA series to estimate returns before 1980. However, at this

262 AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, p. 70.

263 AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, p. 70.

264 AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, p. 58.

265 The Tribunal recognised this view in the Dampier to Bunbury Natural Gas Pipeline (DBNGP) matter. Australian Competition Tribunal, Application by DBNGP (WA) Transmission Pty Ltd (No 3) [2012] ACompT 14, 26 July 2012, paragraph 153

point of time we have decided not to pursue this option.[266] As the RBA paper notes, there are a number of issues with the price return series it constructed due to the data it used.[267] This means, even if the RBA dividend series is better than the existing dividend series we use, construction of an alternative accumulation return series requires further work to estimate a matching price return series.

7.2.1.1 Sample periods

In 2018 we considered 5 sampling periods for HER as suggested by Brailsford, Handley and Maheswaran (BHM).[268] These estimates show that the historical excess returns are relatively stable over long periods of time.

Table 7.1 Historical excess returns using a 10-year term estimates

Sampling period	Arithmetic average (%)	Geometric average (%)
1883 to 2021	6.4	5.1
1937 to 2021	6.2	4.4
1958 to 2021	6.7	4.5
1980 to 2021	6.8	4.8
1988 to 2021	6.5	5.1

Note: 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 analysis.

Although these estimates change slowly over time, we consider they are likely to reflect prevailing market conditions on average if investor expectations are guided by historical excess returns.

Brailsford, Handley and Maheswaran stressed that these estimation periods are not arbitrary; rather, they are determined by clearly identifiable and material changes in the underlying data.[269]

The rationale for each of the estimation periods are:

- 1883 – the first (calendar) year for which data is available
- 1937 – the first year for which data is available on both a broad stock index – the Sydney All Ordinary Shares price index – and on marketable 'short-term' government securities
- 1958 – the first year for which the Sydney All Ordinary Shares price index was calculated on a daily, rather than a retrospective basis, and (approximately) the first year

[266] AER, *Overall Rate of Return, Equity and Debt omnibus working paper*, December 2021, pp. 41–42.

[267] Thomas Matthews, *Research discussion paper RDP 2019-04, A history of Australian equities*, June 2019, p. 31.

[268] AER, *Rate of Return Instrument Explanatory Statement*, December 2018, p. 240.

[269] AER, *Better Regulation: Explanatory Statement Rate of Return Guideline (Appendices)*, December 2013, p.82

for which marketable short-term government securities – seasonal securities/treasury notes – were issued

- 1980 – the first year for which the ASX All Ordinaries accumulation index was calculated on a daily, rather than a retrospective basis
- 1988 – the first (full) year of operation of the dividend imputation tax system in Australia.

Our draft decision is to use a term that aligns with the length of the regulatory period, which is typically a 5-year term. Since the RBA only publishes 5-year CGS yields after 1972, this is the earliest we can calculate HER with a 5-year term.

We consider that the 3 sample periods (1972 onward, 1980 onward and 1988 onward) provide useful information in estimating a forward-looking MRP. While the longer periods are likely to be more statistically robust, the period of 1988 onwards is most likely to provide an estimate that is more representative of current investor expectations and macroeconomic conditions. This period also has the advantage of only including data after commencement of imputation tax system in Australia, which has impacted the operation of the market and investor expectations. The more recent period is largely post inflation targeting by the Reserve Bank of Australia.

We were advised by the experts at the concurrent evidence session that 30 years of data is short, and we would need to test for stationarity and ergodicity. They suggested that certain statistical properties such as the law of large numbers[270] only apply once there are many observations in the data series – by using only 30 years of data, the confidence intervals of the HER point estimates are wide. [271]

We had Dr Lally perform tests for mean stationarity in excess returns, real returns and nominal returns using data from 1884 through to 2021.[272] The data he used was the same data underlying Figure 7.7. His results indicated you could not reject mean stationarity in any of the data series. However, Dr Lally's results are consistent with the comparison of rolling averages in Figure 7.7. That is, among the three series, excess returns are the most stable, with real returns and then nominal returns showing less stability based on the F statistics. These results suggest that in our circumstance, a fixed MRP may be more suitable than alternative specifications.

In our view the most recent time period of 1988 onwards is the most relevant to our task of estimating a forward-looking MRP because it reflects the introduction of imputation credits and is more likely to represent current market conditions.

However, we acknowledge that using the most recent time period must be balanced against the precision of the resulting estimate. We have therefore observed the standard deviation for each sample period and note that the volatility in the most recent sample period (1988 to

[270] The law of large numbers states that an observed sample average from a large sample will be close to the true population average and that it will get closer the larger the sample.

[271] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, pp. 35, 69-70.

[272] Dr Martin Lally, *Test of mean stationarity for Australian share market returns data*, 2 June 2022.

2021) has been lower than the 3 sample periods before it and slightly higher than the full sample period, as shown in the Table 7.2. It is unclear if these differences are by chance or reflect structural changes in the expected return distribution over time.

Table 7.2 Standard deviation of historic excess return series using a 10-year term

Measure of variability	1883 to 2021	1937 to 2021	1958 to 2021	1980 to 2021	1988 to 2021
Standard deviation	16.2%	18.9%	21.0%	20.2%	16.4%

Source: AER analysis.

If we were to use the longest period possible, we would have to use the 1972 to 2021 sample period because we are moving to a 5-year term. The standard deviation of the historical excess return series for a 5-year term is illustrated in Table 7.3.

Table 7.3 Standard deviation of historic excess return series using a 5-year term

Measure of variability	1972 to 2021	1980 to 2021	1988 to 2021
Standard deviation	21.7%	20.2%	16.4%

Source: AER analysis.

In our view, the sample period from 1988 to 2021 is preferred because it is most likely to be reflective of recent market structure, conditions and investor expectations. Therefore, acknowledging the results of Dr Lally that show you cannot reject mean stationarity in excess returns over a longer period, our decision is to use the estimates from this period to estimate the MRP.

7.2.1.2 Term of the MRP

While the majority of our regulatory determinations have an expected regulatory control period of 5 years, we have also considered how we should vary the application of the SL CAPM (its term) for longer or shorter regulatory control periods.

We think we should apply the SL CAPM consistently with the length of the regulatory period. Rather than match precisely the length of the regulatory period, we think it is a reasonable approximation to apply the SL CAPM in 4 broad bands as follows:

- regulatory control periods with a length of less than or equal to 5 years and 1 month
- regulatory control periods with a length greater than 5 years and 1 month and less than or equal to 7 years
- regulatory control periods with a length greater than 7 years and less than or equal to 9 years
- regulatory control periods with a length greater than 9 years.

Employing these bands simplifies the operation of the instrument without significant loss of accuracy. In deciding not to specify a band for shorter regulatory control periods than 5 years we note:

- regulated electricity businesses are currently prohibited from proposing regulatory periods of less than 5 years
- although regulated gas NSPs could propose shorter regulatory periods than 5 years, which we might accept, we consider this will be rare.

We will need to match the maturity of the risk-free rate yield to the period of the MRP. This is to enable regulated businesses to be appropriately compensated. Given that the term structure of interest rates is generally upward sloping on average, this would be expected to result in firms with a longer regulatory period receiving a slighter higher return on equity, on average.

We have directly estimated the MRP using both 5-year and 10-year risk-free rate yield data. We have then used those estimates via linear interpolation to estimate MRPs for single period SL CAPM application longer than 5 years and 1 month and less than or equal to 9 years. We have rounded our estimates to one decimal place as follows:

- for a 5-year application of the SL CAPM the raw MRP = 6.80974% = 6.8% rounded to one decimal place
- for a 6-year application of the SL CAPM the MRP = 6.80974% − 1/5*(6.80974% − 6.50871%) = 6.74954% = 6.7% rounded to one decimal place
- for a 7-year application of the SL CAPM the MRP = 6.81% − 2/5*(6.80974% − 6.50871%) = 6.68933% = 6.7% rounded to one decimal place
- for an 8-year application of the SL CAPM the MRP = 6.81% − 3/5*(6.80974% − 6.50871%) = 6.62912% = 6.6% rounded to one decimal place
- for a 9-year application of the SL CAPM the MRP = 6.81% − 4/5*(6.80974% − 6.50871%) = 6.56892% = 6.6% rounded to one decimal place
- for over 9 years the application of the SL CAPM will be based on 10 years and the MRP = 6.50871% = 6.5% rounded to one decimal place.

This results in 4 MRPs applied for the following expected regulatory control period length ranges in the Instrument:

- 6.8% for expected regulatory control periods with a length of less than or equal to 5 years and 1 month
- 6.7% for expected regulatory control periods with a length greater than 5 years and 1 month and less than or equal to 7 years
- 6.6% for expected regulatory control periods with a length greater than 7 years and less than or equal to 9 years
- 6.5% for expected regulatory control periods with a length greater than 9 years.

7.2.1.3 Arithmetic vs geometric averages

In our processes a debate has been running for many years about the merits of arithmetic versus geometric averages. This debate has also been considered in legal process associated with our earlier decisions. This debate has continued into this current process.

In response to our Rate of return final omnibus paper, NSPs submitted that there is no rationale for considering geometric means. They further stated that there are consistent and clear explanations from a range of sources, including leading finance textbooks, as to why only arithmetic averages must be used in the AER's process.[273]

However, the CRG submitted that the superiority of arithmetic averages is predicated on the assumption that returns are serially uncorrelated, which is by no means a given. They conclude that if this assumption does not hold then the best estimate of future returns will lie between the arithmetic and the geometric average.[274]

In this decision we have once again explored the theory around arithmetic and geometric means. We think both approaches have advantages and disadvantages. In particular, both will provide biased estimates in different circumstances. For our purposes, we think that the arithmetic mean is likely to produce a result that is most consistent with our task. This is because the expected arithmetic mean is better at measuring all possible states, whereas geometric averages assume one path of history.

However, we do acknowledge that the arithmetic average is likely to be subject to a small upward bias. Therefore, we have reviewed both sets of averages before settling on a value.

Table 7.4 Historical excess return estimates

Sampling period	Arithmetic average 10 years (%)	Geometric average 10 years (%)	Weighted average 10 years (%)	Arithmetic average 5 years (%)	Geometric average 5 years (%)	Weighted average 5 years (%)
1972 to 2021	6.7	4.3	6.2	6.9	4.5	6.7
1980 to 2021	6.8	4.8	6.3	7.1	5.0	6.9
1988 to 2021	6.5	5.1	6.1	6.8	5.4	6.6

Note: 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 analysis.

We have decided to set the MRP at 6.8%. This number is the arithmetic average of historical excess returns for the period 1988 to present. By identifying this data point, we have ensured that stakeholders can transparently calculate the value we use.

Our value of 6.8% has been estimated in manner that is consistent with 6.1% used in the 2018 decision, which corresponds with the arithmetic mean for 1988 to 2017.

[273] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, pp. 69, 75.

[274] CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 69.

7.2.2 Questions that have assisted our consideration of the MRP

We now turn to the 5 questions that have assisted our consideration of the MRP. They are:

1) Does the MRP vary through time, and can it be modelled?
2) Is there a quantifiable relationship between the risk-free rate and MRP?
3) Is the DGM likely to be a better estimator of a forward-looking MRP than the HER approach and what is the best way to apply the DGM in our regulatory framework?
4) What is the role of surveys in informing our MRP?
5) What is the role of conditioning variables in informing our MRP?

7.2.2.1 Does the MRP vary through time, and can it be modelled?

At the concurrent evidence session, the experts agreed that there are 2 types of MRP:[275]

- the unconditional MRP
- the conditional MRP.

The unconditional MRP is one that does not vary much through time (a relatively constant risk premium), whereas the conditional MRP varies through time.

We agree with the expert view that the conditional MRP does vary through time and is in principle desirable to estimate.

However, there was no agreement among the experts that the conditional MRP can be accurately modelled. Some experts argued it is impossible to measure the conditional MRP precisely and reliably, while others argued that there is convincing empirical evidence of a negative relationship.[276]

CEPA's report to the AER noted that recent academic literature overwhelmingly uses a time varying MRP, and there are many recent examples of the use of DGM and related models to estimate how the MRP changes. Recent approaches include work by the European Central Bank, Federal Reserve Bank of New York and the Bank of England.[277]

CEPA stated that in the past the academic literature relied on or at least was consistent with the assumption that the MRP was stable. This is no longer the case and the MRP is now seen as a variable to be estimated. However, the academic literature does not provide a firm

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[275] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, p. 25.

[276] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, pp. 20, 26.

[277] CEPA, *Relationship between RFR and MRP*, 16 June 2021, p.13; D Kapp and K Kristiansen, *Euro area equity risk premia and monetary policy: a longer-term perspective,* 2021; F Duarte and C Rosa, *The equity risk premium: a review of models*, 2015, New York Federal Reserve Board; Bank of England, *Topical article: An improved model for understanding equity prices*, 2017, p.86.

guide as to whether the MRP should vary with the risk-free rate. Therefore, a decision on what assumption to make about the MRP should rely on empirical evidence.

Valuation models such as the DGM or conditioning variables are options to estimate a time varying MRP. However, there is some uncertainty about their ability to predict excess returns. Accordingly, we express caution when using them to predict excess returns. We have discussed this in more detail in our Rate of return final omnibus paper.[278]

At the concurrent evidence session, some of the experts agreed that there may be some relationships between the risk-free rate and market risk premium. For instance, Dr Jonathan Mirrlees-Black and Dinesh Kumareswaran stated that there is convincing empirical evidence that there has been a negative relationship between the prevailing risk-free rate and the prevailing MRP since at least the mid-1990s.[279]

In contrast, Professor Graham Partington and Dr Martin Lally stated that they would not place any reliance on the statistical relationships that have been found. Professor Partington further commented that there is no consistent reliable evidence for the direction of the relationship. You can find an inverse relationship, you can find a positive relationship, you can find no relationship, you can find regime shifts. There is no consistent reliable evidence for the direction of the relationship.[280]

Dr Glenn Boyle agreed that there may be good reasons for why there might be a negative relationship between the MRP and the riskless interest rate, but he would be hesitant when observing these empirically estimated relationships. He stated that it is important to remember that we cannot actually observe, even ex-post, the true market risk premium and these negative relationships have all been estimated using some model.[281]

NSPs supported recognising an inverse relationship between the MRP and the risk-free rate. QTC explained that a negative relationship is supported by the expectations, practices and observations of real-world investors as well as regression analysis of risk-free rates and implied MRPs from independent expert reports. ENA further stated that a negative relationship is consistent with the empirical evidence reported in the CEPA report commissioned by the AER, whereas a zero relationship is not. In ENA’s view, the empirical evidence of a negative relationship between the MRP and the risk-free rate is an outcome of the market data and not an assumption of the model.[282] In contrast, the CRG stated in response to a previous working paper that they are concerned that the AER continues to

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[278] AER, Overall Rate of Return, Equity and Debt omnibus working paper pp. 35–37.

[279] Dinesh Kumareswaran, Session 3, *MRP presentation*, February 2022, p. 4.

[280] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, pp. 35, 63.

[281] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, pp. 36–37

[282] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers,* 11 March 2022, pp. 82, 88; QTC, 2022 Rate of Return Instrument: Rate of return information paper and final working papers, 11 March 2022, pp. 17, 22, 24.

entertain the debate despite no new evidence, theories or consensus emerging since it was reviewed in the 2018 Instrument review. The MEU also shared a similar view to the CRG. [283]

In the section below we examine CEPA's results and then present our views on whether a relationship could be quantified and implemented in our Rate of Return Instrument.

7.2.2.2 Is there a quantifiable relationship between the risk-free rate and MRP?

The CEPA report uses empirical data on stock prices and dividend yields and a variant of the Gordon DGM to derive an implied expected market return and MRP. CEPA concludes that a strong negative relationship exists in their sub-sample period 1993 to 2020, and a weaker relationship during their whole sample period 1917 to 2020.

The CEPA modelling employs an assumption of a constant expected return in the Gordon DGM that drives a more stable expected return (hence a stronger negative relationship between RFR and MRP).

The CEPA DGM is based on the AER 2018 DGM, taking the following form:

$$P_c = \frac{mD_c}{(1+k)^{m/2}} + \sum_{t=1}^{N} \frac{D_t}{(1+k)^{m+t-0.5}} + \frac{\frac{D_N(1+g)}{k-g}}{(1+k)^{m+N-0.5}}$$

Where:

- P_c is the current price of equity
- $E(D_c)$ is expected dividends per share for the current financial year
- $E(D_t)$ is expected dividends per share for the financial year, t years after the current financial year
- m is the fraction of the current financial year remaining, expressed as a decimal point
- N is the time period after which dividend growth reverts to its long-term rate (for the 2-stage model, N = 2)
- g is the expected long-term growth rate in nominal dividends per share
- k is the expected return on equity for the market portfolio.

As can be seen from the formula, the expected market return k is assumed constant in the model. The flat term structure of equity is anchored to the expectation as at $t = 0$. In other words, the realised share price and dividend yield at $t = 0$ reflect the expected cashflows (for a given dividend growth rate) discounted at this particular expected market return.

At another point, say $t = s$, the share price P_s and dividend yield D_s would reflect a (possibly) different expected market return anchored to the expectation as at $t = s$. Thus, for a time

[283] CRG, *The Overall Rate of Return, Debt Omnibus and Equity Omnibus paper — Volume 1: Technical*, 3 September 2021, p.13; MEU, *Rate of return Omnibus papers on 2022 RoRI: Response to draft working papers*, 3 September 2021, pp. 13–14.

series of share price P_t and dividend yield D_t, the model derives a time series of implied expected market return $E_t(k)$.

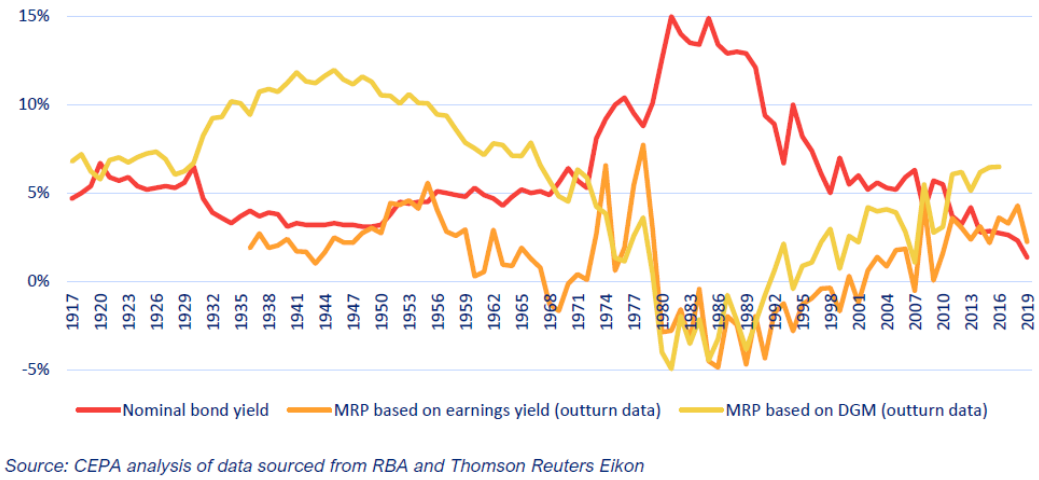
Deducting the contemporaneous risk-free rate from the model derived expected market return in each period gives a time series of MRP. Therefore, even though the share prices and dividend yields are observed empirical data, the implied MRP is a function of the assumed term structure of equity.

In its report, CEPA stated:[284]

> As part of these analyses, we are not claiming that the DGM and earnings yield model produce accurate measures of the MRP, but merely that they can be used to provide a consistent estimate of the directional changes in MRP.

Figure 7.1 shows the results produced by the CEPA report.

Figure 7.1 Nominal bond yield compared with select MRP estimates



Source: CEPA report to the AER.

In our Rate of return final omnibus paper we noted a range of studies, which had different conclusions.[285] In a previous submission the CRG noted the diverse opinions on this matter.[286]

ENA and QTC have referenced the Campbell, Pflueger and Vieira (2020) paper to support an inverse relationship between the risk-free rate and the MRP.[287] The paper found a

[284] CEPA, *Relationship between RFR and MRP*, 16 June 2021, p.38.

[285] AER, AER, Rate of return – *Final omnibus paper*, December, p. 61.

[286] CRG, *The Overall Rate of Return, Debt Omnibus and Equity Omnibus paper — Volume 1: Technical*, 3 September 2021, p.84.

[287] ENA, *Estimating the cost of equity: Response to AER's Pathway to 2022 Rate of Return Instrument Draft Equity Omnibus Working Paper*, 3 September 2021, p.39; QTC, *Submission to the Equity Omnibus draft working paper*, 3 September 2021, p.1.

negative correlation between inflation and output gap in the 1979 to 2001 period and a positive correlation in the 2001 to 2011 period.

ENA also submitted a paper by Li et al. for our consideration. QTC submitted a further 2 pieces of academic literature (Li, Zha, Zhang and Zhou (2020) and Campbell, Sunderam and Viceira (2016)) that provided support for a negative relationship between the risk-free rate and the MRP.

In our omnibus paper we noted contrasting work by Baele, Bekaert and Inghelbrecht (2010), who examined the bond-stock return correlation in a sample period similar to Campbell et al. They found that economic variables such as inflation and output gap have little explanatory power and that liquidity proxies play an important role in explaining the bond-stock co-movements. [288]

They conclude that:

> These liquidity factors may be correlated with the 'flight-to-safety' effects that have been documented in the literature (see especially Connolly, Stivers, and Sun (2005)). In the end our fundamental model does not seem to produce an entirely satisfactory fit of the 'flight-to-safety' effects that are likely at the heart of the negative correlations observed post 2000.

7.2.2.3 Is the DGM likely to be a better estimator of a forward-looking MRP than the HER approach and what is the best way to apply the DGM in our regulatory framework?

In 2018 we stated that the DGM can be used to inform the MRP. However, at the time our confidence in the robustness of its estimate had diminished since the 2013 Guideline. Therefore, we were not persuaded to select an MRP towards the top of the empirical estimates of the historical excess returns (HER).

Since 2018 we have received several submissions on the use of the DGM. For instance, the NSPs submitted that the DGM has a strong theoretical basis and provides useful evidence about the forward-looking MRP. They further stated that the DGM is consistent with the observations of experts that MRP moves over time and should be given weight alongside the HER result.[289] On the other hand, the CRG was of the view that in practice the DGM requires the use of input assumptions that are inherently contestable and contentious, resulting in outcomes with a very wide confidence interval. In conclusion, they submit that DGMs are

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[288] L Baele, G Bekaert and K Inghelbrecht, '*The Determinants of Stock and Bond Return Comovements'. The Review of Financial Studies*, 2010, 23(6): 2374–2428.

[289] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 84. APGA, *APGA Submission to the AER: Rate of return final omnibus paper and information paper*, 11 March 2022, p. 22.

subject to wide variability, making them unsuitable for point estimates of MRP in the context of the AER's regulatory task. [290]

At the concurrent evidence session, the experts agreed that the DGM is a well-developed theoretical model that contains useful information. However, some experts also highlighted the various implementation issues with the model that lead to MRP estimates, which are too volatile for regulatory use.[291]

We also note that some experts stated that all methods used to estimate the MRP have limitations and that we should consider a combination forecast of a set of methods. In their view, relying on the HER point estimates alone would result in a false sense of security and they recommend putting weight on other methods, such as the DGM, that contribute useful information.[292]

However, there was no consensus on which specification of the DGM the AER should use. Some experts suggested the use of multiple models, whereas other experts suggested the use of a single model the AER considers is best fit for regulatory purposes.[293] Some experts also suggested that ENA's calibrated DGM (discussed in the section below) should be explored further. There was no agreement on the best way or the best DGM or set of DGMs to apply to our regulatory framework.

We also note that the Brattle and CEPA reports highlighted that international regulators such as the New Zealand Commerce Commission (NZCC) and the US Federal Energy Regulatory Commission (FERC) use the DGM to estimate a forward-looking MRP.

The Brattle Group's report referred to the SL CAPM as a model that relies on backward-looking information (particularly when populated with a historical MRP) and the DGM as a model that uses forward-looking information. The report suggested that implementation of the SL CAPM could be improved by using forward-looking evidence when estimating inputs such as the MRP. Using the DGM to estimate the MRP would provide more contemporaneous information, and this is particularly important during periods of change in financial markets.

The CEPA report considered 2 approaches (the DGM and the earnings yield model) to investigate whether the MRP moves over time and whether there is any relationship with the risk-free rate. However, in relation to whether the models can accurately predict MRP, CEPA states:[294]

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[290] CRG, Advice to the Australian Energy Regulator: *CRG Response to the AER's December 2021 Information paper*, March 2022, pp. 11, 70.

[291] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, pp. 49,62.

[292] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, pp. 43,65.

[293] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, p. 108.

[294] CEPA, *Relationship between RFR and MRP*, 16 June 2021, p.38.

> As part of these analyses, we are not claiming that the DGM and earnings yield model produce accurate measures of the MRP, but merely that they can be used to provide a consistent estimate of the directional changes in MRP.

We are also aware that institutions such as the Bank of England (BOE) use the DGM to help aid monitoring of asset price moves in support of monetary and financial stability objectives. The BOE states that MRP cannot be observed and any estimate of it is necessarily subjective.[295] Part of the uncertainty associated with model-based estimates of the MRP reflects uncertainty about the measurement of the model's input. This inherent uncertainty about the true value of the MRP is reflected in the wide dispersion of MRP estimates in the literature. Given the uncertainty associated with measuring the MRP, the BOE's analysis tends to focus less on the precise levels of the MRP and more on changes in the MRP over time or on the level of the MRP relative to historical averages.

In a recent report to the Civil Aviation Authority (CAA), PwC stated that the BOE DGM has been created to help monitor equity price moves in support of its policy objectives.[296] It is interested in whether risk premiums are rising, or whether analysts are cutting their forecasts of earnings and dividends, and this is instructive for both managing monetary policy and financial stability. It is less concerned with the absolute level of the equity return predicted in its model. PwC stated that for the regulatory purpose of setting the level of equity returns, the potential for analyst optimism is more problematic and using analyst forecasts of dividend growth is not well suited to a regulator's purposes.

The UK Regulators Network (UKRN) report also agrees with this assessment, noting that the BOE's most recent application used the model as an accounting procedure to explain the shifts in the stock market after the event, not predict returns.[297]

The Reserve Bank of Australia (RBA) also uses a DGM to generate information on the Australian MRP. We requested assistance from the RBA to better understand how it was being implemented.[298]

The RBA stated that the DGM is used informally and sometimes used to consider the market's attitude toward risk. In their view, the DGM is particularly sensitive to assumptions about the long-run rate of growth.[299] The RBA stated that the assumptions about the long-run rate of growth and long-run payout ratios can have an important bearing on the level of the

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[295] Bank of England, *Topical article: An improved model for understanding equity prices*, 2017, p.86

[296] PwC Economics, *Estimating the cost of capital for H7 - Response to stakeholder views, A report prepared for the Civil Aviation Authority (CAA)*, February 2019, p.10.

[297] UK Regulators Network, *Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason Miles and Wright (2003)*, March 2018, p.42

[298] RBA, *Letter to the AER in response to questions re: RBA Research Discussion Paper RDP 2019-04 and Dividend Discount Models*, 1 October 2021, p.2.

[299] RBA, *Letter to the AER in response to questions re: RBA Research Discussion Paper RDP 2019-04 and Dividend Discount Models*, 1 October 2021, p.2.; Dr Lally noted that in times of low interest rates the DGM can produce upwardly biased

implied equity risk premium. As a result, the RBA pays more attention to changes in the MRP over time rather than paying attention to the level.

In our view, the DGM method is a theoretically sound estimation method for the MRP. Since DGM estimates incorporate prevailing market prices, they are more likely to reflect prevailing market conditions. DGM estimates are also clearly forward-looking because they estimate expectations of future cashflows and equate them with current market prices through the discount rate.

However, we have highlighted consistently in the past that there are practical limitations and issues with using this evidence. In our view these estimates are highly sensitive to the assumptions used and it is necessary that all assumptions used have a sound basis; otherwise, estimated results from DGM analysis may be inaccurate and lead analysts into error.

We note that the ENA constructed and submitted a version of the DGM (the 'calibrated DGM') that attempts to address these concerns.

The ENA's calibrated model uses our DGM specifications (such as the 2-stage and 3-stage DGM) and inputs, except for our long-run estimate of the terminal growth rate. Instead, in 'calibrating' the models, the ENA solves for the long-run growth rate that equates the mean DGM estimate over a sample period with an estimate of the historical average MRP based on HER over the same sample period.[300]

We discuss the models we have been estimating over a number of years and the calibrated DGM in the next 2 sections.

The 2-stage and 3-stage DGM

In the 2013 Guideline and 2018 Instrument we arrived at a version of the DGM we considered was best suited to our regulatory task:

$$P_c = \frac{m\ x\ E(D_c)}{(1+k)^{\frac{m}{2}}} + \sum_{t=0}^{n} \frac{E(D_t)}{(1+k)^{m+t-0.5}} + \frac{\frac{E(D_N)(1+g)}{k-g}}{(1+k)^{m+N-0.5}}$$

Where:

- P_c is the current price of equity, for which we use the S&P/ASX 200 index as the proxy
- $E(D_c)$ is expected dividends per share for the current financial year[301]

[300] Frontier economics, *ENA models user guide, Implementation of a calibrated DGM*, September 2021, p. 1.

[301] We sourced dividend forecasts from Bloomberg. We have been informed by Bloomberg that its convention for reporting dividend forecasts on an index is to use calendar year forecasts as the relevant financial year forecasts

- $E(D_t)$ is expected dividends per share for the financial year, t years after the current financial year
- m is the fraction of the current financial year remaining, expressed as a decimal point
- N is the time period after which dividend growth reverts to its long-term rate (for the 2-stage model N = 2, for the 3-stage model N = 9)
- g is the expected long-term growth rate in nominal dividends per share
- k is the expected return on equity for the market portfolio.

We have used this formulation since the 2013 Guideline and stakeholders have not raised any issues in the past. This construction has enabled us to model 2 versions of the DGM. The 2-stage and 3-stage versions of the DGM are commonly used to estimate the DGM.

The 2-stage DGM divides future time periods into 2 stages. In the second stage, dividend growth is assumed to be constant. In the first stage, the growth rate may vary and is usually determined from estimates of analyst forecasts.

A 3-stage DGM, like a 2-stage DGM, has a final stage in which the growth of expected dividends is assumed to be equal to the long-term dividend growth rate. It also has an initial stage in which expected dividends are assumed to be determined by estimates of analyst forecasts. However, a 3-stage DGM also has an intermediate stage in which the growth rate of dividends is assumed to transition between the short-term growth rate and the long-term growth rate. This transition between the short-run and long run growth rate is assumed to take place in a linear fashion until the 10th year (the year in which the dividend growth reverts to its long-term growth rate).

The principal difference between the 2-stage and 3-stage models is the assumption about the time that it takes for growth to revert to its long-term level. The 2-stage model assumes that the reversion is relatively quick, and the 3-stage model assumes that the process takes somewhat longer.

Calibrated DGM proposed by the ENA

The calibrated DGM uses the 2-stage DGM to provide an indication of whether the current MRP is above or below the long-run average of the MRP. The model solves for the terminal growth rate and is based on the assumption that the average MRP derived from the HER for a specified period would be expected to equal the average MRP derived from a 2-stage DGM.

The ENA considers that this approach addresses the key concerns expressed by the AER, which are:

- there is no single objective way to determine the long-run growth rate and estimates are sensitive to the choice of growth rate
- there are concerns that the DGM approach might produce estimates that are systematically upwardly biased.

The ENA stated that the benefit of the calibrated DGM approach is that, not only does it produce the same average MRP as the historical excess returns approach, but it also provides an indication of whether the current MRP is above or below that long-run average. We have explained how the model is constructed in our Rate of return final omnibus paper and discuss its results in the section below.[302].

The model was endorsed by the NSPs and investor groups.[303] We also engaged with the ENA to discuss the suitability of the calibrated DGM for regulatory purposes.

We recognise that the logic of a calibrated DGM has some merit. As the experts highlighted to us in the concurrent evidence session, there are 2 forms of MRP – the unconditional MRP and a conditional MRP. The calibrated DGM attempts to understand where the conditional MRP sits in comparison with the unconditional MRP.

We note that ENA's original calibrated DGM was over the period Jan 1996 to June 2021.[304] However, since then, ENA has provided us an updated model over the period Jan 1988 to Jan 2022.[305]

Figure 7.2 shows the MRP estimates produced by the calibrated 2-stage DGM over the period from January 1988 to January 2022.

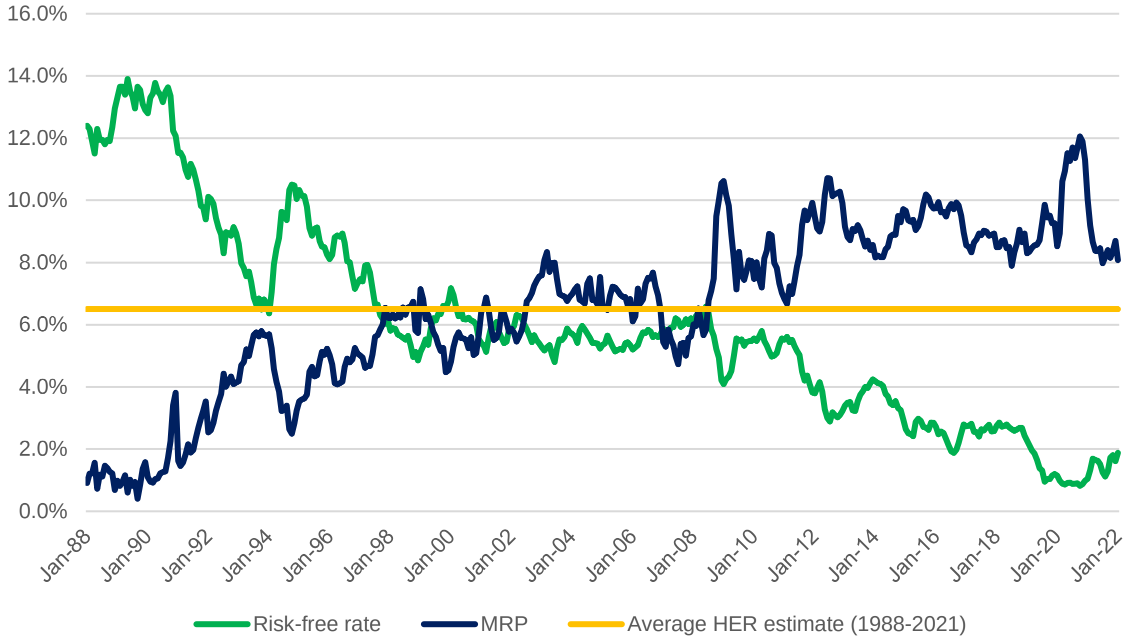
[302] AER, *Overall Rate of Return, Equity and Debt omnibus working paper*, December 2021, p. 48.

[303] APGA, APGA Submission to the AER: *Rate of return final omnibus paper and information paper*, 11 March 2022, p. 22; Endeavour Energy, *Rate of return information paper and call for submissions*, 11 March 2022, p. 4; APA, *APA submission on the Rate of Return Information Paper, Omnibus Paper, and Expert Evidence*, 11 March 2022, p. 26; NSG, *Response to AER Rate of return information paper and Omnibus final working paper*, 11 March 2022, p. 8.

[304] ENA, *Estimating the cost of equity: Response to AER's Pathway to 2022 Rate of Return Instrument Draft Equity Omnibus Working Paper*, 3 September 2021, pp. 55-56; ENA, *2022 RORI scenario testing and calibrated DGM*, 3rd September 2021.

[305] ENA, A calibrated divided growth estimate of the market risk premium, 28 April 2022, p. 12.

Figure 7.2 MRP estimates produced by ENA's calibrated DGM



Source: AER analysis; ENA calibrated DGM results; RBA interest rate statistics f16.

The chart shows the estimated MRP from 1988 to 2021. It was calibrated to match the AER's HER estimate for a 10-year term of 6.51% for the sample period of 1988 to 2021. To calibrate the model to achieve the long-run average of 6.51%, the model uses a single terminal growth rate of 6.023%.[306]

We accept the underlying premise of the calibrated model, but we do not think the results produced by the model can be credibly applied to our rate of return. In particular:

- The MRP estimated from the model exhibits extreme volatility from 0.40% in September 1989 to 12.05% in October 2020.
- The terminal long-term nominal growth in dividends used to calibrate the model of 6% is well above other current estimates of long-term dividend growth, including Australian Treasury forecasts for long-term nominal GDP growth of 5%.[307]

In our view there may be a material time varying error in the model created from using a constant growth rate. We estimate that a 1% increase in the growth rate used will result in approximately a 0.8% increase in the estimated MRP from the model. We also recognise the concerns raised by the CRG over the calibrated DGM. They note that the calibrated DGM 'decouples' the DGM result from the long-term growth rate. The analysis conducted by Woollahra Partners suggests there is at least one independent variable short in the

[306] AER analysis

[307] Treasury, *2021 Intergenerational Report*, June 2021.

regression model – leading to potential for omitted variable bias and future analysis. As a result, investigation is useful.[308]

Therefore, we have decided to not use the calibrated DGM at this point of time. However, we are open to further information on its relative advantages and disadvantages and how it might be employed.

Long-run expected growth rate in dividends

In operating a DGM, we need to develop an approach to forecasting future dividends. The two approaches we could employ are a:

- constant terminal dividend growth expectations over time; or
- variable terminal dividend growth expectations updated each time we run the DGM.

The approach we have used for our two stage and three stage DGM in the past is based on the constant terminal real GDP growth approach. This has resulted in us not changing our real terminal GDP growth rate forecast since we first estimated it in 2013. This terminal GDP growth rate is then adjusted for the net creation of new shares from new companies and new share issues (net of buybacks) from existing companies. It is then converted into nominal terms using expected inflation estimates.

To illustrate this, we refer to our 2013 Guideline and 2018 Instrument where our central dividend growth rate was 4.6%. This estimate comprised of the expected long-run real growth in GDP of 3% derived from the Australian Federal Treasury (in 2012) less a deduction of 1% for the net creation of capital. The expected inflation estimate was 2.5% (the midpoint of the Reserve Bank of Australia’s target range).[309]

We could continue to adopt this approach going forward but update it for any change in forecast real GDP growth at the commencement of the 2022 Instrument. As a minimum we consider updating the real GDP growth rate at the commencement of the 2022 Instrument is required. If we were to do this, we would derive the real GDP growth forecast from either the Treasury Intergenerational report or from the latest available Consensus Economics forecasts. We would then make a 1% deduction to account for the net creation of new shares from new companies and new share issues (net of buybacks) from existing companies. If we were to use the Treasury Intergenerational report, we will use the midpoint of RBA target range of 2.5% for expected inflation to convert the adjusted real GDP estimate to nominal terms. If we were to use Consensus Economics forecast, we would use the forecast provided by Consensus Economics for inflation in year 10.

[308] CRG, Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper, March 2022, p. 72.

[309] Dr Martin Lally, Review of the AER’s proposed dividend growth model, December 2013, p.14.

The deduction to account for the net creation of new capital is based on the advice we received from Dr Lally in 2013 and support from other pieces of academic literature such as Krugman, Baker and DeJong (2005), Cornell (2010) and Burnstein and Arnott (2003).[310]

The deduction is made based on the principle that earnings must grow slower than GDP because the growth of existing enterprises contributes only part of GDP growth; the role of entrepreneurial capitalism, the creation of new enterprises, is a key driver of GDP growth, and it does not contribute to the growth in earnings and dividends of existing enterprises. Therefore, we consider an adjustment must be made to ensure that the ratio of dividends to GDP does not eventually exceed 1.[311] There is uncertainty about the value that should be deducted, but we have accepted Dr Lally's advice that a deduction should be made, and we consider 1% a reasonable estimate based on his work.

If we were to maintain our current approach but update it with a more recent real GDP growth rate prior to making the 2022 Instrument, our long run expected growth rate in dividends would either be 4.14% based on the Intergenerational Report, or a number based on the most recent Consensus Economics data. We have estimated 4.14% by using the real GDP forecast of 2.6% provided by the 2021 Treasury Intergenerational approach, less a 1% deduction for the net creation of capital. We converted this into nominal terms using an expected inflation estimate of 2.5% (the midpoint of the Reserve Bank of Australia's target range).[312] Alternatively, if we were to use an updated estimate based on Consensus Economics data, our long run expected growth rate in dividends would be 3.74%.[313]

We consider both approaches are largely consistent with the approach we adopted in the 2013 Guideline and 2018 Instrument, although both update the terminal growth rate relative to the estimate from 2013. However, given the Consensus Economics data is more recent than the Treasury Intergenerational Report there is an argument that using 3.74% will give the better estimate at the current point in time (noting we would update this with the latest Consensus Economics data prior to publication of the final Instrument in December this year).

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310 Dr Martin Lally, Review of the AER's proposed dividend growth model, March 2013, pp. 13-17; Dr Lally proposed a range for the deduction of net creation of new shares from new companies and new share issue from existing companies. He proposed that we should use 0.5%, 1.0% and 1.5%. We have used the midpoint of the range proposed. Dr Martin Lally, Review of the AER's proposed dividend growth model, December 2013, pp. 14-18; Paul Krugman, Dean Baker and Bradford DeJong (2005), Asset Returns and Economic Growth, Brookings Paper on Economic Activity, p. 306-307; Bradford Cornell (2010), Equity growth and equity investing, Financial analysts journal, p. 61; William Burnstein and Robert Arnott (2003), 'Earnings Growth: The two percent dilution', Financial analysts journal, p. 47.

311 Dr Martin Lally, Review of the AER's proposed dividend growth model, March 2013, p. 13.

312 The Treasury, 2021 Intergenerational report, June 2021, page viii. The estimate of 4.6% is based on following calculation. (1 + (2.6% - 1.0%)) * (1+ 2.5%) -1. The formulae has been noted below.

313 Due to licencing agreement with Consensus Economics, we have not published the real GDP and inflation forecasts.

Alternatively, we could employ an approach where the growth rate is re-estimated periodically as we move through the Instrument. We think there is merit to this approach as we are looking to estimate an MRP that is reflective of the current market conditions and expectations. We consider that using a growth rate that is updated across the course of the instrument is more consistent with the principles that support option 3b. Under option 3b, we would be updating both HER and DGM estimates periodically to reflect recent market data. In this frame of reference, it makes more sense to use an updated growth forecast than a fixed estimate from an earlier time.

We are able to estimate updated terminal growth rates for dividends across the Instrument using data from survey results published quarterly by Consensus Economics. We consider this would best fit option 3b, as it reflects updated information to estimate an MRP that is reflective of the current market expectations at the point of MRP estimation. We also note that the Intergenerational report is only updated once every five years and therefore could not be used to update the growth rate during the life of the Instrument.

We note that using the Consensus Economics survey completed in July 2021, the closest survey to when the Intergenerational report was released, we would have estimated a nominal GDP growth rate of 4.01%, only slightly below the 4.14% we would have derived using the Treasury 2021 Intergenerational report (See above). Therefore, when compared at similar times, both approaches to estimating real GDP appear to give similar results.

Overall, we think the better approach is to have a growth rate estimate that is updated through time across the life of the Instrument, because it is more likely to be reflective of the current market conditions and expectations. This would be a change from the approach we have been employing since 2013. However, in support of this change, we note that our approach to updating the growth rate in the model appears similar to the approach the Bank of England (BOE) uses in applying its DGM. The BOE had previously assumed that beyond the five-year horizon, dividends were expected to grow in line with average historic GDP growth rates. The BOE now states that expected long-term dividend growth rates are likely to vary over time. For example, it noted previously that expected long-term GDP growth might have fallen since the financial crisis.[314]

The BOE's revised model captures time-variation in long-horizon dividend growth expectations by tying these to the long-term GDP projections. Specifically, the model assumes that beyond the five-year horizon, dividends are expected to grow in line with five-year ahead GDP forecasts produced by the International Monetary Fund (IMF). We note that these forecasts are published in April and October each year.[315]

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314 Bank of England, Quarterly Bulletin 2017 Q2, *Topical article: An improved model for understanding equity prices*, 2017, p.90

315 Bank of England, Quarterly Bulletin 2017 Q2, *Topical article: An improved model for understanding equity prices*, 2017, p.90, IMF data mapper, IMF; The World Economic Outlook (WEO) database is created during the biannual WEO exercise, which begins in January and June of each year and results in the April and September/October WEO publication. Selected series from the publication are available in a database format.

On that basis we are proposing to update our growth rate using Consensus Economics data as we are able to obtain forecasts each quarter. Where *g* denotes the growth rate, the formula for this approach is as follows[316]:

$$g = \big(1 + (r - 0.01)\big) * (1 + \pi) - 1$$

Where:

- r is the 10-year real GDP forecast from the most recent Consensus Economics publication
- π is the 10-year expected inflation forecast from the most recent Consensus Economics publication.

Applying the DGM in a directional sense

Our Rate of return final omnibus paper outlined 3 broad options for setting the MRP. The second set of options was to use the DGM in a directional sense. If we were to employ this approach we would start with our estimate of HER and then add or subtract a margin depending on the current results from the DGM.

In their recent submission, the CRG expressed concern with this approach.[317] The CRG noted if we were to apply the DGM in a directional sense at the start of the Instrument, it could result in a biased MRP because the resurgence of inflation makes it likely that rates will by higher (on average) over the next 4 years. This could lead to an equity allowance that is biased, because a higher risk-free rate combined with an MRP predicated on a low risk-free rate, may result in an upward biased return on equity.

The CRG went on to say that, even assuming a good, unbiased estimate of the prevailing MRP was derived from some DGM-based method, it would only be a good estimate when paired with the prevailing risk-free rate at the same time. The AER's second proposed option means that the point estimate will be paired with future, different risk-free rates. If there is indeed a relationship between the risk-free rate and MRP, then the total equity allowance at that time will be wrong.[318]

We agree with the CRG. The intent of employing the DGM is to be able to adjust the MRP over time in line with movements in forward estimates of the MRP. Locking in an MRP value

[316] Dr Martin Lally, Review of the AER's proposed dividend growth model, December 2013, p. 6.

[317] CRG, Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper, March 2022, p. 75.

[318] CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 75.

in the Instrument runs counter to this intent. Therefore, if we are to use DGM estimates, we think the better approach is option 3b.

Mechanical approach updated throughout the life of the Instrument

If we were to implement a mechanical approach that updated throughout the life of the Instrument (option 3b), we see it being codified as follows:

- We would apply 50% weight to the MRP from HER and 50% weight to the MRP from the 3-stage DGM.
  - We would adopt our standard 3-stage DGM and would not use our standard 2-stage DGM, because it seems more likely growth in dividends moves slowly to the long-term terminal growth rate.
  - We would use the standard 3-stage DGM and not a calibrated DGM because we have more confidence in its MRP estimate. We acknowledge that using a calibrated DGM is an option, and we are open to receiving more information on its suitability.
- For the HER-based MRP estimate, we would select a single period estimate of the arithmetic average from 1988 to the most recent full calendar year using a 5-year term. We would calculate this value once per year at the end of February based on end of December data and then apply it to all regulatory determinations in the next 12 months.
- The data sources we would use are
  - returns data from S&P global website – we will use December to December averages of growth (or decline) in the ASX All Ordinaries index to estimate the growth or decline of the Australian market portfolio (total market returns)
  - CGS data from the RBA website. We will use the indicative mid rates of Australian Government Securities – F16 to calculate the risk-free rate. We subtract the risk-free rate from the total market return data to obtain the yearly excess return.
  - direct imputation credit yield from the ATO website. Imputation Credits need to be factored in the MRP calculation because their tax benefits (when paid out as part of dividends) increase the return for investors.
  - historical excess return series data used by Brailsford, Handley and Maheswaran (BHM) – the BHM data set contains an ASX adjustment to address potential problems with the realised Australian market (All Ordinaries) return data series before 1958 (set out in Appendix C).
- In terms of our standard DGM, we would use the 3-stage DGM. To update this model, we would:
  - obtain the dividend forecasts and the share market price index from Bloomberg
  - obtain the risk-free rate data from the RBA We will use the indicative mid rates of Australian Government Securities – F16 to calculate the risk-free rate.
  - estimate the Australian nominal GDP growth rate and the inflation forecast using the most recently published Consensus Economics (CE) long-term forecast data for Australia (APCF LT Australia) – we would use the most distant forecasts available for years from 1 to 10 years in the future and these estimates will be used to reflect the current market environment.
  - make a 1% deduction to the long-term real GDP when estimating the terminal dividend growth rate to account for new capital
  - use the average estimates produced by the DGM over a period of 2 months.

  - recalculate these estimates based on the dividend price forecasts and the share market price index information from Bloomberg, the risk-free rate data from the RBA and the latest reports from CE at the time of each determination – if any data sources cease to be available, the last 2-month MRP estimate would be fixed until data becomes available again
  - use a 10-year CGS rate in the model to calculate a 10-year MRP
  - calculate a 5-year MRP estimate from the DGM by reducing the 10-year MRP estimate by our estimate of the difference between the 10-year and 5-year MRP from HER data over the period from 1988 to the last full year available.

If we were to use a calibrated DGM model we would:

- obtain the Bloomberg and RBA data as illustrated in the example above
- We expect we would use consensus analysts' dividend forecasts for the period from 12/1995 to 02/2006 obtained from the Refinitiv data service and for the period from 03/2006 to current we would use consensus analysts' dividend forecasts from Bloomberg. However, we will consider if consensus analysts' dividend forecasts obtained from Refinitiv for the period after 02/2006 should be used in conjunction with or instead of forecasts obtained from Bloomberg. We note consensus analysts' dividend forecasts are not currently available from Bloomberg before March 2006 and are not currently available from Refinitiv before December 1995.
- Calibrate the single growth rate in the model to match the HER average over all full years since 1996 (or 1988 if forecasts dividends can either be obtained or estimated in a way that is likely to lead to a preferable MRP time series for calibration relative to the one from 1996 onwards).
- use the average estimates produced by the DGM over a period of 2 months
- recalculate these estimates at the time of each determination using the steps outlined.

While Frontier Economics has estimated forecast dividends for the period pre-Dec 1995, we are still considering if this approach, or any alternatives to estimating forecast dividends, should be used. We are interested in stakeholders' views on this.

Materiality of the options

In chapter 11 we review sensitivity and scenario testing. In that chapter we have compared outcomes under our proposed approach and option 3b (a mechanical approach). We show what outcomes would have been achieved over the past 4 years for each approach. We also forecast potential outcomes going forward for different market conditions. These forecasts are indicative only because the relationship generated by the DGM varies over time.

This analysis shows that over the past 4 years option 3b would have produced a more stable and higher return on equity than option 1. We estimate that the return on equity could have been approximately 0.46 percentage points higher, on average over the 2018 to 2022 period. Our analysis also indicates that the return on equity is likely to be more stable going forward under option 3b, but it could be higher or lower than our current approach depending on the outcomes of the DGM.

Based on a 5-year term, the MRP we would derive by incorporating a 3-stage DGM to option 3b would be 6.6%. Alternatively, if we were to adopt ENA's calibrated DGM to option 3b, the MRP would be 7.7%. This has been illustrated in Table 7.5.

Table 7.5 MRP estimates based on option 3b at December 2021

Mechanical approaches (Option 3b)	5-year term (%)	10-year term (%)
Mechanical approach using 3-stage DGM		
HER estimate	6.8	6.5
DGM estimate (3-stage DGM)	6.4	6.1
MRP (equal weight applied to the HER and DGM)	6.6	6.3
Mechanical approach using ENA's calibrated DGM		
HER estimate	6.8	6.5
DGM estimate (calibrated DGM)	8.6	8.3
MRP (equal weight applied to the HER and DGM)	7.7	7.6

Note: HER has been calculated as at end December 2021. The 3-stage DGM and the calibrated DGM estimates are based on a two-month average ending February 2022. It should be noted that the calibration was done to the end of 2021.

7.2.2.4 What is the role of surveys in informing our MRP?

Survey evidence provides an expectation of a forward-looking MRP from market participants. Raw results are rarely produced; however, in published results, modes, means and medians are often included.

NSPs submitted that the AER should not rely on survey evidence to inform the estimate of the MRP because it is of low quality. To the extent that survey evidence is used, it is important to consider the whole of the response and not just part of it. They further submitted that the AER should consider only contemporaneous surveys.[319]

Consumer groups highlighted the considerable noise and possible bias surveys contain. However, they noted that surveys may have some value when combined with other approaches.[320]

In the concurrent evidence sessions, there was disagreement on the value of surveys. Some experts stated that surveys contain useful information because they represent an independent estimator of the conditional MRP. However, other experts stated that surveys are only as reliable as the survey design, citing that most respondents are not involved in asset valuations.[321]

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[319] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 94

[320] CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 72.

[321] AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, pp. 108, 110–111

We recognise that surveys have limitations and are not at a level of reliability to give weight as a direct estimation method of the MRP. However, we consider that they have some value because they inform us of expectations of survey participants. Table 7.6 demonstrates the results from various surveys. The survey results tend to align with estimates derived from HER.

Table 7.6 MRP survey results, 2012 to 2022

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
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

Source: KPMG, Valuation practices survey 2018, November 2018; Fernandez, Ortiz, Acín, Market Risk Premium and Risk-Free Rate used for 69 countries in 2019: a survey, April 2019; KPMG, Valuation practices survey 2019, February 2020; Fernandez et al, Survey: Market risk premium and risk- free rate used for 81 countries in 2020, March 2020; Fernandez et al, Survey: Market Risk Premium and Risk-Free Rate used for 88 countries in 2021, June 2021. All other data is the same as published with the 2018 explanatory statement.

In reporting the results for the MRP, we note that the survey results indicate that some market participants adjust the risk-free rate rather than the MRP.

To the extent that survey participants make this type of adjustment it increases the caution we should exercise when considering survey results.

Our draft decision is to not move our HER estimate of the MRP or provide an uplift to the risk-free rate based on the survey results.

7.2.2.5 What is the role of conditioning variables in informing our MRP?

Conditioning variables (such as implied volatility, dividend yields and credit spreads) are market data indicators that provide information on the potential risk in the market. Their main strength is their ability to detect changing market conditions, which may indicate expectations of risk premium movement.

Some experts at the concurrent evidence sessions stated that conditioning variables, included in a combination forecast, have a role to play in estimating the conditional MRP.[322]

The CRG highlighted the considerable noise and possible biases conditioning variables contain. They stated that given these indicators are impacted by short-term spikes, conditioning variables could provide a fundamentally misleading indicator of a forward-looking MRP for the next decade.[323]

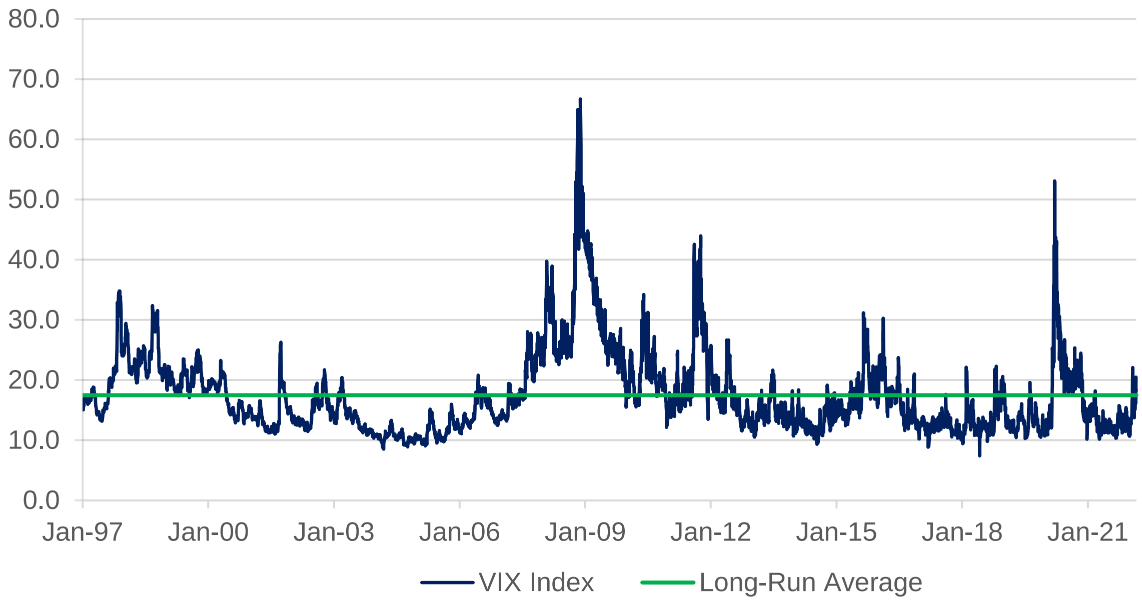
In the following sections we outline the conditioning variables that are available to us.

Implied volatility

The implied volatility approach assumes that the MRP is the price of risk multiplied by the volume of risk (volatility).[324] Volatility can indicate the degree of risk in the market.

The current volatility as illustrated in Figure 7.3 is slightly higher than the historical average. There is also a large spike in the volatility index in early 2020 likely due to the COVID-19 pandemic. A higher volatility index may signal higher risk and warrant greater compensation for bearing risk.

Figure 7.3 Implied volatility



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

322 AER, *Concurrent evidence session 3 - Proofed transcript*, February 2022, pp. 103, 108.

323 CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 72.

324 AER, *Rate of return instrument, Explanatory Statement*, December 2018, p. 92.

Source: AER analysis; ASX200 VIX volatility index, sourced via Bloomberg code AS51VIX from 2/01/2008 and code CITJAVIX prior to 2/01/2008.

Dividend yields

Dividend yields are represented by the average dividend yield of the ASX 200, which can change in times of high market risk, as seen during the 2008 GFC and the COVID-19 pandemic. We compare current dividend yields with the average dividend yield over time.[325]

The most recent spike as illustrated by Figure 7.4 may be due to recovery from pandemic-related lockdowns and decreases in stock prices from historical highs in December 2021.

Figure 7.4 Dividend yields

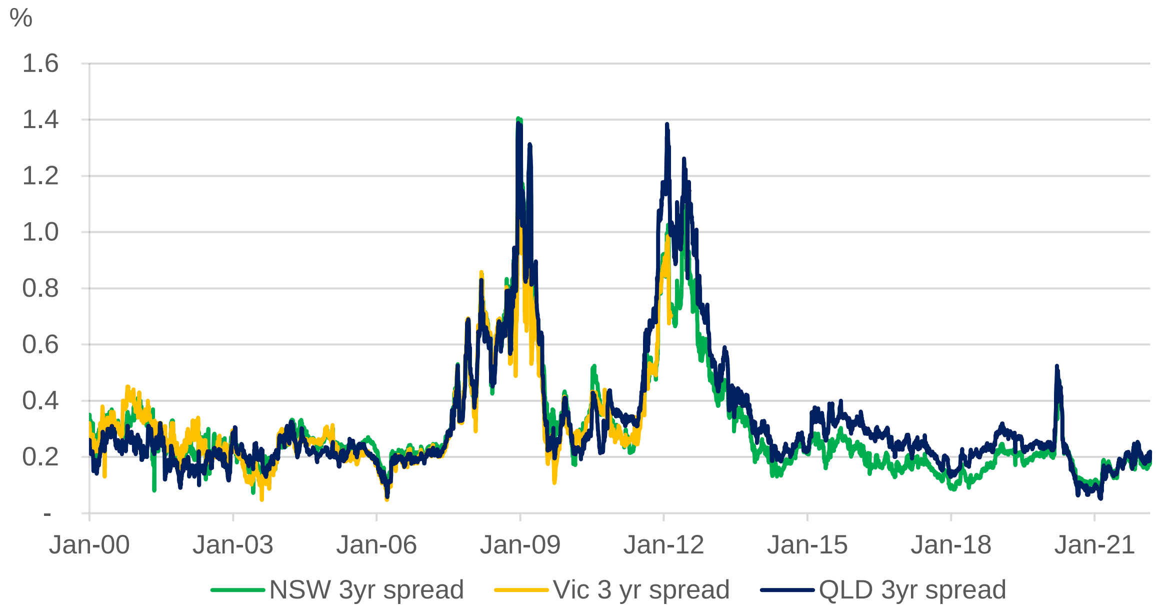
Notes: Long-run average taken from the start of the data series in 2000.
Source: AER analysis; sourced via Bloomberg code AS51.

Credit spreads

Credit spreads are the spreads between the risk-free rate (the yield on Australian Commonwealth Government Securities or CGS) and the return on debt for different debt instruments. We look at whether the spreads are widening, stabilising or narrowing as an indicator of changes in market conditions. Credit spreads as illustrated in Figure 7.5 are currently slightly below their long-term average.

325 AER, *Rate of return instrument, Explanatory Statement*, December 2018, p. 92.

Figure 7.5 Credit spread



Source: AER analysis; Spreads from Australian government securities to state government bonds with 3 years term to maturity, sourced via Bloomberg interest rate statistics.

Our draft decision is to not move our HER estimate of the MRP based on the conditioning variable results. We acknowledge that volatility and dividend yield are slightly above the long-term average.

7.2.3 Total market returns approach (TMR or Wright approach)

The total market returns (TMR) approach, also known as the Wright approach, assumes a largely stable return on equity. The approach implies a perfect negative relationship between the risk-free rate and the MRP and is used by several regulators in the United Kingdom, including Ofgem and Ofwat.

In the 2018 Instrument, we did not place any reliance on the TMR approach.[326] We noted that there is no theoretical basis for the TMR approach in Australia, and it is not used by market practitioners.

Since then, we engaged Partington and Satchell to provide expert advice on return on equity models. They found the TMR approach assumptions implausible – for example, where the risk-free rate was above the historical average return (as has been the case) it would lead to a negative market risk premium.[327]

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326 AER, *Rate of return instrument, Explanatory Statement*, December 2018, p. 83.

327 Partington and Satchell, *Report to the AER: Alternative Asset Pricing Models*, June 2020, p. 23.

However, we note that CEPA recommended that we consider the use of a TMR approach.[328]

In response to our overall rate of return, equity and debt omnibus paper, ENA and QTC submitted that the AER has not properly considered the TMR approach (which assumes a perfect negative relationship between the MRP and the risk-free rate) and should reconsider using it in our 2022 Instrument. In their view, there is at least as much evidence to support the use of the TMR approach as for the historical excess returns approach and that different standards of assessment have been applied to each piece of evidence.[329] The NSPs recommended that we give meaningful weighting to the HER, TMR approach and the calibrated DGM.[330]

In contrast, the CRG recommended that the AER not use the TMR approach, or any modification of this approach, to determine or constrain the estimate of the market risk premium or the overall return on equity.[331] The CRG considered the assumption of a one-for-one inverse relationship between the risk-free rate and market risk premium was not supported in any consistent way by the empirical data and would lead to market risk premium results that did not make sense from either a practical or theoretical perspective.

We have reviewed the theoretical basis and empirical evidence available to evaluate the TMR approach.

7.2.3.1 The theoretical basis to support the TMR approach

The QTC cites the Consumption CAPM (CCAPM) as the theoretical basis for the Wright approach in response to the overall rate of return, equity and debt working paper. The motivation of Wright's original argument for using a constant expected return is the so-called equity premium puzzle and risk-free rate puzzle identified in Mehra & Prescott (1985) and Weil (1989). Various CCAPM models have been developed since then to address the two puzzles, but there has been no consensus among the academics as to what underlies the puzzles or whether the puzzles even exist.

This was discussed in the CEPA (2021) report to the AER.

> The existence of this puzzle seems to throw into question whether CCAPM models are useful in explaining observed (or expected) risk-free rate and MRP or any relationship between the two. Furthermore, in 2017 Siegel observed a substantial divide between academics and practitioners on this point – 'In one of

[328] CEPA, *Relationship between RFR and MRP*, 16 June 2021, p. 44.

[329] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 88; QTC, *2022 Rate of Return Instrument: Rate of return information paper and final working papers*, 11 March 2022, p. 2

[330] QTC, *2022 Rate of Return Instrument: Rate of return information paper and final working papers*, 11 March 2022, p. 1; ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, pp. 88-91.

[331] CRG, *Submission to AER, Return on equity*, 9 October 2020, pp. 8, 37.

> the sharpest divides in memory, some academics still consider the ERP puzzle literature relevant while almost no practitioners do'.
>
> More recently, Jorda et al (2019) has continued the debate, demonstrating how asset returns from 15 countries from 1870 onwards are inconsistent with consumption-based theory.
>
> That these theories have not been reconciled is important for the question we address here. It means that asset pricing models, and models of the relationship between equity returns and some fundamental variables do not rely on micro foundations of behaviour in the same way as preferred macroeconomic models do. In our opinion these models are of no help in the task of estimating MRP for regulatory purposes.

Wright (2003) considers that the two puzzles are two sides of the same coin, which leads him to argue that one should focus on the expected market returns since the historical mean return on equity is much more stable than the historical mean return on bonds and bills.

In our view:

- Wright's conclusion is based on empirical evidence about realised returns in Siegel (1998). However, the Siegel's Constant is subject to debate.
- Wright's argument assumes an expectation error of zero in order to go from stable historical mean return to stable expected mean return.

The assumption of constant expected returns implies an inverse relationship between risk-free rate and MRP mechanically. Lally (2012) points out this is not in Siegel's papers.

> In turn Smithers and Co reach this view based upon the observation that the real return on US stocks over the last 100–200 years has been much more stable than the real risk-free rate, and they refer to this as 'Siegel's Constant'. This view presumably comes from Siegel (1992, 1999), who claims that the real return on equities is more stable than that on long-term government bonds, that this is due to significant unexpected inflation during the 20th century, that historical average excess returns from 1926 overestimate the true MRP during that period, and that the MRP in the future will therefore be significantly less than that estimated by historical average excess returns using data from 1926. However, Siegel's arguments are concerned with real rather than nominal returns. Furthermore, even in respect of real returns, Siegel does not argue that the MRP moves inversely with the risk-free rate to the point that the cost of equity is largely unchanged.

The 'Siegel's Constant' has been subject to debate, for instance:

- Dimson, Marsh and Staunton (2001) argue that the Siegel's Constant is not a global phenomenon.
- Lettau and Ludvigson (2005) explicitly reject constant expected return.

In our view, the CCAPM does not predict stable expected total return, so it cannot act as a theoretical basis for the Wright approach as QTC argued.

The CCAPM also fails empirical tests. For instance, Campbell and Cochrane stated that:

> Unfortunately, consumption-based pricing models prove disappointing empirically.
>
> Alas, the canonical consumption-based model performs no better, and in many respects worse, than even the simple static Capital Asset Pricing Model (CAPM).
>
> The canonical consumption-based model has failed perhaps the most important test of all, the test of time. Twenty-five years after the development of the consumption-based model, almost all applied work in finance still uses portfolio-based models to correct for risk, to digest anomalies, to produce cost of capital estimates, and so forth.

Based on this evidence, we do not accept CCAPM as a theoretical basis for the Wright approach as argued by QTC.

7.2.3.2 The empirical evidence to support the TMR approach

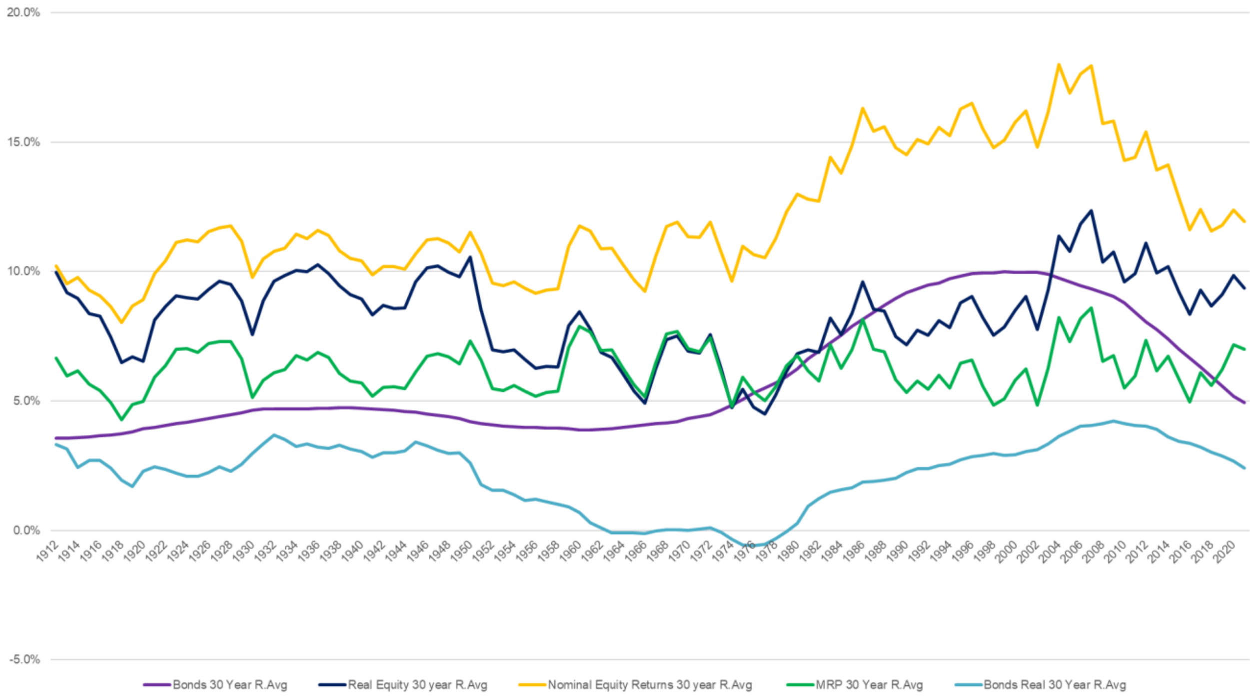
QTC drew reference to the Figure 1.1 in Wright and Smithers (2013), reproduced below in Figure 7.6. They stated that this shows that the rolling 30-year average real return on equity based on United States data oscillates in a relatively tight range around an average value of about 7.0%. This behaviour is consistent with the underlying real returns being stable. In contrast, the historical real returns on nominal bonds and cash are not stable because the rolling 30-year averages do not oscillate around any particular value. Rather, the rolling averages display large, sustained swings away from the sample averages as new data becomes available.

Figure 7.6 Wright and Smithers (2013) – Figure 1.1

QTC stated that the stability of the historical real return on equity means the historical average is a statistically valid unconditional estimate of the expected real return on equity. This is the empirical basis for the Wright approach.

In Figure 7.7 we have graphed the rolling 30-year average real return on equity along with rolling averages for the nominal return on equity, the market risk premium and both real and nominal bonds. This replicates key elements of the Siegel chart using Australian data.

Figure 7.7 Rolling 30-year average ending 1912 to 2021



Source: AER analysis

Figure 7.7 shows that the nominal return on equity appears to move with the nominal return on bonds and the MRP appears relatively stable. In our circumstances, this data is more supportive of using a fixed MRP rather than a fixed return on equity. This is also consistent with Dr Lally's findings from his examination of stationarity.[332] He found that you could not reject mean stationarity in any of the data series. Dr Lally's finding were also consistent with the comparison of rolling averages in Figure 7.7 showing the greatest variability for nominal returns, followed by real returns, and the least variability for excess returns. The reported F statistics were generally consistent with this result. These results suggest that in our circumstance, a fixed MRP may be more suitable than alternative specifications.

Having evaluated the material before us, we have determined that the TMR approach should not play a role in our MRP estimation process.

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[332] Dr Martin Lally, *Test of mean stationarity for Australian share market returns data*, 2 June 2022.

7.2.4 Assessment criteria

As discussed above, our consideration of issues shows that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. Where necessary we have applied our assessment criteria to assist us to exercise our judgement. Table 7.7 sets out our assessment criteria and key areas where they have assisted us make our decision.

Table 7.7 Criteria of draft decision MRP assessment

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and are informed by sound empirical analysis and robust data.	The HER method is based on the view that (on average) past realised returns equal investor expectations and that past expectations are as good an estimate of forward expectations (or required returns). This method has been extensively studied and the results are well understood. This ensures they are credible and verifiable. The estimates are widely used and have support as the benchmark method for estimating the MRP in Australia.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and consider the limitations of that purpose (b) promote simple over complex approaches where appropriate.	In estimating the HER we use the Brailsford, Handley and Maheswaran (BHM) methodology to estimate the excess returns. This method has been extensively studied and the results are well understood. This ensures they are credible and verifiable. Historical estimates are widely used and have support as the benchmark method for estimating the MRP in Australia. The HER method is relatively simple to implement, and it tends to give estimates that are sensible and reasonably stable over time. The results are supported by estimates used in broker reports, survey results and by most domestic regulators. However, there are concerns with the quality of the historical data (particularly the older data). In the past we have given relatively less weight to estimates using data before 1958. This is due to concerns with data reliability given the age of the data. There is also a debate around how to adjust the pre-1957 data for biases it contains.
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	The simplicity of the HER method enables it to be estimated in a robust, transparent and replicable manner. The method is widely used by academics, market practitioners and other regulators to estimate the market risk premium and the input parameters values can be estimated with tolerable accuracy. The HER input parameters are sourced form S&P Dow Jones indices, RBA and the ATO. Therefore, the market data is credible and verifiable.

Assessment criteria		Draft decision
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling that avoids arbitrary filtering or adjustment of data that does not have a sound rationale.	In estimating the HER we use the Brailsford, Handley and Maheswaran (BHM) methodology to estimate the excess returns. The rationale for the estimation's periods is not arbitrary, but rather is determined by clearly identifiable and material changes in the underlying data. This method has been extensively studied and the results are well understood. This ensures they are credible and verifiable. The input parameters can be estimated with tolerable accuracy.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	The HER input parameters are sourced form S&P Dow Jones indices, RBA and the ATO. Therefore, the market data is credible and verifiable. However, we acknowledge the limitation with the data, particularly pre-1958 data.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	The MRP is updated at the beginning of the regulatory period and reflects an estimate of the prevailing market rates at that time. It remains constant within the regulatory period. Therefore, our draft decision is not flexible to allow for changing market conditions because it focuses on the long-term trends in the MRP and may not fully capture market expectation of the current economic cycle. It will also not pick up short-term changes in MRP (even at the start of the regulatory period) given the impact of averaging long periods of data. However, using a fixed MRP will result in the total return on equity moving in line with the risk-free rate. The risk-free rate moves in line with economic conditions, meaning our return on equity will also tend to move with the base cost of money as it varies with changing market conditions and this could be more appropriate in regulatory context.
7	The materiality of any proposed change.	Currently we adopt a 10-year term to estimate the HER. Adopting a 5-year term would result in a small increase in the value of historical excess return.
8	The longevity or sustainability of new arrangements.	Promotes regulatory stability.

8 Equity beta

The equity beta is a key parameter within the Sharpe–Lintner CAPM (SL CAPM) that we use to estimate the return on equity. It measures a firm's exposure to systematic risk compared with that of the market. Specifically, the equity beta measures the standardised correlation between the returns on an individual asset or firm with that of the overall market.[333]

Investors are generally able to diversify away non-systematic risk and do not require compensation for business-specific risk.[334] Therefore, the equity beta only compensates investors for bearing systematic risk.[335]

A firm's sensitivity or exposure to systematic risk will depend on its business activities and its level of financial leverage.[336] For firms we regulate, this reflects the risk in providing Australian regulated energy network services.[337]

8.1 Draft decision

We have considered a range of stakeholder submissions, expert opinions (including views expressed in concurrent evidence sessions) and other information. Our draft decision is to apply a point estimate of 0.6 for the value of equity beta.

We maintain our overall approach to estimating the equity beta parameter from the 2018 Instrument, including:

- placing most weight on the longest period estimates, while also being informed by 5-year estimates
- maintaining the existing comparator set of 9 Australian firms, and not including international energy firms or domestic infrastructure firms in our comparator set
- setting a single beta for regulated gas and electricity networks
- not making an adjustment for low beta bias
- not using other regulators' decisions on equity beta values to directly inform our estimates.

We have examined different estimation periods for beta. We consider that the equity beta for a benchmark regulated energy network business is likely to be stable over the long term. Longer periods offer more observations and, hence, more statistically robust estimates.

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[333] R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, McGraw–Hill: First Australian edition, 2000, pp.186–188.

[334] G. Pierson, R. Brown, S. Easton and P. Howard, *Business Finance*, 8th Edition, p.214.

[335] Non-systematic risks are considered separately in the cash flows that are discounted by the rate of return, for example, in depreciation.

[336] M. McKenzie and G. Partington, *Report to the AER: Estimation of the equity beta (conceptual and econometric issues) for a gas regulatory process in 2012*, 3 April 2012, p.5.

[337] NER 6.5.2(c), 6A.6.2(c) and NGR 87(3).

Shorter periods offer more up-to-date information but may be biased by statistical noise. We consider that giving most weight to the longest period while also being informed by 5-year estimates remains appropriate.

We continue to rely primarily on empirical estimates of relevant Australian energy network businesses. We have considered the suitability of our existing Australian comparator set. With the recent delisting of Spark and AusNet, APA is now the only firm that is still listed. We examined international energy firms and domestic infrastructure firms to see if we could use their beta estimates to inform our decision. We observe that these firms are different to the benchmark Australian regulated energy network business both in the scope of their activities and their corresponding risk profile. We also observe significant divergence in the statistical estimates for these firms. It is not clear that there is a readily available method to quantify or adjust for these differences. As such, at this time we consider that our existing comparator set is likely to produce a better estimate than an estimate that draws on international energy firms or domestic infrastructure firms.

We recognise that in the future we may need to develop a revised approach as our comparator set ages, unless privately owned networks once again list on the share market. We aim to undertake more work to consider whether other comparators can be satisfactorily employed. To date we have not received evidence on how this might be done in a way that would overcome the drawbacks.

We have considered whether to continue to set a single beta for gas and electricity businesses and examined the potential risk of asset stranding faced by gas networks. We conclude that stranding risk is primarily non-systematic and that the systematic risks between gas and electricity networks are sufficiently similar. Therefore, they should continue to have a common equity beta.

We have examined the issue of low beta bias. We consider the issue to be a matter of ongoing academic debate with no clear consensus. We maintain our approach of continuing to use the Sharpe-Lintner CAPM (SL CAPM) and not adjusting the equity beta for the low beta bias, because experts broadly supported this position.

We have considered whether we should be informed by other regulators' decisions. We observe that there are differences in regulatory approaches between us and other regulators, and between the regulators themselves. There are differences in how judgement has been exercised in setting the beta value. While we have reviewed this material, we have not used other regulators' decisions on beta values to directly inform our estimates.

We have updated our empirical beta estimates to include data up to February 2022. Our draft decision is to set a point estimate of 0.6, because:

- The 2022 estimates continue to cluster around 0.5 to 0.6, so an estimate in this range seems to best reflect the data.
- We give most weight to the longest period available estimates, which have remained relatively stable since the 2018 Instrument. The stability of the estimates suggests continuing the value from 2018 of 0.6.
- We give limited weight to most recent 5-year estimates, which have declined significantly since 2020. These estimates provide some support for choosing a value below 0.6.

- We use international estimates to crosscheck our domestic estimates. The longest period international data cluster in the range 0.7 to 0.9. However, 5-year international estimates have increased substantially since 2020 and are now considerably higher than the 5-year domestic estimates. International estimates suggest choosing a value above 0.6.
- Our point estimate of 0.6 is consistent with our conceptual analysis, which indicates that the equity beta estimate is likely to be below 1.0 for an efficient Australian regulated energy network business.

Taking all of this together, there is support for using a value of 0.6, but also support for a higher or lower number. Our best data suggests an estimate in the range of 0.5 to 0.6. In view of the limitations of the other evidence, we think the better approach is to maintain our current value of 0.6. This is consistent with our principles of promoting stability and predictability.

8.2 Issues and considerations

8.2.1 Methodology for estimating beta

Our approach to estimating beta is to use regression analyses of the returns of a set of comparator firms against the return of the overall market. Our comparator set comprises of Australian energy networks, which should have a similar degree of risk as the benchmark Australian regulated energy network business.

We have updated our estimates by including data up to February 2022. This refreshes our most recent annual update published in December 2021.[338] The methodology was developed in Professor Olan Henry's 2009 study,[339] which he subsequently updated in 2014.[340] It was adopted in our 2013 Guideline, 2018 Instrument and subsequent annual updates.

We consider that the most useful empirical estimates:

- use the Ordinary Least Squares (OLS) estimator
- are measured over multiple estimation periods
- use weekly return intervals
- are based on averages of individual firm estimates and fixed weight portfolios (equal weighting and value weighting)
- use the Brealey–Myers formula to de-lever and re-lever raw estimates to a benchmark gearing of 60%
- do not apply a Blume or Vasicek adjustment.

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[338] AER, *Rate of Return Annual Update*, December 2021.

[339] Olan Henry, *Estimating Beta*, April 2009.

[340] Olan Henry, *Estimating Beta*, An Update, April 2014.

We consider that these empirical estimates best meet the criteria for assessing materials for relevance and suitability in informing our decision on the rate of return. That is, the empirical estimates are:

- reflective of economic and finance principles and market information because they are based on available market data and derived from sound, econometric techniques
- fit for purpose, because they are based on firms that most closely meet our definition of a service provider in the provision of Australian regulated energy services
- implemented in accordance with good practice, because they are derived from robust, transparent and replicable regression analysis
- based on quantitative modelling in that they are derived using regression techniques with no arbitrary adjustment to the data
- based on market data that is credible, verifiable, comparable, timely and clearly sourced.

We recognise that our proposed approach may not best satisfy the criteria for sustainability and flexibility for changing market conditions in the future, because 8 of the 9 firms in our comparator set have now been delisted. We aim to further explore ways to use other comparators in future reviews.

For the 2022 Instrument, we consider that our empirical results are likely to contribute to an equity beta estimate, which forms part of a rate of return estimate, that would achieve the regulatory objectives.

8.2.1.1 Estimation technique

Our draft decision is to maintain our current estimation technique, including:

- using Ordinary Least Squares (OLS) regression
- using weekly data
- using 3 estimation periods, placing the most weight on the longest available period, while being informed by the most recent 5 years.

Stakeholders did not comment on the first 2 points. On the estimation period, some stakeholders suggested placing more weight on shorter-term estimates, such as 10-year data. We examine this issue in section 8.2.4.

8.2.1.2 Comparator set

Our draft decision is to maintain the existing comparator set of 9 Australian energy network businesses. These firms are listed in Table 8.1.

Table 8.1 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

Firm (ASX ticker)	Time / trading period	Sectors
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[341] – November 2021	Electricity, Gas
AusNet Services (AST), formerly SP AusNet (SPN)	December 2005 – February 2022	Electricity, Gas

Source: AER analysis

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. Some stakeholders, especially energy network businesses, suggested that the existing comparator set is no longer sufficient and should be revised, such as by including international firms, domestic infrastructure firms, and/or by removing delisted firms. We address these issues in section 8.2.5.

Our comparator firms are aggregated into 8 portfolios (labelled P1 to P8), each with different constituent firms and time periods, as summarised in Table 8.2.

Table 8.2 List of our comparator portfolios

Portfolio	Firms	Dates
P1	APA, ENV	June 2000 – September 2014
P2	AAN, AGL, APA, ENV, GAS	December 2001 – October 2006
P3	APA, DUE, ENV, HDF, AST	December 2005 – November 2012
P4	APA, DUE, ENV, HDF, SKI, AST	March 2007 – November 2012
P5	APA, DUE, ENV, SKI, AST	March 2007 – September 2014
P6	APA, DUE, SKI, AST	March 2007 – April 2017
P7	APA, SKI, AST	March 2007 – November 2021
P8	SKI, AST	March 2007 – November 2021

Source: AER analysis

We use both portfolio estimates (equal-weighted and value-weighted) and averages of individual firm estimates to inform our decision.

8.2.1.3 Gearing

We have maintained our gearing adjustment methodology – de-levering a firm's raw equity beta estimates using a firm's actual gearing, then re-levering it to the benchmark gearing value of 60%. We also consider debt beta to be zero. We discuss benchmark gearing ratio in section 4.

341 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.

The raw equity beta estimates of comparator firms reflect varying levels of actual financial leverage. De-levering these raw estimates would provide the asset beta of the firms, as if it was financed entirely with equity and zero debt. The asset betas can then be re-levered to match a benchmark level of gearing that would reflect the degree of risk of a benchmark efficient firm.

We use the Brealey–Myers formula to de-lever and re-lever the comparable firms' equity beta estimates:

$$\beta_e = \beta_a \left(1 + \frac{D}{E}\right)$$

where:

- β_e is the equity beta
- β_a is the un-levered asset beta
- $\frac{D}{E}$ is the debt-to-equity ratio.

We also adjust the gearing of firms that hold a minority interest (less than 50% ownership) in a company. This is because their investments may be reported using the equity accounting method, which does not capture the debt held by those investments on their balance sheet and may result in their debt level being understated.

This is the case with Spark Infrastructure (SKI), which holds a minority interest in SAPN, CitiPower, Powercor and TransGrid. Its share of debt held by those networks was not reported in its public financial reports due to the use of the equity accounting method. SKI also provided related party lending to those same networks.

To ensure that all debt attributable to SKI is reflected in its gearing estimate, we have incorporated the related party lending and SKI's share of the asset-level debt. This method is summarised in the following steps:

1) estimate SKI's own value of debt (excluding its minority interests) using its financial statements
2) estimate SKI's share of its assets' debt (net of related party borrowings) by multiplying the percentage ownership with the value of the assets' borrowings
3) combine the 2 estimates above to arrive at a total value of debt
4) derive overall gearing in combination with market value of equity.

8.2.2 Range and point estimate

Table 8.3 provides a comparison of the key ranges between the 2022 estimates and estimates from the 2018 Instrument. It shows that the longest period estimates have remained relatively stable, while the 5-year estimates have decreased significantly. Both the 2018 and 2022 estimates clustered around 0.5 to 0.6.

Table 8.3 Comparison of key ranges of re-levered weekly equity beta estimates (OLS, data to September 2018/February 2022)

Australian comparator set estimates	2018 Instrument	2022 Draft Instrument
All portfolios (all estimation periods)	0.42 – 0.88	0.34 – 0.69
Largest cluster of all estimates	0.5 – 0.6	0.5 – 0.6
All portfolios (longest period)	0.42 – 0.67	0.39 – 0.68
All portfolios (recent 5 years)	0.49 – 0.88	0.34 – 0.57
Portfolio estimates for SKI and AST (longest period)	0.42 – 0.43	0.39 – 0.40
Portfolio estimates for SKI and AST (recent 5 years)	0.70 – 0.72	0.34 – 0.37
Individual firm average (longest period and 5 years)	0.57 – 0.72	0.53 – 0.56

Source: Bloomberg, AER analysis

Table 8.4 provides the detailed empirical portfolio estimates (equal-weighted and value-weighted) as well as averages of firm estimates.

Table 8.4 Re-levered weekly equity beta estimates (OLS, data to February 2022)

Portfolios	Average of firm estimates	P1	P2	P3	P4	P5	P6	P7	P8
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
Start	Various	23 Jun 2000	28 Dec 2001	23 Dec 2005	09 Mar 2007	09 Mar 2007	09 Mar 2007	09 Mar 2007	09 Mar 2007
End	Various	12 Sep 2014	06 Oct 2006	23 Nov 2012	23 Nov 2012	12 Sep 2014	28 Apr 2017	26 Nov 2021	26 Nov 2021
Equal weighted									
Longest available period	0.56	0.49	0.50	0.54	0.52	0.43	0.46	0.51	0.40
Post tech boom & excl. GFC	0.59	0.53	0.51	0.59	0.58	0.50	0.54	0.57	0.46
Recent 5 years	0.53	n/a	n/a	n/a	n/a	n/a	n/a	0.51	0.37
Value weighted									
Longest available period	n/a	0.53	0.68	0.47	0.47	0.44	0.49	0.55	0.39
Post tech boom & excl. GFC	n/a	0.58	0.69	0.56	0.55	0.53	0.58	0.62	0.46
Recent 5 years	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.57	0.34

Source: Bloomberg; AER analysis

The historical beta estimates in Table 8.5 and Table 8.6 show that the 5-year estimates have declined and are now below the longest period estimates. This is apparent in the decline in the 5-year estimates for P7 and P8 from 2020 onwards.

Table 8.5 Historical re-levered weekly equity beta estimates (OLS, data to September 2018/August 2019/August 2020/August 2021/February 2022)[342]

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 review	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 draft instrument	0.39 – 0.68	0.51 – 0.55	0.39 – 0.40
Post technology boom and excluding GFC			
2018 review	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 draft instrument	0.46 – 0.69	0.57 – 0.62	0.46 – 0.46
Recent 5 years			
2018 review	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 draft instrument	0.34 – 0.57[343]	0.51 – 0.57	0.34 – 0.37

Source: Bloomberg, AER analysis

Table 8.6 Comparison of re-levered weekly average firm equity beta estimates (OLS, data to June 2013/September 2018/August 2019/August 2020/August 2021/February 2022)

Period	Henry (April 2014)	Sep 2018	Aug 2019	Aug 2020	Aug 2021	Feb 2022
Longest period	0.52	0.57	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

342 The results for the 2020 update have been revised since its original publication due to an anomaly in SKI data.

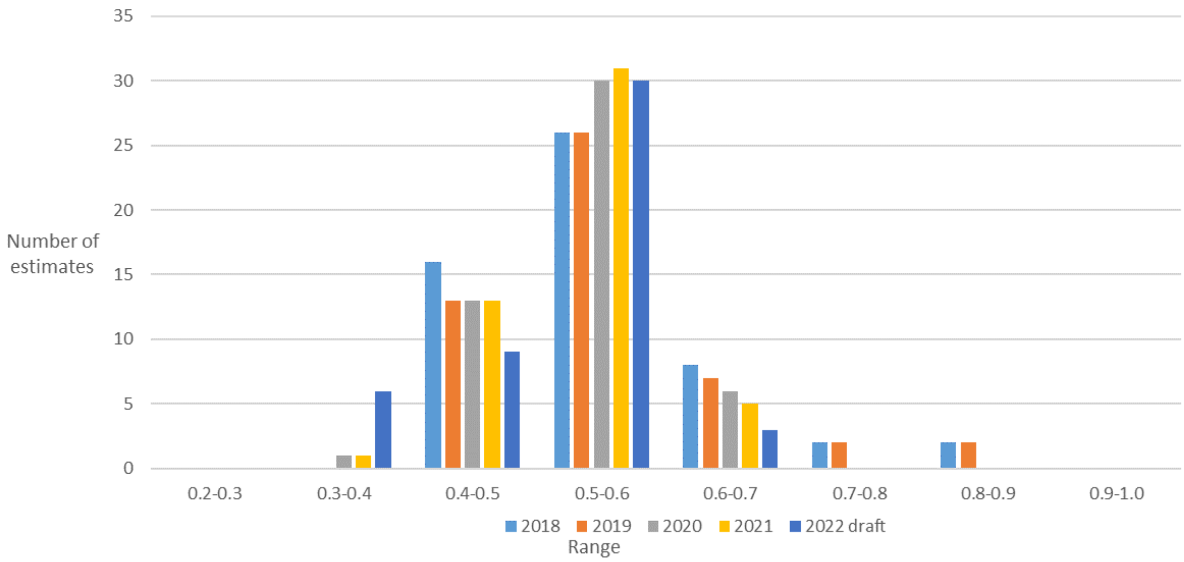
343 The recent 5 years estimates show a substantial decrease from Aug 2021 to Feb 2022 because P6 was removed from the category.

Recent 5 years	0.46	0.72	0.72	0.56	0.59	0.53[344]

Source: Bloomberg; AER analysis; Olan Henry, Estimating beta: An update, April 2014.
Notes: The results for the 2020 update have been revised since its original publication due to an anomaly in SKI data.

Consistent with the decrease in the 5-year estimates, Figure 8.1 shows a notable increase in the number of estimates in the 0.3 to 0.4 range. Nonetheless, the 2022 estimates continue to cluster around 0.5 to 0.6, consistent with the previous years.

Figure 8.1 Distribution of re-levered weekly beta by range (OLS, all periods)

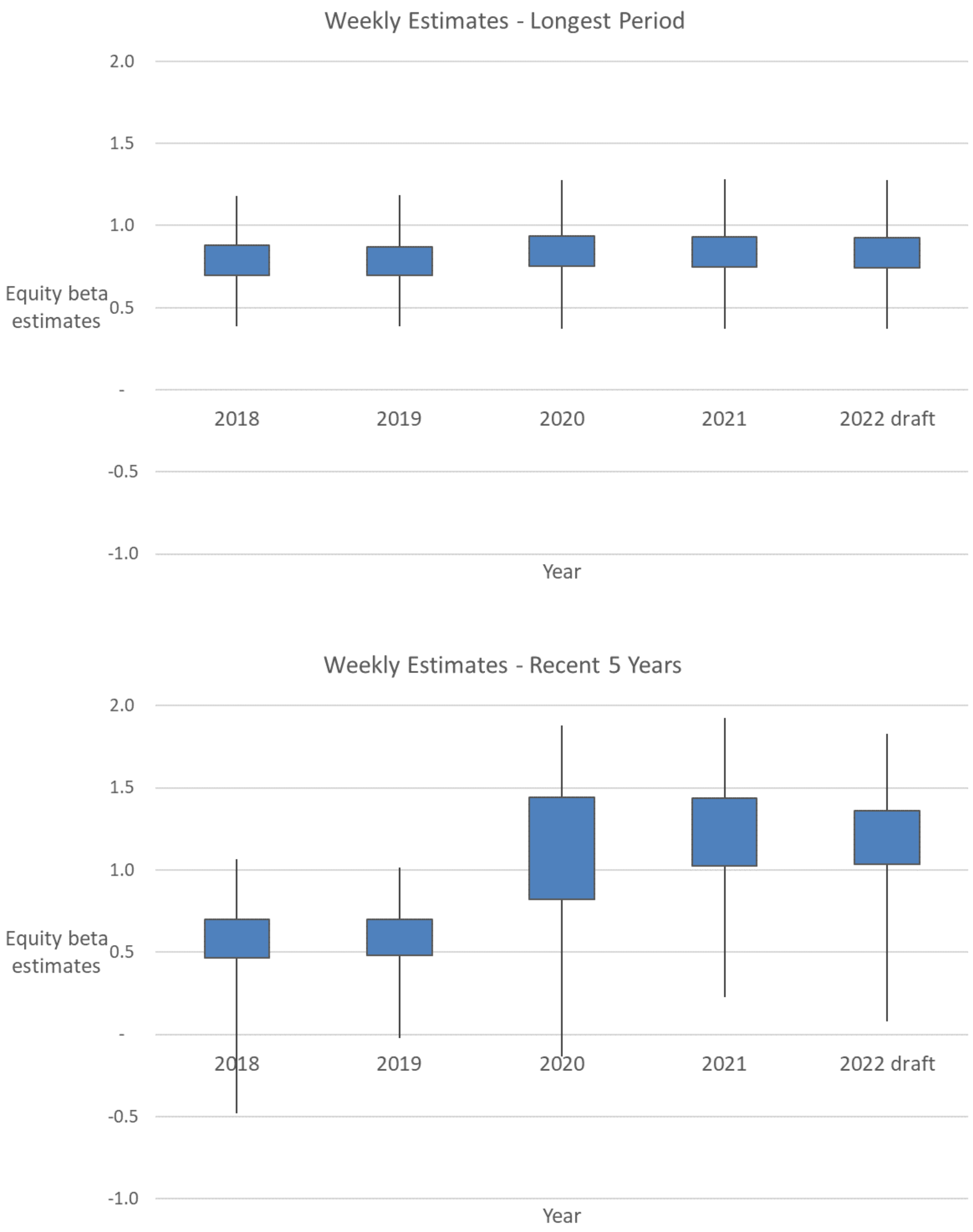


Source: Bloomberg; AER analysis
Notes: There are fewer total estimates from 2019 onwards because the 'recent 5 years' category no longer includes portfolios ending in 2014 (P1 and P5). Similarly, the 'recent 5 years' category in 2022 excluded P6, which ended in 2017.

We also reviewed estimates from a sample of 56 international energy firms, which we have analysed in the 2018 Instrument and subsequent annual updates. As shown in Figure 8.2, while the longest period international estimates have been relatively stable, the 5-year international estimates have increased substantially since 2020. This contrasts with the significant decrease in our domestic estimates since 2020 shown in Table 8.5. This divergence in trends between the domestic and international data could be a statistical anomaly, or it could reflect a difference in risk profile between domestic and international energy firms. Our network performance monitoring shows that networks maintained stable revenue profiles during the pandemic period. Domestic networks were largely insulated from the instability observed across the broader economy, which may explain the decrease in their equity beta estimates.

344 The recent 5 years estimates show a substantial decrease from Aug 2021 to Feb 2022 because DUE was removed from the category.

Figure 8.2 Summary of re-levered weekly international estimates (OLS, data to February 2022)



Source: AER analysis; Bloomberg

Notes: 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.

8.2.3 Conceptual analysis

We reaffirm the conclusions of our conceptual analysis undertaken in the 2018 Instrument that the equity beta for an efficient Australian regulated energy network firm would likely be below 1.0.[345] In particular, we consider that:

- The systematic risk for an efficient firm would be below that of the market average firm. This is because such a firm would likely have low intrinsic risk exposure relative to the market average. Reasons supporting this include:
  - the firm would be a regulated natural monopoly that provide an essential service with low price elasticity of demand
  - incentive regulation allows service providers to earn more stable cashflows than firms that are not regulated
  - the structure of the regulatory regime insulates service providers from systematic risks (including inflation risk), such as through revenue cap regulation, tariff variation mechanisms, cost pass through mechanisms, fixed charges and protection of sunk investment through rolling forward the regulatory asset base (RAB).
- The higher financial leverage of an efficient Australian regulated energy network business, relative to the market average, does not necessarily correspond to an equivalently high exposure to financial risk.

Our conceptual analysis is used to crosscheck the range and point estimate derived from our empirical analysis, which we give primary weight to.

8.2.4 Estimation period

Our draft decision is to continue to give most weight to estimates from the longest estimation period, while also being informed by the most recent 5 years.

We consider the longest period data provides the most reliable estimates, because:

- the equity beta of Australian regulated energy networks is likely to remain relatively stable over the long term due to the monopoly nature of the service it provides as well as the regulatory protection it enjoys
- longer-term estimates provide more statistical observations, which would lead to a more robust and reliable equity beta estimate
- we observe higher volatility in short-term beta estimates and that long-term estimates minimise the impact of one-off events, which can temporarily obscure the systematic risk of a regulated energy network business
- experts and stakeholders broadly agree on the strengths of long-term estimates.

2018 Instrument

[345] AER, *Rate of return instrument, Explanatory Statement*, December 2018, pp.46-51, 144-147.

In the 2018 Instrument, we maintained our approach from the 2013 Guideline. We constructed our empirical estimates on 3 estimation periods:[346]

- the longest period available
- the period after the 'technology bubble' and before the global financial crisis (GFC) and the period after GFC (PTEG)
- the most recent 5 years of available data.

We gave the most weight to the longest period estimates because it was more stable and statistically reliable.[347] We were also informed by the 5-year data because it better reflected current conditions.[348]

Our final working paper

We considered the approach to estimating equity beta in our final working paper. Our preliminary view was to continue to place most weight on the longest period estimates.[349] We considered that the systematic risk of the Australian regulated energy networks is likely stable over the long term.[350]

Concurrent evidence sessions

A range of views were expressed at the concurrent evidence session. Dr Boyle and Mr Hancock suggested that the longest period would most likely provide the most accurate and precise estimate of beta.[351]

Some experts disagreed on the usefulness of short-term estimates. Mr Kumareswaran noted the potential trade-off between using short and long estimation periods: short periods reflect prevailing market conditions but have fewer observations, resulting in statistically noisy estimates, while long periods offer more observations, but older data may be less relevant and thus biased.[352] He agreed with our existing approach of using a mix of short and long estimation periods and considered that using a mix of different estimation periods is likely to reduce the overall estimation error.[353] Dr Lally disagreed with this view and suggested choosing a single estimation period that minimises the estimation error.[354] Mr Hancock also cautioned that combining different estimation periods is unlikely to lead to more precision in the beta estimates.[355] Mr Kumareswaran also noted that another weakness with 5-year estimates is that we only have data for 3 of the 9 firms in our comparator set (APA, Spark

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[346] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.162.

[347] Ibid.

[348] Ibid.

[349] AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, p.104.

[350] Ibid., p.105.

[351] AER, *Concurrent evidence session 1, Proofed transcript*, February 2022, pp.40-45, 72-74.

[352] Ibid., pp.46-54.

[353] Ibid.

[354] Ibid., pp.60-61.

[355] Ibid., p.73.

and AusNet), with APA being the only firm still listed, because the other 6 comparators have been delisted for 5 years or longer.[356]

Experts also disagreed on the relevance of past data that contain shocks. Mr Kumareswaran and Dr Hird suggested that past shocks, such as the global financial crisis, may cause bias in estimates of beta,[357] while Dr Boyle noted that past shocks may offer useful information in predicting the future.[358]

Stakeholder submissions

Stakeholders also broadly supported the continued use of long-term estimates but disagreed on whether short-term estimates should be considered. The CRG considered that we should use the longest, reliable estimation period, not a mix of long-term and short-term estimates.[359] It also suggested that any adjustments made to the longest period estimates should be open and transparent.[360] The AEC agreed with our existing approach of using a mix of long-term and short-term estimation periods.[361] ENA proposed that we use a 10-year estimation period.[362] It noted the trade-off between long-term and short-term estimates, that long-term estimates are more statistically reliable, while short-term data is more relevant.[363] APA proposed that we use a 5-year estimation period to reflect broader structural changes such as transition to renewables.[364] NSG considered that our current approach to estimating beta 'mutes the impact of increases in systematic risk over time',[365] but did not comment specifically on the estimation period.

Furthermore, ENA noted that equity beta estimates will tend to be downward biased during periods of merger activity if the market considers that a transaction is likely to proceed, because the stock price is likely to reflect the present value of the offer price and become less susceptible to movements in the broader market.[366] This may have affected the beta estimates for Spark and AusNet for the months prior to their delisting in November 2021 and February 2022, respectively.

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[356] AER, *Concurrent evidence session 1, Proofed transcript*, February 2022, pp.48-49.

[357] Ibid., pp.48-49; Ibid., pp.63, 74-76.

[358] Ibid., pp.75, 78-79.

[359] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.76.

[360] Ibid., p.79.

[361] AEC, *2022 AER Rate of Return Instrument review - Information paper and final Omnibus paper – Submission*, 10 March 2022, p.2.

[362] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp.96-97.

[363] Ibid.

[364] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, pp.41-43.

[365] NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p.2.

[366] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp.108-109.

Conclusion on estimation period

Most experts and stakeholders acknowledged the value of longest period estimates. As Dr Boyle suggested, equity beta for firms we regulate is likely to be constant over the long term;[367] therefore, using the longest period would offer the most accurate and precise estimates. Economic Insights, in a previous expert report, agreed with this view.[368] It considered that, given the natural monopoly characteristics of Australian regulated energy networks and the stability of the regulatory framework, it is likely that their systematic risk is relatively stable over the long term.[369]

Our own estimates show that the longest period estimates tend to be relatively stable over time, despite events such as the COVID-19 pandemic (see Table 8.5). Therefore, we maintain the view that the longest period is likely to offer the most statistically robust estimates of beta.

We disagree with ENA's proposal of switching to a 10-year estimation period, because we do not see a clear advantage of making such a switch. ENA's analysis shows that 10-year estimates are still quite volatile.[370] A 10-year estimation period also does not seem to have much support from experts or consumer group stakeholders.

We consider that 5-year estimates may offer some useful information. Brattle Group's previous report recommended that 2-year to 5-year estimates are more reflective of current market conditions.[371] However, the 5-year estimates tend to be more volatile (see Table 8.5), which confirms stakeholders' concerns that 5-year estimates may be susceptible to statistical noise and estimation error.

Considering these strengths and weaknesses of short-term estimates, our view is 5-year estimates may contain useful information despite being affected by statistical noise.

Dr Hird considered that past shocks to the economy may not be repeated in the future.[372] We acknowledge that future shocks may not be an exact repetition of past shocks. However, we think removing data from past periods is arbitrary and will rob the estimate of its richness in demonstrating sensitivity to shocks.

Having considered the relevant arguments of experts and stakeholders and evidence before us, we have continued to give most weight to estimates from the longest period, while also giving limited consideration to the most recent 5-year data.

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[367] AER, *Concurrent evidence session 1, Proofed transcript*, February 2022, p.43.

[368] Economic Insights, *Methodological issues in estimating the equity beta for Australian network energy businesses*, June 2021, p.ix.

[369] Ibid.

[370] ENA, *Estimating the cost of equity: Response to AER's Pathway to 2022 Rate of Return Instrument: Draft Overall Rate of Return Omnibus Working Paper*, September 2021, p.84.

[371] The Brattle Group, *A Review of International Approaches to Regulated Rates of Return*, June 2020, p.38.

[372] AER, *Concurrent evidence session 1, Proofed transcript*, February 2022, p.74.

8.2.4.1 Implication of the term of return on equity on the length of beta estimation period

One aspect of our draft decision is to change the term of equity from 10 years to 5 years (discussed in section 6.2). We do not consider the term of return on equity should affect the estimation period we should use for equity beta, because they are separate issues.

Concurrent evidence sessions

The experts at the concurrent evidence session agreed that the term of return on equity and the length of beta estimation period are largely independent and unrelated, and that length of estimation period should provide an unbiased and precise beta estimate.[373]

Stakeholder submissions

The CRG and ENA both agreed that the estimation period for beta is independent of the term of the risk-free rate.[374]

Conclusion on impact of the term of equity

Given the broad support among experts and stakeholders, our view is to not take into account the term of the return on equity when setting the estimation period for beta.

8.2.5 Comparator set

Our draft decision is to be informed by the existing comparator set of 9 Australian energy network firms.

Table 8.7 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[375] – November 2021	Electricity, Gas

[373] AER, *Concurrent evidence session 1, Proofed transcript*, February 2022, pp.44, 46; AER, *Concurrent evidence session 2, Proofed transcript*, February 2022, pp.9-10.

[374] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.61; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp.40-41.

[375] 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.

Firm (ASX ticker)	Time/trading period	Sectors
AusNet Services (AST), formerly SP AusNet (SPN)	December 2005 – February 2022	Electricity, Gas

Source: AER analysis

The existing comparator set of domestic firms provides (historically) reliable information on the systematic risk of an efficient Australian regulated energy network business.

We recently examined this issue in our final working paper and considered that we should continue to use our existing comparator set.[376]

Given the reduction in the number of live firms, we considered a number of options to augment our comparator set:

- including international energy firms
- including domestic infrastructure firms
- removing delisted firms.

We have not received sufficient evidence to suggest that any of these options would provide a significant improvement to our existing comparator set at this time. We consider that the beta for the benchmark regulated energy network business is likely to be relatively stable over the long run, and delisted firms remain relevant in informing our decision.

We also consider that international energy firms and other Australian infrastructure firms are different to Australian regulated energy networks, and these differences are difficult to quantify or adjust for. Nonetheless, we consider that international energy firms likely have more similar characteristics as the energy networks we regulate than domestic infrastructure firms and therefore are a better candidate for comparators. We have used international estimates to crosscheck our domestic beta estimates.

We recognise the need to develop a revised approach for future reviews and have begun work in that area.

8.2.5.1 International energy firms

Our draft decision is to only use international energy firms to crosscheck our domestic estimates.

We have reviewed a range of potential comparators and comparator sets to inform our consideration. We observe significant differences between international energy firms and Australian regulated energy networks, particularly in terms of firm characteristics.

2018 Instrument

[376] AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, p.108.

In the 2018 Instrument, we did not use international energy firms as comparators due to their inherent differences to Australian regulated energy networks, which were difficult to quantify or adjust for.[377] We used international firms to crosschecks our empirical estimates.[378]

Our final working paper

In our final working paper, we discussed the challenge and complexities in using international energy firms and consider that they may not be good comparators.[379]

Concurrent evidence sessions

At the concurrent evidence session, Mr Kumareswaran, Dr Hird and Dr Lally considered that international firms are likely to be sufficiently comparable to domestic firms in terms of risk and recommended that we should give some weight to international energy firms.[380] Dr Lally and Mr Kumareswaran noted that combining multiple estimates would improve precision by reducing the estimation error (if the errors associated with the estimates are not correlated).[381] Mr Kumareswaran also provided advice on selecting a sample of international comparators using an approach similar to that used by the New Zealand Commerce Commission.[382]

Dr Boyle suggested that international energy firms would introduce significant amount of bias because they may be very different to the firms we regulate.[383] He considered that for our regulatory purposes, it is more important to have an accurate and unbiased beta estimate even if it is imprecisely estimated.[384] Dr Lally disagreed and suggested that the standard practice is to minimise estimation error rather than to minimise bias.[385]

Dr Boyle also noted that it would be difficult to determine the appropriate weight that should be given to international energy firms.[386] In response, Dr Hird noted that not considering international energy firms is the same as giving them zero weight.[387]

Mr Hancock suggested that the composition of international markets may be different to the domestic market and may cause international energy firms to have higher beta than

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[377] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.151.

[378] Ibid., p.156.

[379] AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, pp.108-110.

[380] AER, *Concurrent evidence session 1, Proofed transcript*, February 2022, pp.52-54, 58-59, 60, 61-62.

[381] Ibid., pp.50-51, 59-60.

[382] Ibid., pp.67-69.

[383] Ibid., pp.56-57.

[384] Ibid.

[385] Ibid., p.59.

[386] Ibid., pp.57-58, 69-70.

[387] Ibid., p.67.

domestic comparators.[388] In response, Dr Hird noted that the composition of the domestic market has also changed significantly over time.[389] Dr Lally noted a potential approach to correct for differences in market compositions by adjusting markets industry weights.[390]

Stakeholder submissions

Stakeholder submissions were divided on the issue. The CRG and the AEC opposed the inclusion of international energy firms as comparators.[391] The CRG also noted that there are enormous methodological hurdles to overcome before international firms should be considered.[392]

Endeavour supported our view to delay introducing international energy firms to future reviews, but suggested that there are readily available solutions that can be implemented in the current 2022 Instrument.[393]

ENA, APGA, NSG and several network businesses considered that a comparator set consisting of only one live firm is insufficient and supported considering international energy firms as comparators.[394]

ENA, APGA and Endeavour also noted that other regulators, such as the New Zealand Commerce Commission, the Queensland Competition Authority, the Economic Regulation Authority Western Australia and the Independent Pricing and Regulatory Tribunal, have either adopted or are considering adopting international comparators.[395] The main reasons cited from these regulators can be summarised as:

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[388] Ibid., p.64.

[389] Ibid., pp.64-65.

[390] Ibid., pp.65-66.

[391] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.76; AEC, *2022 AER Rate of Return Instrument review - Information paper and final Omnibus paper – Submission*, 10 March 2022, p.2.

[392] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.87.

[393] Endeavour Energy, *Rate of Return information paper – Submission*, 11 March 2022, p.1.

[394] ENA*, Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.95; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p.12; NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p.10; AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, p.5; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.38; Ausgrid, *Rate of Return 2022 information paper – Submission*, 11 March 2022, p.3; Jemena, *AER information paper – Submission*, 11 March 2022, p.3; TransGrid, *AER Rate of Return final Omnibus paper – Submission*, 11 March 2022, pp.7-8.

[395] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp.100-102; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p.14; Endeavour Energy, *Rate of Return information paper – Submission*, 11 March 2022, p.4.

- the domestic Australian sample has become too small, and a larger sample would allow for beta estimates that are more statistically reliable and more reflective of current market conditions
- international energy firms have broadly similar regulatory arrangements as regulated energy networks in Australia – they all tend to allow for recovery of efficient costs, including a return on capital. Therefore, they are likely to have broadly similar risks as Australian regulated energy networks

In a subsequent memorandum, ENA reiterated its view that we should give weight to international energy firms and to the approaches and estimates of international regulators.[396]

CEG, in a report commissioned by APGA, analysed the beta estimates of international energy firms and provided the following conclusions and recommendations:[397]

- Comparing 3 Australian firms (APA, Spark and AusNet) and 24 international firms (20 US, 2 Canadian, 1 UK and 1 NZ), it found that international firms have higher beta estimates than Australian firms.
- It identified and tested 4 possible theoretical reasons for this difference in beta estimates and found that the sample data did not support 3 of these theoretical reasons.
- It constructed 95% confidence intervals for beta estimates for the Australian sample and the international sample. It recommended an asset beta value of 0.3 (or 0.75 when re-levered to 60%), which is the lower end of the overlapping sections of the confidence intervals for the 2 samples.

Conclusion on international comparators

A key theme from experts and stakeholder submissions is whether international energy firms are sufficiently comparable to Australian regulated energy networks to be useful to our task.

Since the 2018 Instrument, we have undertaken annual updates of beta estimates of a comparator set of 56 US firms that was originally compiled by CEG in 2013.[398] We have updated our estimates using data up to February 2022 in section 8.2.2. Figure 8.2 showed that the longest period beta estimates have been relatively stable, while 5-year estimates showed a significant increase since 2020. This trend contrasts with the trend in our domestic comparator set in Table 8.5, which shows a notable decrease in the 5-year beta estimates since 2020.

Our review of the international energy firms' financial data suggests that many have non-energy-related operations (such as telecommunications, water, construction and real estate), with most firms being vertically integrated with energy generation and/or retail activities.

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[396] ENA, *Reaching a cost of equity estimate in the 2022 Rate of Return Instrument applying regulatory discretion*, 11 April 2022, pp.5-6.

[397] APGA, *Rate of Return Instrument information paper - Submission attachment - CEG report - Use of foreign asset beta comparators*, March 2022, pp.19-20.

[398] CEG, *Information on equity beta from US companies*, June 2013.

We also reviewed comparator sets of international energy firms used by other regulators, including:

- New Zealand Commerce Commission's (NZCC) 2016 comparator set[399]
- Economic Regulation Authority's (ERAWA) proposed comparator set in its current review.[400]

The short-term beta estimates of these also show increasing trends similar to our annual update results. These samples contain a high proportion of firms that have non-energy-related operations and/or are vertically integrated. We note there is significant overlap between these and our own annual update samples.

We have considered ways in which less comparable firms may be systematically identified. TDB Advisory undertook a process to refine NZCC's comparator set in 2016.[401] It concluded that only 8 of the 74 firms in NZCC's comparator set can be considered 'pure play' firms,[402] including 3 Australian firms that are already in our domestic comparator set. We note that of the 5 non-Australian 'pure play' firms, 3 (Spire, Northwest Natural Gas and Unitil) still appear to be vertically integrated with energy retail operations.

We acknowledge stakeholder concern that our domestic comparator set has diminished significantly. We think international energy firms may potentially offer a more viable solution than alternatives such as domestic infrastructure firms. However, there are complex issues with using international energy firms as comparators and more work is needed in this area.

For the 2022 Instrument, we consider it prudent to continue to be informed primarily by the beta estimates of our domestic comparator set and to use international estimates to crosscheck our domestic comparator set.

8.2.5.2 Domestic infrastructure firms

Our draft decision is to not use domestic infrastructure firms in our equity beta comparator set, because there are significant differences between non-energy infrastructure firms and regulated energy networks that are difficult to quantify or adjust for.

2018 Instrument

In the 2018 Instrument, we did not include domestic infrastructure firms in our comparator set, because they differ from an efficient Australian regulated energy network and these differences cannot be easily quantified or adjusted for.[403]

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[399] NZCC, *Input methodologies review decisions, Topic paper 4: Cost of capital issues*, December 2016, pp.221-228.

[400] ERA Western Australia, *2022 gas rate of return instrument review - Discussion paper*, December 2021, p.111.

[401] TDB Advisory, *Submission to the Commerce Commission on the Input Methodologies Review Draft Decisions: Comparative Company Analysis*, August 2016.

[402] Ibid., p.44.

[403] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.151.

Our final working paper

In our final working paper, we considered that domestic infrastructure firms may not be useful comparators, because they operate in different industries and thus face different risks when compared with regulated energy network businesses.[404]

Stakeholder submissions

Stakeholder submissions were divided on the issue. ENA and NSG supported giving some consideration to domestic infrastructure firms,[405] although ENA considered domestic infrastructure firms to be less directly relevant than international energy firms.[406]

On the other hand, the CRG and APA supported our view and opposed the inclusion of domestic infrastructure firms as comparators, because of their differences with regulated energy networks in terms of firm and market characteristics.[407]

Conclusion on domestic comparators

Economic Insights' report for us considered that a potential option of augmenting our existing comparator set would be including selected domestic infrastructure firms, including toll roads operators such as Transurban and Atlas Arteria.[408]

We consider that domestic infrastructure firms, such as toll roads operators, likely have different risk profiles to the Australian regulated energy networks. For example, the COVID-19 pandemic led to lockdown periods across Australia that placed severe restrictions on travel but had relatively minor impact on energy consumption (and regulated network revenues).

ENA suggested that evidence from domestic infrastructure firms (Aurizon, Atlas Arteria and Transurban) supports a range for beta of 0.9 to 1.5 or above.[409] This is significantly higher than the estimates from our domestic comparators shown in Table 8.4, which ranged from 0.34 to 0.69. We consider that this difference in empirical beta estimates further highlights the difference in systematic risks between the 2 industries.

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[404] AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, p.112.

[405] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.99; NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p.10.

[406] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.112.

[407] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.76; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.38.

[408] Economic Insights, *Methodological issues in estimating the equity beta for Australian network energy businesses*, June 2021, pp.71-77.

[409] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.112.

APA noted a lack of suitable methodology to adjust for the differences between infrastructure firms and regulated energy network businesses.[410] We agree with this view and note that no stakeholder has proposed a viable methodology to make such adjustments.

Given the difference in risk exposures between non-energy infrastructure firms and regulated energy networks, and a lack of methodology to adjust for this difference, we maintain the view to not include domestic infrastructure firms in our comparator set.

8.2.5.3 Delisted firms

Our draft decision is to continue to be informed by data of the delisted firms in our comparator set. We consider that delisted firms remain relevant in informing the systematic risk and the beta estimate of regulated energy networks.

2018 Instrument

In the 2018 Instrument, we were informed by our comparator set including the delisted firms in the set, because they provided historically reliable and accurate information on the systematic risk of the benchmark regulated energy network business.[411]

Our final working paper

In our final working paper, our preliminary view was to continue to include delisted firms in our comparator set.[412] We considered that the long-run beta for the benchmark regulated energy network business is likely relatively stable and delisted firms are useful comparators.[413]

Concurrent evidence sessions

The experts at the concurrent evidence session did not explicitly discuss whether we should give reduced weight to delisted firms. However, they mostly agreed that long-run historical data would provide useful information and enable more accurate and precise beta estimates.[414] Dr Boyle said that ‘as a working approximation, it is probably best to assume that beta is approximately constant and use the longest possible available time series’.[415]

Stakeholder submissions

The CRG considered that delisted firms can cause upward bias to the beta estimate and should be given reduced weight.[416] The AEC stated that keeping delisted firms is problematic

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[410] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, pp.44-46.

[411] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.171.

[412] AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, pp.112-113.

[413] Ibid.

[414] AER, *Concurrent evidence session 1, Proofed transcript*, February 2022, pp.40-45, 49, 72-74.

[415] Ibid., p.43.

[416] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, pp.76, 85.

over time.[417] NSG supported giving reduced weight to delisted firms because these firms provide limited information on contemporary equity risks and return requirements.[418] ENA considered that evidence from delisted comparators remains relevant and should be given significant weight, but it should be afforded less weight as it becomes more out of date.[419]

Conclusion on delisted firms

We consider that the delisted firms offer some value. As Dr Boyle and other experts have noted, the equity beta is likely to be stable over time. Economic Insights suggested that this is due to the long-term nature of the regulatory framework under which the regulated energy firms operate and their strong natural monopoly characteristics.[420] This means that historical data of the delisted firms can improve the statistical reliability of beta estimates by providing more observations. Therefore, delisted firms remain relevant in informing our beta estimate.

8.2.6 Setting a single beta for regulated gas and electricity businesses

Our draft decision is to continue to set a single beta for the regulated gas and electricity firms. We consider that they are likely to face similar systematic risks, given that they share similar characteristics as natural monopolies and operate under similar regulatory frameworks.

While there may be a potential risk of asset stranding for gas networks, we did not find evidence that would suggest that such risk is primarily systematic in Australia. Therefore, our view is not to adjust the equity beta to compensate for potential stranding risk. We consider it more appropriate to address this issue under the broader regulatory framework, such as through depreciation policy.

2018 Instrument

In the 2018 Instrument, we applied a single beta for regulated gas and electricity firms.[421] We considered that the equity beta for regulated gas and electricity firms are likely to be similar because they are regulated natural monopolies with similar regulatory frameworks, which limits systematic risk exposure.[422] We also considered that international information did not

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[417] AEC, *2022 AER Rate of Return Instrument review - Information paper and final Omnibus paper – Submission*, 10 March 2022, p.2.

[418] NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p.2.

[419] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.98.

[420] Economic Insights, *Methodological issues in estimating the equity beta for Australian network energy businesses*, June 2021, p.vi.

[421] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.175.

[422] Ibid.

provide persuasive evidence that separate betas were warranted due to differences in regulatory frameworks, environments and risk characteristics.[423]

Our final working paper

In our final working paper, our preliminary view was to continue to set a single beta for gas and electricity networks.[424] We found no clear evidence of a material difference in overall systematic risks between electricity and gas networks.[425] We considered the issue of potential stranding risk faced by gas networks and considered that it was unclear whether such risk has a systematic component in Australia.[426]

Concurrent evidence sessions

Most experts at the concurrent evidence session considered that gas stranding risk is unlikely to be systematic and that there is no reliable way to assess its nature and magnitude.[427] Mr Hancock noted that stranding risk may potentially have an inverse correlation with the market (and thus a negative influence on beta) because a strong economy could enable investments to accelerate the energy transition from gas to renewables, while a weak economy could delay it.[428] Dr Hird disagreed and considered that stranding risk could have a systematic component, depending on investor perception of the future, especially on climate risk.[429] Dr Hird and Dr Boyle also suggested using international energy firms to further assess the effect of stranding on beta.[430]

Stakeholder submissions

The CRG agreed that stranding risk is not a systematic risk; therefore, it should not be compensated under our approach to determining the equity beta or the rate on equity.[431] The CRG also suggested that addressing stranding risk through regulatory depreciation may potentially limit the total future systematic risk faced by gas networks and questioned whether it would warrant a downward adjustment to beta.[432]

ENA, APGA, APA and Jemena suggested that existing evidence from domestic comparators does not allow an adequate comparison of beta between gas and electricity networks, and

[423] Ibid.

[424] AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, p.113.

[425] Ibid., pp.114-115.

[426] Ibid., pp.116-118.

[427] AER, *Concurrent evidence session 1, Proofed transcript*, February 2022, pp.80-83.

[428] Ibid., p.83.

[429] Ibid., p.82.

[430] Ibid., pp.82-83, 85-86.

[431] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.81.

[432] Ibid. pp.81-82.

that further analysis is needed with a larger sample of firms, such as international firms.[433] ENA also considered it appropriate to address specific risks associated with decarbonisation faced by gas networks elsewhere in the regulatory process, such as through depreciation allowance, rather than making an arbitrary adjustment to beta.[434] AusNet suggested that asset stranding protections should be maintained by the regulatory framework and that the rate of return should reflect the very low levels of stranding risk ordinarily faced by regulated networks.[435]

Conclusion on gas beta

In our recent paper 'Regulating gas pipelines under uncertainty', we examined the issue of uncertain future demand for gas and offered a preliminary view of using accelerated depreciation as the preferred option to manage this issue.[436] We did not recommend adjustments to the rate of return because we considered asset stranding risk to be non-systematic.[437] This view is consistent with that of most of the experts.

Stakeholders have not provided any substantive evidence that would suggest that stranding risk has a systematic component or that a significant difference in beta estimates exists between gas and electricity networks.

We consider there are challenges in comparing the beta of gas and electricity firms using international energy firms, as some experts and stakeholders suggested. As discussed in 8.2.5.1, we found that many international energy firms have unrelated business segments and/or are vertically integrated. Very few firms can be considered 'pure play' regulated energy network businesses.

We disagree with APA's conclusion that gas networks have higher betas by comparing the beta of APA against AusNet and Spark.[438] APA derives a significant proportion of its revenue from non-regulated pipeline activities, such as gas storage and processing, energy generation and asset management services.[439] Non-regulated activities likely involve higher risks than regulated network operations, which may be reflected in a relatively higher equity beta estimate. In contrast, AusNet and Spark derive most of their revenue from regulated networks.

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[433] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.105; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, pp.13, 14, 15; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.51; Jemena, *AER information paper – Submission*, 11 March 2022, p.4.

[434] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.105.

[435] AusNet, *Rate of Return 2022 information paper – Submission*, 11 March 2022, p.2.

[436] AER, *Regulating gas pipelines under uncertainty, Information paper*, November 2021.

[437] Ibid., pp.32-33.

[438] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.51.

[439] APA, *Annual Report 2021*, p.64.

Therefore, we have adopted a single rate for the gas and electricity networks. We consider that asset stranding risks faced by gas networks should be addressed through the broader regulatory framework (e.g. accelerated depreciation).

8.2.7 Low beta bias

The low beta bias is an observation that ex-post returns from low beta stocks tend to outperform their expected returns implied by the SL CAPM.Our draft decision is that we should maintain our approach of not adjusting the equity beta or the rate of return for low beta bias.

2018 Instrument

We considered this issue in detail in the 2018 Instrument, and decided not to adjust our SL CAPM estimate for low beta bias because:[440]

- the SL CAPM remains the standard and most widely used model in practice
- investors and market practitioners do not appear to consider low beta bias on an ex-ante basis
- observations of higher actual returns than the SL CAPM estimates for low beta stocks do not necessarily imply low beta bias or that the bias should warrant increasing the allowed rate of return – a range of reasons can explain these observations and it is not clear investors expect a higher return from low beta stocks.

The Independent Panel also stated that the Black CAPM and low beta bias have 'nothing to do with estimating beta' and recommended against 'an arbitrary add-on' to the equity beta to account for them.[441]

Our final working paper

In our final working paper, we proposed to maintain our approach, noting the lack of any substantive evidence to warrant a change in our position.[442]

Concurrent evidence sessions

The issue of low beta bias was briefly noted by Dr Hird and Mr Kumareswaran in the concurrent evidence sessions, and both supported to continue to use the CAPM.[443]

Stakeholder submissions

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[440] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.196.

[441] Ibid., p.197.

[442] AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, p.118.

[443] AER, *Concurrent evidence session 2, Proofed transcript*, February 2022, pp.16-17; AER, *Concurrent evidence session 3, Proofed transcript*, February 2022, pp.74-75.

ENA submitted that there is a large body of well accepted evidence of low-beta bias and that we should consider this evidence in setting the return on equity.[444] It provided examples of empirical evidence of low beta bias, which showed that stocks with a low beta estimate generate higher returns than the CAPM would predict.[445] It also referenced a finding by Economic Insights suggesting that industry practice is to adopt a higher rate of return for low-beta stocks than a mechanistic application of the CAPM would suggest.[446] However, it did not propose to use such evidence to adjust beta or any other parameter.[447] AGIG, SAPN and VPN, in their joint submission, considered low beta bias to be a known weakness of the CAPM that is supported by well documented evidence.[448] In contrast, APA considered low beta bias to be a ‘second order issue’ and did not advocate for any adjustments.[449]

Conclusion on low beta bias

We considered this issue in detail in the 2018 Instrument review. We concluded that low beta bias is a matter of ongoing academic debate and there are a range of issues with ex-post empirical tests for low beta bias.[450]

We also note that Economic Insights recommended the CAPM in a regulatory context.[451] Other experts, including Partington and Satchell and Sapere Research Group, have also agreed that the SL CAPM should continue to be used without adjusting for low beta bias.[452]

Given the broad support from experts, our draft decision is to maintain our approach and not to make an adjustment for low beta bias.

8.2.8 Other regulators’ decisions

We do not propose to use other regulators’ beta values to directly inform our own estimates. Having said that, we have reviewed their methodologies and approaches. We observe that there are differences between approaches adopted across the regulators.

Our final working paper

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[444] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p.95.

[445] Ibid., p.106.

[446] Ibid., p.107.

[447] Ibid., p.107.

[448] AGIG, SAPN, VPN, *2022 Rate of Return Instrument review – Omnibus papers final – Submission*, 11 March 2022, pp.4-5.

[449] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.39.

[450] AER, *Rate of return Instrument, Explanatory Statement*, December 2018, pp.211-212.

[451] Economic Insights, *Methodological issues in estimating the equity beta for Australian network energy businesses*, June 2021, p.28.

[452] Partington & Satchell, *Report to the AER: Alternative Asset Pricing Models*, June 2020, p.22; Sapere Research Group, *Systematic risk and the role and measurement of equity beta: A report to the AER Consumer Reference Group*, June 2021 pp.32-33.

In our final working paper, our preliminary view was not to use other regulators' decisions to directly inform our beta estimates.[453] We highlighted that there are differences between our methodology and those of other regulators.[454] We considered that there is a need to be cautious when comparing beta decisions across industries and/or jurisdictions.[455]

Stakeholder submissions

ENA and TransGrid submitted that Economic Regulation Authority Western Australia (ERAWA) has adopted a beta value of 0.79 (adjusted for gearing differences), while several international regulators have adopted beta values of 0.8 or higher, and that we should properly consider this evidence.[456] Endeavour similarly noted that other regulators generally set beta allowances that are higher than our current estimate.[457] On the other hand, APA suggested that there is little to be learned from the decisions of other regulators.[458]

ENA, APGA, Endeavour, AGIG, SAPN and VPN also noted that some other regulators have either adopted or are considering adopting international energy firms as comparators.[459] In a subsequent memorandum, ENA reiterated its view that we should give weight to international energy firms and to the approaches and estimates of international regulators.[460] We discussed the issue of international energy firms in section 8.2.5.1.

Conclusion on other regulators' decisions

In our working paper 'International regulatory approach to rate of return', we reviewed international regulators' decisions and observed that there are several factors that may have contributed to their beta estimates differing from ours.[461] For example, some regulators may use shorter estimation periods and/or include international firms in their comparator sets.[462] Our approach and rationale for selecting estimation periods and comparator firms is discussed in sections 8.2.4 and 8.2.5 respectively.

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[453] AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, p.111.

[454] Ibid.

[455] Ibid.

[456] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp.103-104; TransGrid, *AER Rate of Return final Omnibus paper – Submission*, 11 March 2022, pp.7-8.

[457] Endeavour Energy, *Rate of Return information paper – Submission*, 11 March 2022, p.4.

[458] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.38.

[459] ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, pp.100-102; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p.14; Endeavour Energy, *Rate of Return information paper – Submission*, 11 March 2022, p.4; AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, p.5.

[460] ENA, *Reaching a cost of equity estimate in the 2022 Rate of Return Instrument applying regulatory discretion*, 11 April 2022, pp.5-6.

[461] AER, *International regulatory approach to rate of return*, August 2020, pp.9-12.

[462] Ibid.

We also note that the international regulators we reviewed are European and US regulators of various industries, including energy, water and transport. Therefore, the difference in beta may be due to differences in risks between industry sectors.

These factors may have contributed to some international regulators setting higher beta values than our value of 0.6.[463]

We also considered other regulators' approaches in Australia and observe that there are differences between our approach and approaches adopted by other regulators (such as ERAWA), which may have contributed to the difference in our beta values.[464]

We note that ERAWA is currently undertaking a review of its 2022 Gas Rate of Return Instrument. In its 'Discussion Paper on Focused Consultation', it consulted on issues relating to using a comparator set that includes both domestic and international energy firms and to maintain its equity beta of 0.7 (based on 55% gearing).[465]

Given the differences between our approach and that of other regulators, we maintain our view that our beta estimates are not directly comparable with that of other regulators.

8.2.9 Assessment criteria

Our consideration of issues shows that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. In this regard, where necessary we have applied our assessment criteria to assist us exercise our judgement. Table 8.8 sets out our assessment criteria and key areas where they have assisted us to make our decision.

Table 8.8 Criteria of draft decision equity beta assessment

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and are informed by sound empirical analysis and robust data.	Our decision is informed by empirical estimates based on up-to-date market information and reflect well-accepted economic and finance principles.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and consider the limitations of that purpose (b) promote simple over complex approaches where appropriate.	Our decision is based on well-established methodology of estimating beta in accordance with the CAPM. We used regression analysis of market data of a comparator set of listed Australian energy networks.

463 We acknowledge that ENA identified an error in our gearing calculations of the equity betas of international regulators and have made the correction.

464 AER, *Overall rate of return, equity and debt omnibus, Final working paper*, December 2021, p.111.

465 ERA Western Australia, *2022 gas rate of return instrument review - Discussion paper*, December 2021, pp.72, 84.

3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Our approach to estimating beta is based on good practices that are supported by relevant academic literature. We have clearly described our approach so that it is transparent and replicable. We use data sourced from Bloomberg, a reputable provider, in conjunction with company annual reports.
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling that avoids arbitrary filtering or adjustment of data and that does not have a sound rationale.	Our approach to regression modelling is statistically robust because it relies on a large number of observations based on a comparator set of firms over multiple estimation periods. We have provided rationales for when we gave more (or less) weight to some evidence relative to others.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	We used up-to-date market data sourced from Bloomberg, a reputable provider, as well as company annual reports, which are publicly available. We have included footnote references for our sources of information.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	Our existing approach sufficiently reflects existing market conditions, but may not be flexible to changes, because only one of the 9 firms in our comparator set is still listed. We aim to further explore ways to use international energy firms, which may offer more up-to-date market information, in future reviews.
7	The materiality of any proposed change.	We largely maintained the same approach to estimating beta as that of the 2018 Instrument. We also maintained the point estimate of 0.6.
8	The longevity or sustainability of new arrangements.	Our existing approach may not be sustainable, because only one of the 9 firms in our comparator set is still listed. We aim to explore more sustainable solutions by analysing international energy firms, which offer a larger sample of still-listed firms, in future reviews.

9 Return on debt approach

In this section we discuss our overall approach and the implementation of our approach to return on debt.

In our 2018 Instrument, we calculated the return on debt through a simple trailing average approach. We used third-party yield curves with a 10-year benchmark term of debt and benchmark credit rating of BBB+. We adopted a 10-year transition between the previous 'on-the-day' approach and the 10-year trailing average to satisfy our NPV=0 principle. Each yield estimate was calculated through an averaging period between 10 days and one year in length, with each NSP nominating their respective averaging period.

We focused our 2022 Instrument review in our return on debt approach on whether to adjust our simple trailing average approach, and whether to use the EICSI to adjust return on debt. We considered implementing a weighted trailing average approach to account for expected large projects to be undertaken in the next few years in line with NSPs' transition towards renewable energy, which will require large capital investments. We also reviewed our benchmark term of debt, benchmark credit rating, use of third-party yield curves, and averaging period.

9.1 Draft decision

Our draft decision is to largely maintain our return on debt approach from the 2018 Instrument. We consider the appropriate benchmark for estimating the return on debt to be the yield on debt instruments at 10-year term to maturity, issued at a BBB+ investment grade rating. We will estimate a BBB+ yield through a weighted average of B (two-thirds) and A (one-third) rated yield curves published by the RBA, Bloomberg, and Thomson Reuters. We will continue to use our 10-year simple trailing average approach with a 10% weighting for each of the 10 years, along with a 10-year transition for an NSP's first determination. We will not use the EICSI to adjust return on debt but will continue to monitor our return on debt approach against the EICSI. Our debt averaging period will remain between 10 days and 1 year, however, we will modify the start and end dates of the averaging period nomination window. This will now begin no more than 17 months and finish no less than 5 months prior to the regulatory period. We believe that this approach most accurately reflects a benchmark business, is in line with the NEO and NGO, and satisfies our assessment criteria.

The majority of stakeholders have indicated support to retain our current approach. QTC submitted an alternative to our trailing average approach, which we address in section 9.2.7.

9.2 Issues and consideration

The following sections set out our draft decision consideration of the issues related our approach to the return on debt.

9.2.1 Benchmark term

We need to specify the benchmark debt term for a debt portfolio in order to estimate the allowed return on debt for an NSP. The benchmark term is an input to obtaining yields to estimate the return on debt. It also establishes the period over which the trailing average is calculated and determines the period of the transition to the trailing average.

The debt term for the return on debt is currently set at 10 years and applied through a 10-year trailing average. NSPs go through a 10-year transition period to transition from our previous ‘on-the-day’ approach – applied prior to the *2013 Rate of Return guideline* – to the trailing average.[466]

We consider that the benchmark term of debt, equity and expected inflation should be set independently based primarily on the NPV=0 principle. If they are the same value, it should be the result of analysis rather than an explicit requirement. Further, we consider that the benchmark term should match that of an efficient firm's borrowing consistent with Dr Lally's advice.[467] As we detail below, we have conducted further analysis to ascertain whether the benchmark debt term of 10 years remains appropriate for estimation of allowed return on debt.

The approach proposed by Chairmont in 2019 to calculating the average term of debt is to use a weighted average term to maturity at issuance (WATMI).[468] The WATMI suggests that the average term of debt is currently between 8 years as the lower bound and 10 to 11 years as the upper bound. In response to our Information paper, there was a general view in submissions that the current industry data suggested an average term that was not significantly different from the current benchmark, so 10 years should be maintained to avoid a new set of transition mechanisms.[469] The CRG accepted on balance that the 10-year benchmark should be maintained, noting the costs and risks involved in such a change and the relatively small benefit. However, it also noted that if most NSPs were already not following the existing benchmark, then there would be no need to apply any transition to maintain NPV neutrality, and a change should be implemented as soon as possible.[470]

Our decision is to maintain the benchmark return on debt term at 10 years. This aligns with the debt financing practices of regulated businesses to issue long term debt. Our analysis of industry debt data also does not show clear evidence that the current benchmark of 10 years is no longer an appropriate benchmark term, or that there is a materially better alternative.

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466 AER, *Explanatory Statement – Rate of Return guideline*, December 2013, pp. 120–121.

467 Dr Martin Lally, *The Appropriate Term for the Allowed Cost of Capital*, 9 April 2021, pp. 53–54.

468 Chairmont, *Aggregation of Debt Data for Portfolio Term to Maturity*, 28 June 2019.

469 AusNet Services, *Rate of Return 2022 information paper - Submission*, 11 March 2022, p. 3; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper - Submission*, 11 March 2022, p. 15–16; Ausgrid, *Rate of Return 2022 information paper - Submission*, 11 March 2022, p. 3; Transgrid, *AER Rate of Return final Omnibus paper - Submission*, 11 March 2022, p. 7; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper - Submission*, 11 March 2022, p. 32–35; APGA, *2022 Rate of Return Instrument information paper - Submission*, 11 March 2022, p.21; AGIG/SAPN/VPN, *2022 Rate of Return Instrument review - Omnibus papers final - Submission*, 11 March 2022, p. 3–6.

470 CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, pp. 93–95.

We also note that there are significant practical limitations on adjusting the benchmark term if a transition is to be applied.

9.2.1.1 Estimation approach

Conceptual considerations

We consider that, within the constraints of the market for corporate bonds, a regulated business would aim to issue longer term debt to minimise refinancing risk. However, we consider this is balanced with higher costs arising from the term premium of longer-term issuance.

We maintain our view from the 2018 Instrument and 2013 Guidelines, in which we concluded that the choice of term at issuance reflects a trade-off between refinancing risk and higher overall portfolio costs.[471]

Refinancing risk is the risk that a firm would not be able to efficiently finance its debt at a given point in time. This may be because the debt instruments that it seeks are not available to it or would not be able to be refinanced at the same cost. Refinancing risk is often due to systematic factors, such as macroeconomic trends or changes in debt market liquidity. However, refinancing risk may also result from company-specific matters.

The need to manage refinancing risk is balanced against the overall cost of the benchmark efficient entity's debt portfolio. For example, a longer average term of debt for a debt portfolio means debt needs to be refinanced less often. But it also means the total cost of the debt portfolio is higher because of the upward sloping term structure and term premium associated with longer term debt (see section 6.2). The efficient debt financing practices would address this trade-off.

As discussed in section 6.2, the term of return on capital is linked to the frequency with which the regulatory allowance is reset. In case of the return on equity, the resetting frequency is linked to the regulatory period. In the case of debt allowance under a trailing average, we have 10 tranches of debt and the return on each tranche is reset every 10 years (once fully transitioned). In this case, we consider that to satisfy the NPV=0 principle, the resetting frequency should be equal to the length of the trailing average and the benchmark debt term.

The outcome of this trade-off between refinancing risk and cost may vary over time. For this reason, we consider that the benchmark term of debt is also an empirical question. In the remainder of this section, we have considered evidence from actual debt raising by (privately owned) NSPs between 2013 and 2021.

Using the EICSI and WATMI for estimating the benchmark term

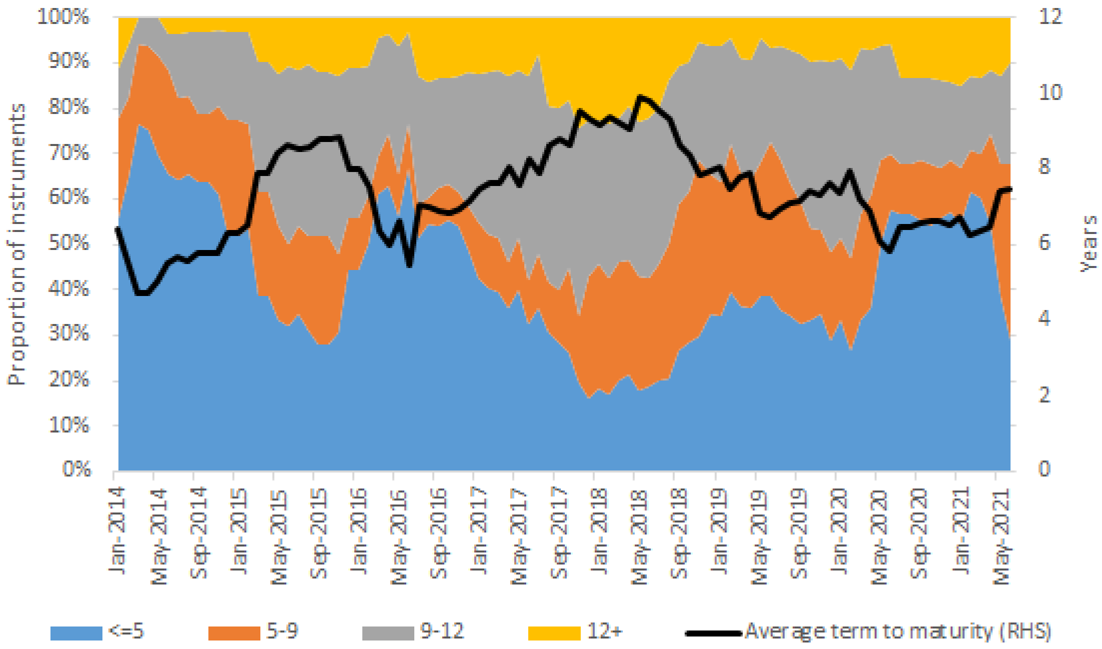
The Energy Infrastructure Credit Spread Index (EICSI) is a 12-month rolling average of credit spreads across all debt instruments that meet our criteria for privately owned NSPs. The EICSI allows us to monitor our benchmark return on debt approach and provides an estimate

[471] AER, *Draft rate of return guideline - explanatory statement*, 10 July 2018, p. 352; AER, *Final rate of return guideline—Explanatory statement*, December 2013, p. 104.

of the average term and credit rating of debt instruments issued by NSPs. We discuss the EICSI and its relationship with the benchmark term further in section 9.2.2.

As shown in Figure 9.1, the average term of all instruments in the EICSI varies over time. In June 2016 the average term was under 6 years, increasing to almost 10 years in May 2018. Our latest estimate of the average term is 7.5 years in June 2021.

Figure 9.1 Proportion of debt instruments included in EICSI by broad term to maturity grouping (January 2014 to June 2021)



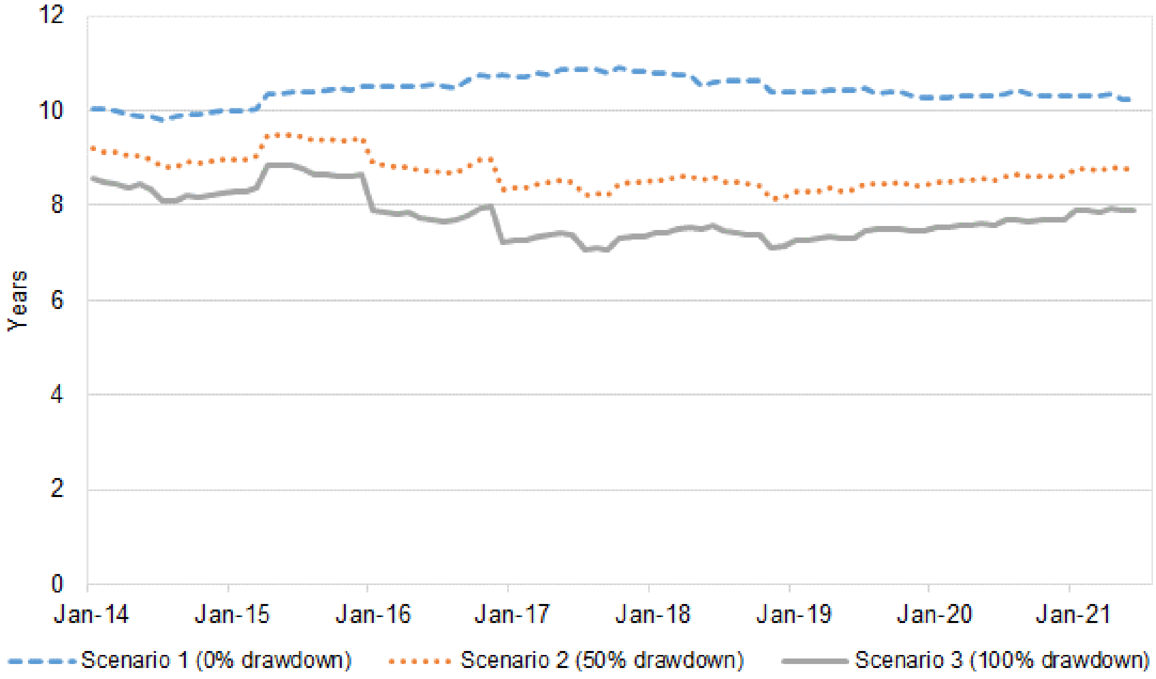
Source: AER analysis; Chairmont, *Aggregation of debt data for portfolio term to maturity*, 28 June 2019.

However, we note that the average term of debt in the EICSI varies significantly across NSPs. Individual NSPs' average term of instruments issued since July 2013 range from under 5 years to over 12 years. As such, the average term of instruments in the EICSI is influenced by a few NSPs that raise shorter-term debt. For example, if 3 of the NSPs with the shortest-term debt instruments are removed from the analysis, the overall average term of instruments in the EICSI would increase from 7.5 years to 8.5 years.

The 2019 Chairmont report also suggested an alternative method to calculate the average term of debt using the WATMI. This index is weighted by the face value of debt and does not apply the same exclusion criteria as the EICSI. Therefore, it includes a broader range of instruments. The WATMI also includes scenarios for the drawdown of bank debt (that is, whether funds are drawn for any of the bank debt reported by the NSPs). As shown in Figure 9.2, scenario 1 reflects no funds being drawn, scenario 2 reflects 50% drawdown of bank debt and scenario 3 reflects 100% drawdown (that is, all bank facilities are fully utilised). When bank facilities are used, the weighted average term drops because the bank facilities used by the NSPs have shorter terms than other debt instruments (i.e., bonds).

The 0% drawdown scenario results in the weighted average debt term at issuance being relatively stable between 10 and 11 years. The 50% and 100% drawdown scenarios show lower average terms and some evidence of increase in the period from January 2019 onwards. The 100% drawdown scenario is currently around 8 years. This analysis is presented in Figure 9.2 and reflects the updated data received from NSPs through to June 2021.

Figure 9.2 Weighted average term to maturity at issuance for the EICSI dataset – comparison of drawdown sensitivities (January 2014 to June 2021)



Source: AER analysis, based on method in Chairmont, *Aggregation of debt data for portfolio term to maturity*, June 2019.

Stakeholders submitted that the EICSI and WATMI should not be used to lower the benchmark term of debt at this stage. Ausgrid, TransGrid, ENA and APGA stated the WATMI cannot be used to deterministically set a benchmark term unless drivers of shorter-term debt are fully understood.[472] Further, APA noted that the EICSI and WATMI were calculated from data for a small number of businesses and could not be regarded as indicators of an industry term to maturity.[473] ENA and AusNet also noted in their submissions that, based on analysis performed by its consultant CEG – who was provided access to similar industry data – recent estimates of WATMI were very close to 10 years, particularly if NSW NSPs were excluded.[474]

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472 Ausgrid, *Rate of Return 2022 information paper*, 11 March 2022, p.3; TransGrid, *AER Rate of Return final Omnibus paper - Submission*, p. 7; ENA, *Rate of Return Instrument review - AER Final Omnibus and information paper - Submission*, 11 March 2022, p. 32, APGA, *Rate of Return Instrument information paper - Submission*, 11 March 2022, p. 21.

473 APA, *2022 Rate of Return instrument review information paper and final Omnibus paper - Submission*, 11 March 2022, pp. 15-16.

474 ENA, *Rate of Return Instrument review - AER Final Omnibus and information paper - Submission*, 11 March 2022, p. 32; AusNet, *Rate of Return information paper - Submission*, 11 March 2022, p. 3.

The CRG also submitted that the current evidence provides limited support for a change to term.[475]

Temporary or typical issuance patterns

In reaching a conclusion on the benchmark term of debt, we seek to estimate an appropriate sector-wide benchmark for the forward-looking period to which the Instrument will apply. For the reasons set out in this section, we consider that analysis of actual debt issuance practices is important information on which to base this conclusion.

It is not clear from the actual debt data from NSPs whether the current debt issuance patterns are temporary – based on the specific circumstance and practices of a few NSPs – or typical of a sector-wide forward-looking benchmark practice. For example, the ENA noted in its submission that if recently privatised firms in NSW were excluded, recent estimates of WATMI would be very close (and sometimes above) 10 years. The ENA suggested that, following the recent sale of those NSPs, debt was refinanced with portfolios of staggered maturities of debt. It is likely that as these tranches of shorter-term debt mature, they will be replaced by longer-term debt. As such, it is not clear that the recent trend of issuing shorter-term debt is representative of a longer-term benchmark estimate.

We also recognise that debt issuances from NSPs or their parent companies are unlikely to only reflect the approach we adopt to estimating the return on debt. As identified in previous reports by Chairmont, service providers could adopt a range of different strategies depending on their appetite for risk.[476]

Differences in debt profile between service providers

Different average terms between the NSPs could reflect different appetites for risk across the sector. The nature of a benchmark term allows for the possibility that different NSPs might adopt strategies facing more or less risk according to their risk preference and expect returns commensurate with the risks. Average term of debt varies significantly across NSPs. Individual estimates of WATMI for NSPs as of June 2021 (scenario 3) also range from 5 years to 13 years, with an industry average of 8.8 years.

We consider that neither the lower-risk nor the higher-risk approach necessarily reflects the most efficient approach. We note that a benchmark term of 10 years may represent an approach at the lower end of the risk continuum.

Interaction with the trailing average

We have taken into consideration that the trailing average approach (using a 10-year trailing average) and the 10-year transition from an ‘on-the-day’ debt approach to the trailing average depend on the benchmark debt term of 10 years.

If we were to adopt a different benchmark debt term, or change it during the transition period, we consider it would be necessary to undertake a further transition between approaches or

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[475] CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, pp. 91.

[476] Chairmont, *Financial practices under regulation: past and transitional*, October 2015, pp. 75-84.

adjust the trailing average calculation methods to achieve the NPV=0 principle. The implementation of this change would require a further transition from midway through the ongoing transition based on the 10-year term.

In response to our *Final working paper*, TransGrid and AGIG/SAPN/VPN submitted that they supported the continued use of a 10-year benchmark term because this would avoid the need to implement a further complex transition before NSPs have completed their transition to the current term.[477] However, the CRG noted that, if most NSPs were already not following the existing benchmark term, there would be no need to apply any transition to maintain NPV neutrality because the NPV=0 principle would already be violated in a manner that favoured NSPs.[478] Under our benchmark approach to setting the rate of return, we consider that to satisfy the NPV=0 principle we must base our considerations of whether a transition applies on the circumstance of the benchmark NSP – independent of the specific practice of individual NSPs.

We maintain that adjusting the benchmark term to reflect shorter-term debt issuances would require a transition and may cause implementation issues. Part of our assessment criteria is to prefer options that promote simple over complex approaches where appropriate. However, we consider that if there was a clearly more appropriate benchmark debt term we should employ this approach and seek to address the complexity.

The benefit to consumers from moving to a shorter term is unclear. First, if a transition is implemented, the change would be neutral in terms of the NPV. Further, applying a shorter term under the trailing average is likely to lead to higher price volatility. The current trailing average is over 10 years to reflect the benchmark term – if this average is shortened to reflect a shorter term, then the volatility of the average would likely increase. The CRG submitted that their research indicates that consumers do value stability, but also value lower prices. They note the challenge in considering these preferences but that there are other tools available to mitigate volatility, such as revenue smoothing, and on balance they consider that the benefit to consumers of lower prices would outweigh volatility concerns in this instance.[479] We note this consideration. Our view is that the evidence at this point is not sufficiently strong to justify moving to a different benchmark term. However, we will continue to monitor the evidence closely and we will change our approach in future if there is a clear case for change to the benefit of consumers.

9.2.1.2 Assessment criteria

As discussed above, our consideration of issues show that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. In this regard, where necessary we have applied our assessment criteria to assist us exercise our judgement. Table 9.1 below sets out our assessment criteria and key areas where they have assisted us make our decision.

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477 TransGrid, *AER Rate of Return final Omnibus paper - Submission*, 11 March 2022; AGIG SAPN VPN, *2022 Rate of Return Instrument review - Omnibus papers final - Submission*, 11 March 2022

478 CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, pp. 93–94.

479 CRG, *Rate of Return Instrument information paper - Submission*, 11 March 2022, p. 94.

Table 9.1 Assessment criteria of draft decision benchmark debt term

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles, and informed by sound empirical analysis and robust data.	Current market evidence not sufficiently strong to justify moving to a different benchmark term. Debt resetting frequency should equal the length of the trailing average and the benchmark debt term.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose (b) promote simple over complex approaches where appropriate.	Method of estimating benchmark term for draft decision is consistent with the original purpose of gathering industry debt data and considers its limitations.
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Construction of EICSI and WATMI has inherent transparency and replicability issues due to confidentiality. Separate work by CEG with similar dataset reaches similar conclusions.
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale.	We consider that current data underlying the EICSI and WATMI is sufficiently robust for use as check on benchmark term. Current evidence not sufficiently strong to justify moving to a different benchmark term.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	This criterion is hard to satisfy due to the confidential nature of the underlying industry data – as such, it is not material to our consideration.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	We will continue to collect industry debt data annually and monitor EICSI and WATMI and use the results to review the overall reasonableness of our benchmark debt term at the next rate of return Instrument.
7	The materiality of any proposed change.	We do not consider there is sufficient evidence to justify moving to a different benchmark term.
8	The longevity or sustainability of new arrangements.	We consider that our benchmark term should only be adjusted if there is a persistent change expected from the current benchmark term of 10 years.

9.2.2 Use of industry data

We developed the Energy Infrastructure Credit Spread Index (EICSI) in 2018 with assistance from Chairmont using actual debt issuance data obtained from regulated NSPs. It reports a rolling 12-month historical average of credit spreads across all new debt instruments issued by privately owned NSPs.[480]

The EICSI provides an indication of the cost of NSP-issued debt to compare with our estimate of the cost of debt. The primary EICSI metric is the spread over the swap rate (credit spread), which is similar to the debt risk premium. This allows us to monitor the performance of our benchmark return on debt against NSPs' actual cost of debt. In the 2018 Instrument, we did not use the EICSI in a determinative way to set or adjust the benchmark cost of debt. Instead, it was used as a ‘sense check’ against our approach to setting the benchmark cost of debt. That is, we used the results of the analysis as a review of the overall reasonableness of our benchmark allowance.[481]

We consider that our benchmark allowance should be adjusted if there is expected to be future material and persistent outperformance (or underperformance) – expected actual cost of debt below (above) our benchmark allowance. If this outperformance (or underperformance) is expected, we consider it unlikely that our benchmark return on debt allowance will reflect that of an efficient benchmark. This analysis is discussed in section 9.2.2.2.

Our decision is to maintain our current approach of using the EICSI as a ‘sense check’ on our benchmark return on debt. We considered further options in our working papers of using the results of EICSI in a more formulaic way. For example, making adjustments to the benchmark credit rating or term to reflect the EICSI or remove expected outperformance (or underperformance). For this draft decision we are not proposing to adjust our approach to estimating the return on debt on the basis of the EICSI.

The EICSI has remained below our benchmark for almost the entire period observed. Consistent with our approach to using the EICSI as a review on the reasonableness of our benchmark allowance, we have conducted analysis of this discrepancy. However, we do not consider that the current data suggests the observed outperformance is material and persistent at this time. We acknowledge that term appears to be a key driver of the observed outperformance, but we consider that any change to term should reflect our assessment of the benchmark term of debt and we do not consider there is sufficient evidence that 10 years is no longer an appropriate benchmark (section 9.2.1). We also consider there to be significant practical limitations on implementing an adjustment to term to reflect the results of the EICSI. Our observations are consistent with experts’ views in the concurrent evidence

[480] AER, *Discussion paper, Estimating the allowed return on debt*, May 2018, pp. 27–35.

[481] AER, *Draft rate of return guidelines, Explanatory statement*, July 2018, p. 452.

sessions and submissions from stakeholders who agreed that observed outperformance is unlikely to be statistically or economically significant to warrant any adjustment.[482]

9.2.2.1 Background

The EICSI is a simple index constructed from actual debt issuance information collected from privately owned (i.e., non-government owned) NSPs we regulate. In 2018 we obtained data on actual debt costs from most of these service providers for the period 2013–14 to 2016–17.[483] We engaged Chairmont to assist us with the collection and analysis of this debt data and the development of the EICSI. The purpose of collecting actual debt information (and developing the EICSI) was to provide a 'sense check' of reasonableness of the outcomes under our benchmark approach.

Since its development, we have updated the index to include new data as it has become available and enhanced the functionality of the existing model. We have also clarified and refined the criteria we employ for deciding which debt instruments to include in the index.

How the EICSI is constructed

Not all debt issued by NSPs is included in the EICSI. When creating the EICSI in 2018, Chairmont decided which instruments would be included. We refined the criteria to guide our decisions as to which debt instruments should be included.

The criteria promote transparency and replicability, but we recognise that applying the criteria may also require some judgement.[484] In our 2020 paper on *Energy Network Debt Data*, we set out criteria by which we would include and exclude debt instruments from the Index.

For inclusion, there is a single overarching criterion:

- We will include any instrument that has the purpose of financing the RAB, has the characteristics of debt and does not meet one of the exclusion criteria. Types of instruments that are included are simple bond issuances, bank loans, USPP (US private placement) or MTN (medium-term note).

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[482] AER, *Concurrent evidence session 1 - Proofed transcript*, February 2022, pp. 15, 21–23; AGIG SAPN VPN, *2022 Rate of Return Instrument review - Omnibus papers final - Submission*, 11 March 2022, p. 6; APA, Ausgrid, ENA, *Rate of Return Instrument review AER Final Omnibus Paper and information paper Submission*, 11 March 2022, p. 120; Endeavour Energy, *Rate of Return information paper - Submission*, 11 March 2022, p. 5, NSG, *AER Rate of Return information paper and Omnibus final working paper - Submission*, 11 March 2022, p. 13; TransGrid, *AER Rate of Return final Omnibus paper - Submission,* 11 March 2022, pp. 8-9, APGA, *Rate of Return Instrument information paper - Submission*, March 2022, p. 24; AusNet, *Rate of Return 2022 information paper - Submission*, 11 March 2022, p. 2.

[483] We asked for details of all outstanding debt and financial instruments held as of 1 January 2013, and then details of all debt and financial instruments issued between January 2013 and December 2017 (though some NSPs provided data through to February 2018). AER, Discussion paper, Estimating the allowed return on debt, May 2018, p. 27.

[484] By replicability in this context, we mean the ability of other parties to replicate our work, that is, to reproduce the EICSI given the same raw data.

We will exclude instruments that do not have simple debt characteristics or are issued for other purposes. These include:

- commercial papers, non-convertible subordinated notes, hybrids and short-term capex facilities
- bridges, working capital and overdrafts
- anything with a term under 12 months.

We have previously published a public version of the EICSI model with indicative data illustrating the construction of the EICSI.[485] We met with the CEG who were independently commissioned by the ENA to analyse the industry data provided to them separately to discuss aspects of the construction of the EICSI. As noted in ENA's submission CEG was largely able to reproduce the results of the EICSI in its analysis of NSP data.[486]

We received mixed responses to our Information paper on our treatment of hybrid securities in the EICSI.[487] ENA and AusNet's submissions supported the inclusion of hybrid securities in EICSI, while APA and CRG disagreed with including hybrid instruments because they do not reflect the practices of most NSPs.[488]

ENA also submitted that hybrid securities should be included in EICSI and consistently included across all other parameters as debt, such as in gearing. ENA and AusNet both noted this approach supports Dr Lally’s advice to the AER. As noted by AusNet in its submission, our final working paper misquoted Lally on his suggested treatment of hybrid securities. Lally's advice was that if the EICSI were used to directly set the allowed DRP for the regulated businesses subordinated debt should be included.[489]

Our decision for this Instrument does not use the EICSI to directly set the return on debt allowance. As such, we will continue our approach to excluding hybrid securities from the EICSI. We do not consider that hybrid instruments meet our current inclusion criteria of having simple debt characteristics. We compare the EICSI to a benchmark comprised of third-party data series that generally exclude subordinated and secured debt, and other bonds with less standard features.[490] While we note below a number of differences between

485 AER, *Aggregation of return on debt data - EICSI model - Public version with indicative data*, 22 May 2018. Available here: https://www.aer.gov.au/node/57843.

486 ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper - Submission*, 11 March 2022, pp. 114–121.

487 In this discussion 'hybrid securities' includes subordinated debt, as these have been referred to as hybrids in previous discussions.

488 ENA, *Rate of Return Instrument review AER Final Omnibus Paper and information paper Submission*, 11 March 2022, pp. 32-33; AusNet, *Rate of Return 2022 information paper Submission*, 11 March 2022, p. 3; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper Submission*, 11 March 2022, p. 73; CRG, *Rate of Return Instrument information paper Submission*, 11 March 2022, p. 93.

489 Dr Martin Lally, *The Appropriate Term for the Allowed Cost of Capital*, 9 April 2021, pp. 51–52.

490 RBA series also includes secured bonds. See: ACCC, *Thomson Reuters credit curve methodology - Note for the AER*, April 2017, pp. 6–7, 17.

the EICSI and other series, we should ideally exclude instruments that the current benchmark does not include. Furthermore, the appropriate tenor to apply as weighting to AusNet's particular hybrid securities is not clear and has a material impact on the EICSI.[491] This is also consistent with our decision on the treatment of hybrids when estimating the benchmark gearing ratio (section 4).

How the data is collected

We collect data on an annual basis from NSPs.[492] This data is used to update the EICSI and inform our analysis. The updated EICSI and analysis is published each year in the *Rate of Return annual updates*.[493] Originally, this data was provided to us on an informal and voluntary basis.

In 2021 we moved from a voluntary data request to a compulsory information gathering process and issued regulatory information notices (RINs) to the service providers. As well as being compulsory, a RIN requires assurances, by way of Statutory Declaration, from the service providers that the data provided is actual or the best estimate when it is not possible to provide actual information. These assurances provide greater certainty that the data included in the EICSI is accurate, which we considered necessary for the ongoing use of the EICSI.

How we compute the EICSI

The EICSI is based on a 12-month rolling average of – in broad terms – the 'current' debt risk premium. The EICSI was originally deliberately constructed without model adjustments, as described by Chairmont:[494]

> It does not weight or adjust the raw data from the companies. The purpose is to produce a ‘pure’ unadjusted index which reflects actual debt raising costs[495] without modelling adjustments to target a theoretical benchmark.

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491 AusNet's subordinated hybrid debt instruments have a 60-year maturity date, but are redeemable at par after around 6 years. See: AusNet Services, *ASX announcement - AusNet Services successfully prices EUR700M subordinated hybrid issue*, March 2021.

492 The 2019 submission included all debt issuances between 1 July 2018 and 30 June 2019, the 2020 submission included all debt issuances between 1 July 2019 and 30 June 2020. In 2021 the AER moved from a voluntary data request to a compulsory information gathering process and issued regulatory information notices (RINs) to the NSPs. For the 2021 submission, the NSPs were asked to submit all debt issued between 1 July 2020 and 30 June 2021 as well as resubmit all instruments issued back to 1 July 2013.

493 AER, *Rate of return Annual Update*, December 2020, pp. 20–22.

494 Chairmont, *Aggregation of Return on Debt Data*, April 2018, p. 3.

495 In this quote, Chairmont uses the term 'debt raising costs' to refer to the ongoing costs of issued debt (effectively interest payments every year). The AER reserves the term 'debt raising costs' for one-off transactional costs incurred when debt is first raised, and uses the terms 'cost of debt' and 'return on debt' for the ongoing interest costs. The AER provides a separate debt raising costs allowance (as part of operating expenditure).

When Chairmont created the EICSI in 2018, it was recognised that the index was a basis that should be built on for future analysis. This includes updating the EICSI analysis to include data beyond 2018 and enhance the functionality of the existing debt aggregation model. As part of our updates, and further analysis in the *Energy network debt data working paper* in 2020, we identified several improvements that could be made to the original index to better reflect the costs faced by NSPs. The main change was the weighting of debt costs by tenor, which accounts for the difference in issuing long-term debt compared with short-term debt. That means the credit spread of longer-term debt in the rolling data window (12 months) is given more weight than the credit spread of shorter-term debt.[496] In its submission to the Information paper, ENA recommended also presenting the EICSI weighted by the face value of debt instruments included. This was also raised by Dr Tom Hird in our expert concurrent evidence sessions.[497] We maintain that the tenor-weighted EICSI is appropriate for comparison against our benchmark approach. Weighting by face value gives significant weight to the debt costs of a few service providers with large asset bases. We do not consider that reflecting this weighting is fit for the purpose of using the EICSI as a check against the benchmark cost of debt. However, in Figure 9.3 we also present the EICSI weighted by value and tenor for comparison.

Fees that are directly attributable to eligible instruments are also included. In this way, the EICSI reflects the actual expenditure related to the instruments. This is particularly significant for short-term debt, such as bank debt, which has high commitment fees. Therefore, we have included ongoing annual commitment fees for bank debt. NSPs were asked not to include any fees that would be compensated in the debt raising cost allowance or the OPEX allowance more generally. In our final working paper we asked for submissions from stakeholders on which fees, if any, should be included in the EICSI, but we did not receive any submissions on this issue.[498]

How the EICSI is different to other series

When referring to the market for debt, there are commonly 2 distinct subcategories that underlie the market. The ‘primary market’, where securities are initially created and issued, and the ‘secondary market’, where these securities are subsequently traded by investors.

The EICSI is constructed from debt issued directly by the business on the primary market. The price and yield of this debt are determined by market conditions and the characteristics of the issuer and bond at the time of issue. The issuer is required to pay back this debt at the agreed rate and terms.

The third-party yield curves that we use in estimating our return on debt – RBA, Bloomberg and Thomson Reuters – are constructed using data from the secondary market. These transactions occur without the issuers’ involvement and do not impact the cost incurred by the issuer of the underlying security.

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[496] AER, *Rate of Return - Draft Debt Omnibus Paper*, July 2021, p. 13.

[497] AER, *Concurrent evidence session 1 - Proofed transcript*, February 2022, p. 12.

[498] AER, *Overall rate of return, equity and debt omnibus – Final working paper*, November 2021, p. 74.

The third-party curves include debt in a broad range of industries beyond regulated gas and electricity NSPs. The EICSI only relates to debt issued by a specific subset of these – privately owned service providers of regulated gas and electricity NSPs.

The EICSI is also weighted by tenor to give more weight to the credit spread of longer-term debt than shorter-term debt in the 12-month window. The RBA yield curve is weighted by the value of debt instruments included, while the Bloomberg and Thomson Reuters series are at least partly value-weighted through excluding low value bonds.[499] The number of firms and instruments included in EICSI is significantly fewer than in the third-party yield curve, which results in significant weight being attributed to the debt costs of a few service providers with large asset bases. As such, we maintain that a tenor-weighted index is appropriate for our use of EICSI.

The criteria for instruments to be included in the various series also vary. We have set out the broad principles for inclusion/exclusion in the EICSI above. The third-party providers have their own criteria for inclusion in their series and this will differ from the EICSI (and from each other). In future development of the EICSI we may look to align the criteria of the EICSI more closely with the third-party series to the extent they both represent our benchmark.

9.2.2.2 Analysis of data

The return on debt provided in the 2018 Instrument is calculated using credit spreads from 3 third-party service providers using the A/BBB weighted average. The allowed return on debt has cycled over time.[500] As shown in Figure 9.3, prior to January 2018 we had seen peaks around 225 basis points and lows around 150 basis points, with the data taking around 18 months to 2 years to move between highs and lows. With the data updated to mid-2021, the credit spread appeared to level off around 160–170 basis points between 2018 and 2021. Since January 2021 we have seen a sharp decline, with the current credit spread around 130 basis points.

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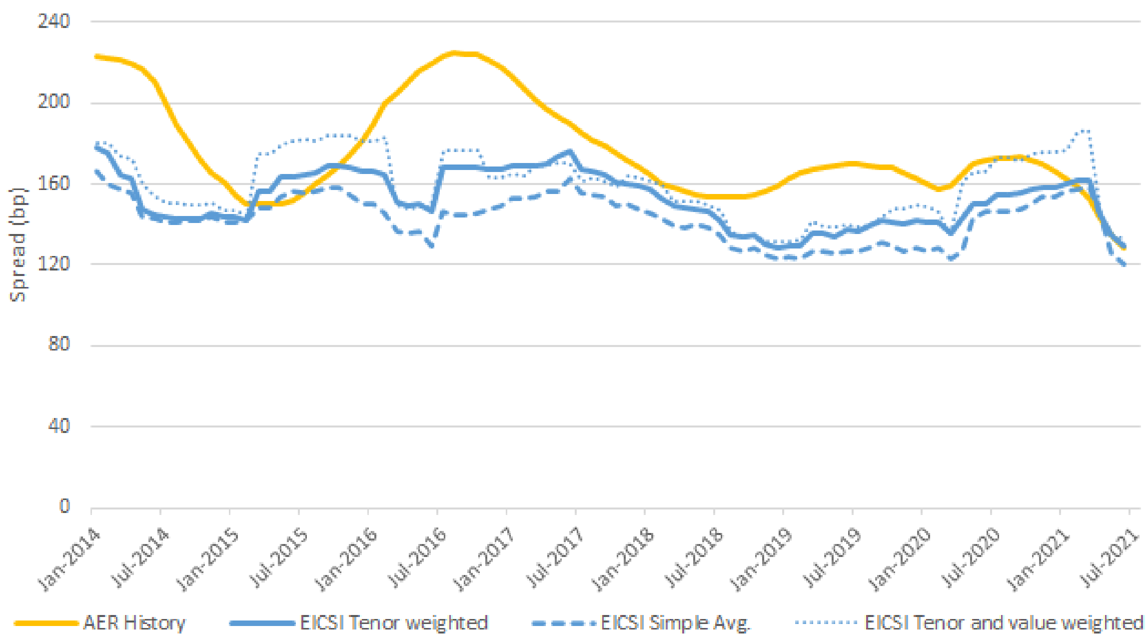
[499] Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, April 2021, p. 51; ACCC, *Thomson Reuters credit curve methodology - Note for the AER*, April 2017, pp. 6–7.

[500] Our approach uses an average weighted 2/3 to BBB and 1/3 to A to estimate a credit rating of BBB+.

Figure 9.3 Comparison of EICSI 12-month rolling average (unweighted, tenor weighted and tenor and face value weighted) against AER A/BBB (10-year term) estimate (January 2014 to June 2021)



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

The EICSI has remained below our cost of debt for almost the entire period observed, suggesting possible outperformance. There have only been 11 months in the last 91 where the EICSI has been above our benchmark cost of debt – all within 14 basis points (based on our current debt methodology approach set in the 2018 rate of return Instrument). On average, the gap between the EICSI and our approach has been about 18 basis points. The gap has been as high as 74 basis points (June 2016) but has closed markedly since March 2021.

As part of our recent working papers, we received a consultant report from Dr Martin Lally, which included comments on our construction and use of the EICSI. This report noted that, in considering any adjustment to our return on debt approach, we should look to decompose the observed EICSI outperformance into 3 factors.[501] These factors were:

- rating
- term
- residual.

[501] Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, April 2021, p.48.

The following sections discuss our analysis of the drivers of the observed outperformance.[502]

Impact of credit rating

We analysed the credit ratings given to issued debt and whether the mix of credit ratings changes over time. To do this we assigned a numerical rating to each instrument included – shown in Table 9.2 – with 'BBB−' rated instruments assigned 1 and 'A' instruments assigned 5. Each higher integer represents a step up in the rating system. This allowed us to perform a high-level check whether the outperformance appears to be impacted by the changes in credit ratings of the debt instruments in the EICSI.

Table 9.2 Numerical rating proxies applied to instruments

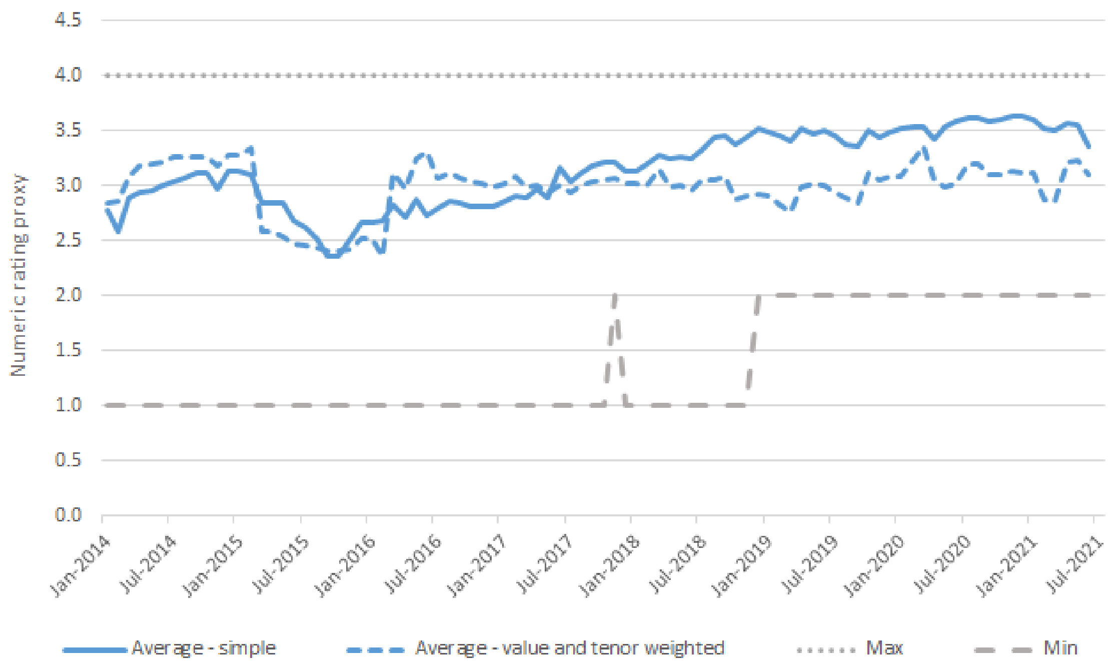
Rating (S&P/Fitch)	Rating (Moody's)	Numerical proxy
A	A2	5
A-	A3	4
BBB+	Baa1	3
BBB	Baa2	2
BBB-	Baa3	1

Notes: Where an instrument has multiple ratings we have used the S&P/Fitch rating. Where it has an alternative rating we have matched to the equivalent S&P/Fitch rating.

As shown in Figure 9.4 the average credit rating of instruments issued has slowly increased since around 2016. Under our numerical rating, the range of BBB+ would be between 2.5 and 3.5. The current average rating is between 3 and 3.5, and it has been relatively stable around the BBB+ range since around 2018.

502 We note that the decomposition that we undertook was broader in nature than that described by Dr Lally in his report.

Figure 9.4 Average and face value weighted credit rating (proxy) of instruments in EICSI (January 2014 to June 2021)

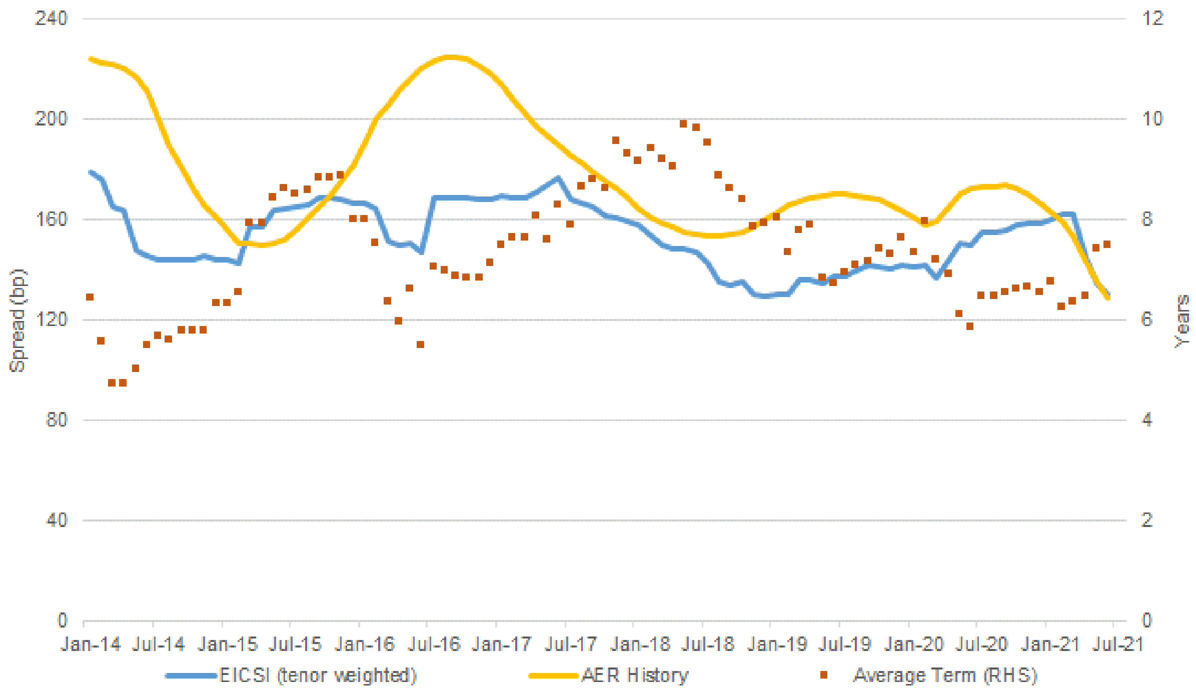


Our analysis also showed no clear relationship between the average credit rating of the EICSI and outperformance against the benchmark estimate. However, it should also be noted that, while rating proxies have been used to allow for this quantitative analysis, credit rating bands are ordinal (non-metric). Although they are ordered categories, the distances between each category are not known. The proxies assume distances are equal between each band, which may not be true in practice.

Impact of term

The average term at issuance of instruments in the EICSI has continued to vary over time as shown in Figure 9.5. It also appears to have a negative relationship with the observed outperformance – when average term is relatively high, there is minimal difference between EICSI and our benchmark, and vice versa. Average term also tends to vary considerably over time. In April 2018 average term at issuance was around 10 years before declining to around 6 in May 2020, with the latest estimate (June 2021) around 7.5 years.

Figure 9.5 EICSI 12-month rolling average, AER A/BBB (10-year term) benchmark estimate, and average term at issuance in EICSI (January 2014 to June 2021)



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

To analyse the impact that the term of debt is having on outperformance we can compare the EICSI against a matched-term AER cost of debt.[503] The average outperformance when compared against this matched-term cost of debt is reduced from 18 basis points to 4 basis points. This analysis suggests that the term of debt issuances included in the EICSI is a key driver of the observed outperformance.

We do not consider that it necessarily flows that term being a key driver of the observed outperformance automatically implies that the benchmark term should be changed, or that this outperformance should be adjusted. We discuss our assessment of the benchmark term of debt further in section 9.2.1

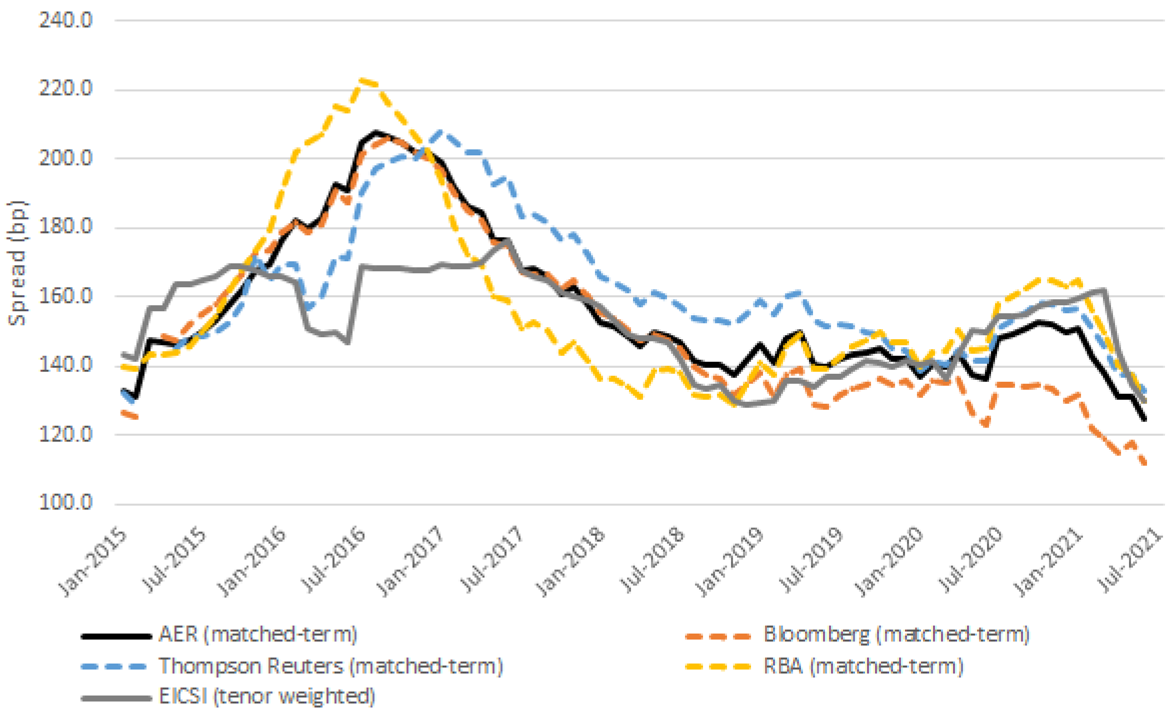
Other impacts

We have also performed further analysis to investigate what else might be driving the residual outperformance of our benchmark. We examined whether any of the individual third-party data series used for our estimate (Bloomberg, Thomson Reuters and RBA) appear to better reflect the debt costs of the NSPs. As shown in Figure 9.6, while the individual series (weighted 2/3 to BBB and 1/3 to A) vary over time, none appear to be particularly more

[503] This involves interpolating values for the AER benchmark estimates from the published debt curves for each 0.1 year increments between 5 and 10 years, and matching this to the average term in EICSI for each month.

reflective of the EICSI over the longer term than the average used in our benchmark approach.

Figure 9.6 Comparison of individual matched-term series (RBA, Thomson Reuters and Bloomberg), A/BBB 12-month rolling average against EICSI (January 2015 to June 2021)



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

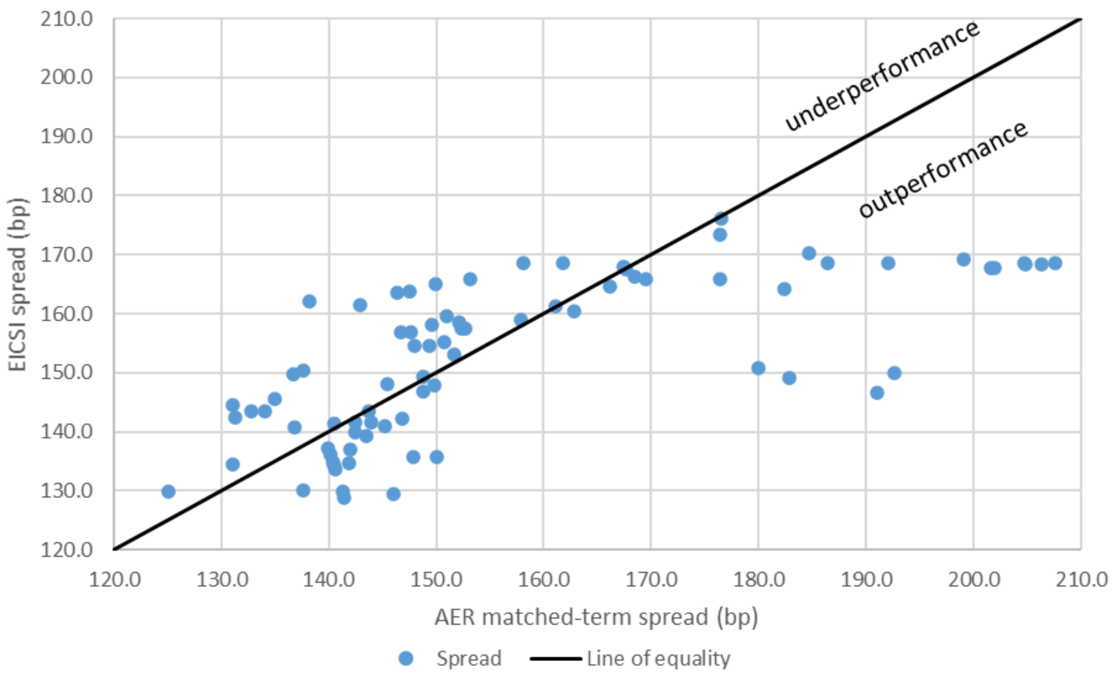
Table 9.3 compares the range of the EICSI and our benchmark spread since January 2014. It shows that, while minimums observed are very similar, the EICSI has a much lower maximum and smaller range compared with our current approach.

Table 9.3 Range comparison of EICSI and AER benchmark credit spreads (January 2014 to June 2021), basis points

Statistic	EICSI	AER
Min	129	127
Max	178	223
Range	49	97

The peaks of the benchmark credit spread tend to be the periods of highest outperformance. This is the case after adjusting for the difference in term. Figure 9.7 plots the monthly EICSI credit spread against the relevant AER matched-term credit spread. Where the point lies to the right of the line there is residual outperformance (the EICSI is lower than the AER matched-term estimate). It shows minimal outperformance or underperformance when the AER benchmark (matched-term) credit spread is under 170 basis points but increases substantially as the benchmark credit spread increases above 170 basis points. When the benchmark (matched-term) credit spread is above 170 basis points the EICSI shows consistent outperformance.

Figure 9.7 AER A/BBB 10-year rolling 12-month and matched-term outperformance (January 2015 to June 2021)



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

This suggests that the debt raised by privately owned regulated service providers on the primary debt market may be somewhat insulated from the high-risk premiums that may be evident in the secondary market, which covers a broader range of borrowers. As such, there may be some residual outperformance in times of high credit spreads (or risk premiums) in the secondary debt market, allowing the regulated NSPs to raise debt at a lower cost than our benchmark suggests. If this is the case and debt costs rise in the secondary market, there may be some expected residual outperformance against our benchmark.

However, the number of observations where the AER matched-term credit spread is above 170 basis points is relatively few – only 18 monthly observations from the 80 observations presented in Figure 9.7. We note that the average residual outperformance of the EICSI against a matched-term benchmark since the start of 2015 is around 4 basis points, while when we perform the same analysis for the period post-April 2018, residual outperformance decreases from 4 basis points to 0.2 basis points.[504]

ENA noted in its submission to the Information paper that it considered residual outperformance of 4 basis points over the period was clearly within the bounds of estimation error. It also submitted CEG's analysis of the NSPs' data that indicated underperformance of 1 basis points on average (EICSI is higher than the AER benchmark), with greater underperformance in recent years. It also noted persistent average underperformance when

[504] Residual outperformance refers to outperformance against the matched-term benchmark cost of debt.

EICSI is tenor and value weighted.[505] As such, ENA submits that the residual outperformance and underperformance identified is not materially significant. Experts in concurrent evidence sessions also agreed that this residual outperformance is unlikely to be statistically or economically significant.[506] Mr Kumareswaran likewise stated during the concurrent evidence sessions that if we are to consider materiality of outperformance, we should also take into consideration the underperformance evident on the left of the line in Figure 9.6, which may be material as well.[507]

9.2.2.3 Reasons for decision

In the 2018 Instrument, we used EICSI as a 'sense check' on our benchmark cost of debt approach. In our final working paper, we considered 3 broad alternative options for using the EICSI in a more formulaic way to adjust our benchmark to better align the return on debt allowance with the expected actual debt costs of the NSPs.[508] These options were:

- remove the residual outperformance and adjust the benchmark blend of credit curves
- remove the residual outperformance and adjust the benchmark term
- remove the residual outperformance.

We noted in our final working paper that adjusting the blend of credit curves was not a preferred option for the 2022 Instrument.[509] The result of our decomposition indicates that credit rating is not a key driver of the observed outperformance. The main driver of the observed outperformance is related to the term of debt, with some potential residual outperformance in times of high average risk premiums in the secondary market yield curves. Changes to the blend of credit rating curves will generally not be NPV neutral and doing so may also create issues with the ability of the firms to match the benchmark debt raising strategy. As such, we do not consider it appropriate to adjust the blend of credit rating curves for a difference that is not directly related to credit rating.

While term of debt issuances included in the EICSI are a key driver of observed outperformance, we do not consider that this necessarily implies that this outperformance should be adjusted or that the benchmark term should be changed. We consider that the benchmark term of the return on debt should match that of an efficient firm's borrowing, consistent with the principles of incentive regulation. As discussed in section 9.2.1, our decision is to maintain the benchmark term of the return on debt at 10 years. We do not consider there to be material benefit for NSPs or consumers of applying a shorter term. Furthermore, it is unclear whether issuing shorter-term debt is a temporary practice by some firms given their circumstance or reflects efficient borrowing practice that will continue in the

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[505] ENA, *Rate of Return Instrument review AER Final Omnibus Paper and information paper Submission*, 11 March 2022, p. 115.

[506] AER, *Concurrent evidence session 1 - Proofed transcript*, February 2022, pp. 15, 21–23.

[507] AER, *Concurrent evidence session 1 - Proofed transcript*, February 2022, pp. 22-23.

[508] AER, *Overall rate of return, equity and debt omnibus - Final working paper*, November 2021, p. 83.

[509] AER, *Overall rate of return, equity and debt omnibus - Final working paper,* November 2021, pp. 85-86.

future. Our analysis of WATMI indicates that the current range for the average term of the return on debt (as of June 2021) is between 8 and 11 years. We do not consider this to be materially different to the current benchmark term of 10 years, particularly given the implementation issues to change to a shorter term while on a trailing average approach.

After adjusting for the impact of term, our analysis suggests there remains some small residual outperformance, particularly when credit spreads in the secondary debt market are high. However, we do not consider there is sufficient evidence to suggest this residual outperformance is material and persistent at this time. The residual outperformance is largely the result of a single period in 2016 when the third-party curves showed high debt costs in the secondary debt market. It is not clear from the current evidence that this experience in 2016 was the result of unusual market conditions or can be expected in future periods of high debt costs. This is consistent with experts' views in the concurrent evidence sessions and submissions from stakeholders who agreed that observed outperformance is unlikely to be statistically or economically significant to warrant any adjustment.[510]

The CRG and ENA both disagree with implementing a cap on the benchmark cost of debt. The CRG notes that such a cap may create unanticipated consequences, while ENA submits that a cap will embed bias in the regulatory allowance and the AER should rule out ever applying a cap.[511] We do not consider it appropriate to rule out the application of a cap should further evidence suggest that the debt costs of service providers of regulated gas and electricity NSPs are materially different to the debt cost evident from the third-party yield curves. As such, our decision is to not adjust the benchmark cost of debt based on our analysis of the EICSI for the 2022 Instrument. Further, Dr Lally noted during the concurrent evidence sessions that – assuming EICSI has a small dataset – it should not be relied on to adjust the benchmark cost of debt strategy; rather, we should use the EICSI to provide some indication on issues that may arise.[512] We agree that the data underlying the EICSI is not yet sufficiently large to appropriately adjust the benchmark cost of debt, but we will continue to collect industry debt data to improve the robustness of the data and monitor EICSI. We maintain that the current data is sufficiently robust to be useful as a ‘sense check’ against our approach to setting the benchmark cost of debt approach and will use the results to review the overall reasonableness of our benchmark allowance at the next rate of return Instrument.

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[510] AER, *Concurrent evidence session 1 - Proofed transcript*, February 2022, pp. 15, 21–23; AGIG SAPN VPN, *2022 Rate of Return Instrument review - Omnibus papers final - Submission*, 11 March 2022, p. 6; APA, Ausgrid, ENA, *Rate of Return Instrument review AER Final Omnibus Paper and information paper Submission*, 11 March 2022, p. 120; Endeavour Energy, *Rate of Return information paper - Submission*, 11 March 2022, p. 5, NSG, *AER Rate of Return information paper and Omnibus final working paper - Submission*, 11 March 2022, p. 13; TransGrid, *AER Rate of Return final Omnibus paper - Submission,* 11 March 2022, pp. 8-9, APGA, *Rate of Return Instrument information paper - Submission*, March 2022, p. 24; AusNet, *Rate of Return 2022 information paper - Submission*, 11 March 2022, p. 2.

[511] ENA, *Rate of Return Instrument review AER Final Omnibus Paper and information paper Submission*, 11 March 2022, p. 121.

[512] AER, *Concurrent Evidence Session 1 - Proofed transcript*, February 2022, p. 15

Table 9.4 provides our assessment of our draft decision against our draft decision use of industry debt data.

9.2.2.4 Assessment criteria

As discussed above, our consideration of issues show that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. In this regard, where necessary we have applied our assessment criteria to assist us exercise our judgement. Table 9.4 below sets out our assessment criteria and key areas where they have assisted us make our decision.

Table 9.4 Assessment criteria of draft decision use of industry data

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles, and informed by sound empirical analysis and robust data.	Using the results of the EICSI analysis as a review of the overall reasonableness of our benchmark allowance is reflective of economic and finance principles and informed by sound empirical analysis and robust data.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose (b) promote simple over complex approaches where appropriate.	The use of industry debt issuance data is consistent with the purpose of examining the relevance of the third-party credit curves for informing the benchmark.
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Construction of EICSI has inherent transparency and replicability issues due to confidentiality. Worked with CEG using similar dataset to clarify construction in final working paper.
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale.	We consider that current data underlying the EICSI is sufficiently robust for use as sense check on benchmark approach. Not yet sufficiently large to appropriately adjust the benchmark cost of debt.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	This criterion is hard to satisfy due to the confidential nature of the underlying data – as such, it is not material to our consideration.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	We will continue to collect industry debt data annually and monitor EICSI and use the results to review the overall reasonableness of our benchmark allowance at the next rate of return Instrument.
7	The materiality of any proposed change.	We do not consider there is sufficient evidence to suggest any residual outperformance is material and persistent to justify formulaic adjustment to the benchmark.

8	The longevity or sustainability of new arrangements.	We consider that our benchmark allowance should only be adjusted if there is expected to be future material and persistent outperformance (or underperformance).

9.2.3 Benchmark credit rating

Our draft decision is to maintain a benchmark credit rating of BBB+. We consider this is consistent with the available empirical evidence. Table 9.5 shows the historical credit ratings for service providers from 2013 to 2022.

Table 9.5 Credit ratings

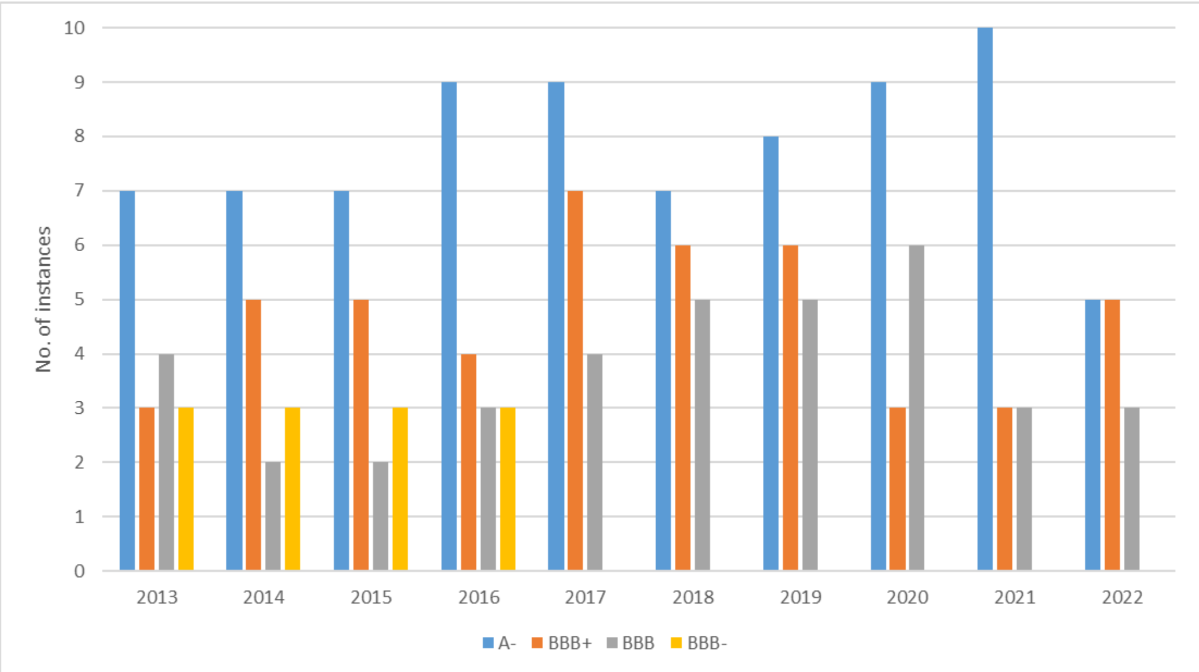
Issuer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
APT Pipelines Ltd	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
ATCO Gas Australia LP	A-	A-	A-	A-	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+
DBNGP Trust	BBB-	BBB-	BBB-	BBB-	BBB	BBB	BBB	BBB	NR	NR
DBNGP Finance Co P/L	BBB-	BBB-	BBB-	BBB-	BBB	BBB	BBB	BBB	A-	NR
DUET Group	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
ElectraNet P/L	BBB	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB	NR	NR
Energy Partnership (Gas) P/L	BBB-	BBB-	BBB-	BBB-	BBB+	BBB+	BBB+	BBB+	A-	NR
Australian Gas Networks Ltd	BBB	BBB+	BBB+	BBB+	BBB+	BBB+	A-	A-	A-	A-
ETSA Utilities	A-	A-	A-	A-	A-	NR	A-	NR	NR	NR
ETSA Utilities Finance P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Powercor Australia LLC	BBB+	BBB+	NR	NR	NR	NR	NR	NR	NR	NR
AusNet Services (Distribution) Pty Ltd	A-	A-	A-	A-	A-	NR	NR	NR	NR	NR
AusNet Services Ltd	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+
AusNet Service Holdings P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+
AusNet Transmission Group P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+
SGSP (Australia) Assets Pty Ltd	BBB+	BBB+	BBB+	A-	A-	A-	A-	A-	A-	A-
The CitiPower Trust	BBB+	BBB+	NR	NR	NR	NR	NR	NR	NR	NR
United Energy Distribution P/L	BBB	BBB	BBB	BBB	A-	A-	A-	A-	A-	A-
Victoria Power Networks Pt/L	NR	NR	BBB+	BBB+	BBB+	BBB+	BBB+	A-	BBB+	NR
Victoria Power Networks (Finance) P/L	NR	NR	BBB+	A-	A-	A-	BBB+	A-	A-	A-

Issuer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NSW Electricity Networks Finance P/ L	NR	NR	NR	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Ausgrid Finance P/ L	NR	NR	NR	BBB+	BBB+	BBB	BBB	BBB	BBB	BBB
Network Finance Company P/L	NR	NR	NR	NR	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+
Industry median (yearly)	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**BBB+**	**A-**	**BBB+**

Source: Bloomberg, Thomson Reuters (S&P Global, Moodys), AER Analysis
Notes:
1. The 2022 data is as at 28 February 2022, while all other years are at 31 December.
2. ATCO Gas Australia, DBNGP Trust and DBNGP Finance are not under AER regulation.
3. For some of the service providers there is now more than one related entity listed in the table above, which may affect the calculation of the median. However after considering this factor, we still consider BBB+ to be the appropriate benchmark.

All debt issuers within the sample have maintained investment grade credit ratings (between BBB- and A-). Table 9.5 shows that NSPs have maintained a median credit rating of BBB+ over the past 10 years. The only exception is 2021 when the median credit rating improved to A-. While this could indicate that NSPs' credit rating are improving, the 5-year and 10-year median remain BBB+. Further, the 2022 median has dropped back to BBB+. Figure 9.8 displays the instances of each credit rating per year.

Figure 9.8 Instances of each credit rating per year (2013-2022)



We also analysed the credit ratings given to issued debt and whether the mix of credit ratings changes over time in our Energy Infrastructure Credit Spread Index (EICSI). Using a numerical scale, the average credit rating of instruments issued remained relatively stable over the past 5 years at BBB+. This is discussed further in Section 9.2.2.2.

In our view this evidence supports adopting a benchmark credit rating of BBB+.

9.2.3.1 Implementation of the benchmark credit rating

Our draft decision is to use a weighting of two-thirds broad-BBB curves and one-third broad-A curves to reflect a BBB+ benchmark credit rating. This maintains the approach in the 2018 Instrument.

A combination of broad-BBB and broad-A curves is required to provide the best fit to a BBB+ benchmark credit rating because:

- reliance on a broad-BBB curve only would overestimate the level of credit risk of a BBB+ benchmark credit rating due to the inclusion of lower rated bonds in the sample (BBB and BBB-).
- reliance on a broad-A curve only would underestimate the level of credit risk for a BBB+ benchmark credit rating as all the constituents (A-,A,A+) are higher rated than the BBB+.

A 2/3 broad-BBB : 1/3 broad-A blend was selected in 2018 after analysis of actual debt raised by service providers in the EICSI showed that it provided the best estimate of the BBB+ benchmark.[513]

Since 2018 we have continued to collect data on the actual debt raised by NSPs and undertaken further analysis. In the final Omnibus paper, we conducted a decomposition of the credit rating blend to understand how much of the observed outperformance of the benchmark return on debt was due to credit rating. This analysis showed that credit rating did not appear to be a particular driver of outperformance, indicating that the current blend was appropriate.[514]

We therefore conclude, that a 2/3 broad-BBB: 1/3 broad-A estimate is a good match for our benchmark credit rating of BBB+. This is supported conceptually and by our analysis of debt issuances over the past 9 years (2013–2021).

9.2.4 Choice of third-party provider

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 Guideline, we relied on yield curve data from 2 data providers, RBA and Bloomberg. In the 2018 Instrument, we added a third data provider, Thomson Reuters. We included Thomson Reuters to expand the number of data providers and therefore reduce the impact of outlier of missing observations on our estimation of the cost of debt. At that time, a fourth provider, S&P Global was also considered but not included.

Figure 9.9 displays debt yield curves for each data provider using the benchmark return on debt methodology outlined in the 2018 Instrument (10-year term and BBB+ credit rating).[515]

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[513] AER, *Rate of return instrument - Explanatory statement*, December 2018, p. 280.

[514] AER, *Overall rate of return, equity and debt omnibus - Final working paper*, December 2021, pp. 85-86.

[515] AER, *Rate of return instrument - Explanatory statement,* December 2018, pp. 7-17.

Figure 9.9 BBB+ debt yield curves for RBA, Bloomberg and Thomson Reuters (April 2015 to February 2022)

Source: RBA, Bloomberg, Thomson Reuters, AER Analysis
Notes: Yields are shown as effective annualised rates and have been calculated according to the 2018 Instrument. Yields have been averaged over a 10-day period.

For our 2022 Instrument our draft decision is to continue to source data from 3 data providers: RBA, Bloomberg and Thomson Reuters. As the use of these three providers has been working well and our EICSI analysis in Section 9.2.2.2 shows no material outperformance, there is limited reason to change the composition of providers.

Specifically, we will rely on:

- RBA estimates from its Aggregate Measures of Australian Corporate Bond Spreads and Yields - F3 data series
- Bloomberg estimates from its BVAL series (BVCSAB Index and BVCSAE Index)
- Thomson Reuters estimates from its blended AUD corporate series (BBBAUDBMK Index and AAUDBMK) Index.

Having regard to the available evidence, we consider none of the RBA, BVAL or Thomson Reuters methodologies to be clearly superior. Our view is that the combined use of the three data providers will contribute to achievement of the NEO and NGO to the greatest degree. Our key reasons for this view are:

- On the bond selection criteria (including approach for identifying outliers) and curve fitting (or averaging) methodologies, we consider that the approaches employed by the RBA, Bloomberg and Thomson Reuters have their unique strengths and weaknesses, but we are not satisfied that any curve is clearly superior.
- All of the curves from all three of the data providers require adjustment from their published form to make them fit for purpose. We are not satisfied that one can be more simply or reliably adjusted to estimate the annual return on debt than another.
- Applying equal weight to each of the three data providers is simple and fit-for-purpose. The process of developing a more sophisticated weighting scheme would rely on

contentious assumptions and we are not persuaded that the increase in complexity would result in an estimator we have greater confidence in. In our view, there is no persuasive evidence that the likely difference in averages from different weighting schemes will be material over time.

- An average of the three data providers reduces the impact of shocks in any one of the individual curves. This will likely reduce volatility of our estimator. Further, the use of three data providers incorporates a natural contingency in the event that one of the data providers ceases publication.
- We have not received any submissions calling for changes of our third-party data providers or supporting the use of any additional data providers.

9.2.4.1 Adjustments to published data

We rely on published third party yield curves in order to implement our return on debt approach. However, in some cases these published third party yield curves require minor adjustments to meet the requirements for our estimation process. Table 9.6, below, sets out the current features of published yield curves that may necessitate some adjustment. Presently, these required adjustments involve extrapolation, interpolation, and conversion to an effective annual rate.

In the 2018 Instrument we adopted a common approach to the extrapolation, interpolation, and conversion for each of the published curves. Our draft decision in 2022 is to maintain this approach.

9.2.4.2 Extrapolation

Where the published curve has a maximum published effective term of less than the target term to maturity, we will extrapolate that term to our benchmark term of 10 years. Specifically:

- If we need to extrapolate a curve with a longest published estimate less than 10 years but greater than or equal to 7 years, we will linearly extrapolate the spread to CGS component of the published yield to 10 years using the two longest published estimates and will add this to a 10 year CGS.
- If a curve provider ceases publishing a curve with a longest term of greater than or equal to 7 years, we will not rely on that curve.

9.2.4.3 Interpolation

We will use linear interpolation, where we need a value for which there is no published estimate but it lies between two published estimates. For example, the RBA only publishes its curve estimates for one day each month, but we require estimates for each business day. As a result, we interpolate the RBA month-end data across all business days in the month.[516]

[516] For the purposes of all return on debt calculations, 'business days' are those days on which the RBA publishes CGS data in its F16 data release—Indicative Mid-Rates of Australian Government securities.

This requires assumptions about the linearity of spread movements over the course of the month.

9.2.4.4 Conversion to an effective annual rate

The effective annual rate is calculated by taking the nominal rate of adjusting it for the number of compounding periods in the year, as follows:

$$\text{Effective annual rate} = \left(1 + \frac{r}{n}\right)^{n} - 1$$

Where:

- *r* is the stated yield
- *n* is the number of compounding periods in a year

Table 9.6 Necessary adjustments to published yield curves

Curve	Criteria
BVAL	Bloomberg typically publishes a daily 10 year BVAL estimate so the only necessary adjustment is conversion to an effective annual rate, which is a straightforward adjustment.
RBA	The RBA only publishes data on one day per month. As a result, we are required to interpolate monthly spreads to Commonwealth Government Securities (CGS) to produce a daily yield series. Also, as a consequence of the RBA's curve-fitting methodology, its published 10 year estimate typically has an 'effective term' of less than 10 years. We extrapolate the RBA curve from its 'published' 10 year term (effective term is closer to 9 years) to an 'actual' 10 year term using linear extrapolation from the published 7 and 10 year estimates. In addition, RBA estimates require conversion to an effective annual rate.
Thomson Reuters	Thomson Reuters typically publishes a daily 10 year estimate so the only necessary adjustment is conversion to an effective annual rate. However, Thomson Reuters does not extrapolate beyond the longest term in its bond sample and the availability of its 10 year estimate may vary.

Source: AER analysis, Bloomberg, RBA, Thomson Reuters

9.2.5 Return on debt averaging periods

To mitigate the day-to-day volatility of market rates, our established approach has been to estimate the return on debt over a specified averaging period. To ensure that the rate of return instrument can be automatically applied, the instrument must set out the required characteristics for return on debt averaging periods and the process for NSPs to nominate periods in determinations and access arrangements.[517]

In our view, the 2018 Instrument approach for determining averaging periods remains mostly appropriate for the purposes of implementing the return on debt approach.

For our 2022 Instrument our draft decision is to modify the start and end dates of the averaging period nomination window to finish no less than 5 months prior (previously 4 months) to the commencement of a regulatory year and start no earlier than 17 months

[517] NEL, s. 18J(2)(b), NGL, s. 30E(2)(b).

period (previously 16 months) to the commencement of a regulatory period. Our key reasons for this decision are:

- We require sufficient time after the end of an averaging period, and prior to the start of a regulatory year, to calculate the updated return on debt and communicate the results to service providers. Service providers then need time to consider these results and incorporate them into their annual pricing for that regulatory year. Retailers then require sufficient time to adjust their pricing.
- Since establishing the averaging period criteria in 2018, we have found that a change to the publication schedule of the RBA (one of the data providers used for the updates) in conjunction with our own internal processes are resulting in short turnaround times for the updates. This increases pressure on service providers, retailers and customers.

As clause 24(e) of the draft Instrument states that averaging periods may not overlap for each different regulatory year, this change will have a one-off impact of reducing the nomination period to 11 months in the first year of the regulatory period for some service providers. If a service provider previously nominated averaging periods ending 4 months prior to the start of the last regulatory year, they will be unable to select a period up to 17 months in the first year of a new regulatory period (they will only be able to select up to 16 months). This is because these periods will overlap. However, after reviewing all previously nominated averaging periods we do not consider this one-off impact to be material.

ENA submitted that service providers have swap portfolios with instruments designed to rollover in periods that they expect to be able to nominate averaging periods within. Placing a new restriction on when an averaging period can be nominated may be disruptive to those businesses, and/or add cost.[518] We acknowledge these potential disruptions but our view is that providing more time for the price adjustment process is important for the orderly operation of the framework. Further, our review of nominated averaging periods does not indicate material disruption.

Some NSPs are affected by a “timing issue” that arises because the date that the AER must publish the rate of return instrument occurs during some reset processes.[519] For service providers affected by the timing issue, they will be required to nominate their averaging periods prior to the commencement of the 2022 Rate of Return Instrument even though the AER will make a final regulatory decision[520] for them after the commencement of the 2022 Rate of Return Instrument. For NSPs in this situation, the permitted averaging periods are unchanged from those permitted under the 2018 Rate of Return Instrument.

The reason we have made this change for these NSPs is because these NSPs were required to nominate average periods consistent with clauses 7, 8, 23 and 24 of the 2018 Rate of Return Instrument before they were aware of the requirements for averaging periods

518 ENA, *Estimating the cost of debt*, September 2021, p. 30.

519 The AER is required to publish the rate of return instrument on the fourth anniversary of publishing the previous rate of return instrument: NEL, s. 18U(2)(a); NGL, s. 30P(s)(a).

520 NER, cll. 6.11.1, 6A.13.1; NGR, r 62.

under the 2022 Rate of Return Instrument. This change ensures that if these service providers lodged compliant averaging periods with their regulatory proposals (under the 2018 Instrument) they will not be penalised irrespective of the clauses in the 2022 Instrument.

Clauses 8 and 24 are amended in this Draft Instrument to deal with this by specifying NSPs that are impacted by the above timing issue have their nominated averaging periods assessed using the same permitted averaging period timing as exists in the 2018 Instrument.

We have taken a slightly different approach to the carve out clauses in the 2018 Instrument[521] where specified NSPs in clause 25 of that Instrument were able to nominate their return on equity and debt averaging periods prior to the start of the risk-free rate and return on debt averaging periods, instead of at or before the lodgement of their regulatory proposals. The reason for this changed approach is we consider it does not penalise service providers if they lodged compliant regulatory proposals.

No changes were made to all other averaging period clauses, which are outlined in Table 9.7.

Table 9.7 Return on debt averaging period criteria - clause 24 of draft rate of return Instrument

Clause no.	2018 Instrument criteria	2022 draft Instrument criteria	Comments
24(a)	Be over a period of 10 or more consecutive business days, up to a maximum of 12 months	No change	N/A
24(b)	Start no earlier than **16 months prior** to the commencement of a regulatory year	Start no earlier than **17 months prior** to the commencement of a regulatory year	Modified to allow service providers to nominate averaging periods up to 12 months with the change to cl. 24(c). There may be a one-off impact in the first year of the regulatory period where service providers can only nominate an 11 month period due to potential overlap with previous averaging periods.
24(c)	Finish no later than **4 months prior** to the commencement of a regulatory year	Finish no later than **5 months prior** to the commencement of a regulatory year	Modified to allow more time for the price adjustment process.
24(d)	Be specified for each regulatory year within the regulatory control period	No change	N/A
24(e)	Not overlap for each different regulatory year, although the averaging period is not required to be identical for each regulatory year	No change	N/A
24(f)	Be nominated both:	No change	N/A

[521] 2018 Rate of Return Instrument clauses 8(d)(ii) and 24(f)(ii) in conjunction with clause 25.

	i. prior to the start of the return on debt averaging period, and ii. no later than the lodgement date of the regulatory proposal for the regulatory control period		

9.2.6 Data provider contingencies

Our draft decision is to adopt an annually updating return on debt approach.

As a result, our decision on how to apply third party data sources must be fully specified upfront in each determination, and must be capable of application over the regulatory control period without the use of subsequent judgement or discretion.

For this reason, we have described a series of contingencies below. These contingencies are set out formally in clause 26 of the draft Instrument. They set out how we propose to estimate the annual return on debt in the event of revisions in the RBA's, Thomson Reuters' or Bloomberg's methodologies or other changes to data availability. Our draft decision is to maintain the contingencies outlined in the 2018 Instrument.

Our overall principles are that the contingencies should:

- Be clear and unambiguous. The rules require the automatic application of a formula to update the trailing average portfolio return on debt. As a result, we will be unable to analyse changes to the approaches or new approaches during the regulatory control or access arrangement period. Therefore, it is important that any contingency be clear and easily implementable.
- Use curves in a form as close as possible to their published form.
- Where necessary, rely on the independent expert judgement of the RBA, Bloomberg and Thomson Reuters. In particular, where Thomson Reuters, the RBA or Bloomberg makes changes to its methodology, we would prefer to evaluate these changes before concluding we are satisfied the curve still meets the criteria set out in the draft Instrument.
- Preserve the use of as many data sources as possible. Where a curve provider shortens its longest published term below 10 years but greater than or equal to 7 years, we will use linear extrapolation to allow for a 10 year estimate for that curve.
- Favour up-to-date data. Where we cannot source data for one or two of the three yield curve providers on a particular day, we will rely only on the remaining curve providers. While this results in a smaller data set, it reflects up-to-date data. Only where all third party yield curve providers cease publication will we rely on historical data.

Table 9.8 Contingencies for implementing the return on debt approach[522]

Clause no.	Contingency approach
Cl 26(a)	If a curve provider on day *i* publishes either a broad A-rated or broad BBB-rated yield estimate with a maximum published term less than 10 years, but greater than or equal to 7 years, then the yield estimate for day *i* must be linearly extrapolated to an exact term of 10 years in accordance with clause 14.
Cl 26(b)	If a curve provider on day *i* does not publish either a broad A-rated and broad BBB-rated yield estimate with term greater than or equal to 7 years but less than or equal to an exact term of 10 years, then the yield for day *i* in clause 10 must be calculated using the remaining available data curves. If all curve providers on day *i* do not publish a broad A-rated or a broad BBB-rated yield estimate (such that there is not a single A-rated or not a single BBB-rated yield estimate) with term greater than or equal to 7 years but less than or equal to an exact term of 10 years, then a simple average of the spread to 10-year CGS will be added to the daily 10-year CGS estimate to provide each curve estimate.
Cl 26(c)	If any curve provider substitutes its current methodology for a revised or updated methodology to replace the current methodology listed in clause 32, clause 33, clause 34, and clause 35, then the revised or updated methodology must be used to calculate yield for day *i* in clause 12, in accordance with clause 31.
Cl 26(d)	If any curve provider revises or updates its historical yield estimates, the revised or updated historical yield estimates must not be used to recalculate the allowed return on debt that has been finalised for any regulatory year in accordance with clause 8.
Cl 26(e)	If the RBA replaces its publication with daily yield estimates, then linear interpolation is no longer required to obtain daily yield estimates, and so the newly published daily yield estimates must be used to calculate the yield for day *i*.
Cl 26(f)	If either Thomson Reuters or Bloomberg replaces their publication with a different frequency (e.g., monthly yield estimates instead of daily yield estimates), then the new yield estimates must be converted into daily yield estimates in accordance with clause 14, clause 15 and clause 16.

9.2.7 Trailing average

Our draft decision is to maintain the 10-year trailing average approach (including transition) with annual updates as adopted in our 2018 Instrument and 2013 Guideline. For clarity, our draft decision is to continue a consistent transition approach across all networks we regulate. That is, we will continue the transition that has commenced in a previous determination for an NSP. This will allow NSPs to complete the 10-year transition period from the previous 'on-the-day' approach to the trailing average approach.

For each year of the 10-year trailing average, we will continue to estimate the return on debt as the simple average of rates observed over a period of time nominated (averaging period) by the NSP. This (simple) trailing average approach:

- applies equal weights to each annual return on debt estimate feeding into the trailing average other than the first year that the transition to the trailing average commenced
- updates the return on debt estimate annually
- uses a benchmark term of debt of 10 years

[522] Exact formulas are set out in the draft Instrument and they take precedent in the event of any perceived or actual inconsistency in Table 9.8.

- implements a 10-year transition into the adoption of the 10-year trailing average approach.[523]

In our final working paper and information paper we explored options to introduce weights to the trailing average approach introduced in the 2013 Guideline (simple trailing average). We did so because we were concerned that the simple trailing average might not operate effectively when regulated businesses finance large capital expenditure by raising more debt in a rising interest rate environment. We were particularly concerned that large capital investments will be required in the transmission sector, and if the current cost of debt is different to the historical trailing average there could be impacts on incentives to invest. For example, if current interest rates are above the historical trailing average, networks could face issues in financing a significant step up in investment.

Having now had the benefit of hearing from experts and stakeholders in submissions, we have decided to maintain our simple trailing average approach. Key reasons in reaching this conclusion are:

- It is not clear whether a benchmark business would find it efficient to increase debt raising significantly beyond 10% in a year. Instead, the benchmark business may issue proportionately more equity than that consistent with the benchmark gearing level, especially at the project's early stages.
- Even when a benchmark business does raise its debt issuance beyond 10% in a year, there are practical difficulties with implementing a weighted trailing average. One difficulty is that introducing a weighted trailing average would introduce additional administrative complexity. Nevertheless, if we thought the weighted trailing average was a superior approach we would engage with its complexity.
- Another practical difficulty is whether to set the weights using forecasts or through a true-up after actual capex is known.
  - The effectiveness of using a forecast depends on the accuracy of the forecast. We have observed that forecast capital expenditure in the Post-tax revenue model (PTRM) differs, both in timing and magnitude, from actual capital expenditure. In particular, we frequently see projects that are delayed by several years. This means weights based on PTRM debt issuance assumptions may not be reflective of the actual debt costs.
  - Using actual capital expenditure to set the weights would result in the need to apply a true-up mechanism. Applying such a mechanism would add complexity and may also result in uncertainty because the true-up could occur under a different Instrument.
- Further, we have compared outcomes under the simple and weighted trailing average across a range of scenarios. Under these scenarios, the difference over the next 5 years in return on debt between the two approaches are only pronounced when both large increases in the RAB and prevailing interest rates occur. This could potentially occur for

[523] AER, *2018 Rate of return Instrument – Explanatory statement*, December 2018, pp. 276, 282.

a limited number of transmission NSPs undertaking large new projects. Transgrid, being one of the NSPs undertaking large new projects, did not submit support for a weighted trailing average.

- Finally, many submissions to our information paper also generally supported retaining the current approach, noting that it had the most merit, and the case for change has not yet been made.[524]

One issue that arose in consultation was whether there would be a preferred approach for an NSP that is entering the regulatory framework for the first time. For a first time determination under the Instrument, applying the current simple trailing average approach would start with on-the-day allowed return on debt before a gradual transition to a full trailing average over 10 years. To the extent a new project is financed by issuing both debt and equity around the time of the first application of the Instrument, the simple trailing average approach would mitigate the potential mismatch between the return on debt allowance and cost of debt.

Given the above, we currently do not consider that the benefits of a weighted trailing average approach are sufficiently clear or necessary to make a change from our current simple trailing average approach. As such, we intend to continue to monitor debt financing practices of the NSPs and revisit the issue in our 2026 Instrument review.

9.2.7.1 Background

Our 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.[525] As discussed in our previous decisions, this approach provides ex-ante efficient compensation on debt capital over the term of the RAB if a full transition is applied.[526]

However, this outcome relies on debt balances of a benchmark business remaining relatively stable over time. If the benchmark business has significantly increasing (or decreasing) debt

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[524] Jemena, *AER information paper – Submission*, 11 March 2022, p. 4; NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p. 13; AEC, *2022 AER Rate of Return Instrument review - Information paper and final Omnibus paper – Submission*, 10 March 2022, p. 2; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 24; AusNet, *Rate of Return 2022 information paper – Submission*, 11 March 2022, p. 3; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p. 13; AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, pp. 6–7; CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 97; Ausgrid, *Rate of Return 2022 information paper – Submission*, 11 March 2022, pp. 3-4.

[525] 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.

[526] AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3 - Rate of return*, November 2017, pp. 326-328.

AER, *Final decision AusNet Services distribution determination 2016 to 2020 Attachment 3 - Rate of return*, May 2016, pp. 307-308.

balances, using a simple trailing average might result in a mismatch between its cost of debt and the allowed return on debt. This mismatch might distort investment decisions and lead to an inefficient outcome.

Our draft debt omnibus paper[527] and final working paper[528] considered whether the annual components of our trailing average return on debt allowance should be modified to reflect potential time variability of debt balances of a benchmark business.

The current simple trailing average mirrors the common practice of raising 10% of the existing debt balances each year. In most cases, the current approach would result in close to achieving the NPV=0 condition. This is due to the relative stability of RABs and PTRM debt balances. In our final working paper, we presented annual changes in PTRM debt balances for the regulated businesses based on recent rounds of AER decisions (or draft decisions).[529] It showed that, setting aside Transgrid and ElectraNet, average annual growth rates over a regulatory period in PTRM debt balances varied between −0.5% and 4.6%. We consider that an average growth rate of under 5% would not result in material deviation from the NPV=0 condition.

Up until recently, observed PTRM debt balances have tended to be relatively stable since we introduced the simple trailing average. However, the integrated system plan (ISP) developed by the Australian Energy Market Operator (AEMO) has raised the prospect of large transmission projects being undertaken over the next 10 to 15 years.[530] These projects could result in the RABs of several transmission NSPs increasing significantly over a short period. As a result, there could be debt raising requirements in some years beyond the 10% level applied in our current simple trailing average approach.

If the capital for a large new project is raised through both debt and equity in the same proportion as our benchmark gearing ratio, then using a simple trailing average for return on debt allowance may lead to a mismatch between the debt costs and the allowance for those businesses. This mismatch would generally lead to a departure from the NPV=0 condition.

While the simple trailing average would remain effective and match debt allowance and debt costs for most NSPs, for those transmission NSPs undertaking large ISP projects, applying weights based on changes in PTRM debt balances may better align with the level of debt needed to support new capital investments. This could reduce any mismatch between the return on debt allowance and benchmark efficient debt financing costs for those transmission NSPs. This might better align with the NPV=0 condition and so may better promote efficient investment.

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[527] AER, *Rate of Return, Draft Debt Omnibus Paper,* July 2021, pp. 18-25

[528] AER, *Rate of return, Overall rate of return, equity and debt omnibus, Final working paper,* December 2021, pp. 87-99

[529] AER, *Rate of return, Overall rate of return, equity and debt omnibus, Final working paper,* December 2021, pp. 92-94.

[530] AEMO, *2020 Integrated System Plan (ISP)*, 30 July 2020, p. 64.

9.2.7.2 Our consideration of the weighted trailing average

Our consideration of benefits of moving to a weighted trailing average for those businesses undertaking large capital expenditure is premised on the assumption that a benchmark business would:

- raise extra debt beyond the 10% level of the existing debt balances
- finance its new capital investment by issuing debt and equity in the proportion consistent with the benchmark gearing ratio.

If the above is the case, then adopting a weighted trailing average could mitigate the mismatch between the debt cost and return on debt allowance and better satisfy the NPV=0 condition than the simple trailing average.

However, it is not clear whether a benchmark business would increase debt raising significantly beyond 10% of its debt balance to raise large amounts of capital for new projects. The CEPA report commissioned by the AEMC found that financing of large new projects, like Project EnergyConnect, at the benchmark efficient entity's capital structure would result in pressure on Transgrid's and ElectraNet's credit rating.[531] Similarly, Transgrid submitted that, in absence of other support mechanisms such as accelerated depreciation allowance, there would need to be more than 40% equity financing in order to retain the benchmark credit rating.[532]

CEPA noted that when a transmission NSP's investment profile departs from business as usual, their capital structure would also change. In such instances, 'pressure on credit ratings can be mitigated by a more prominent role for equity financing and lower gearing'.[533] Under such a scenario, the justification for a weighted trailing average is diminished.

__Practical implementation challenges__

In this section we consider challenges in implementing a weighted trailing average approach. To focus the discussion, we assume that the benchmark entity finances new capital by issuing debt and equity in the proportion consistent with the benchmark gearing.

One practical difficulty is the increased administrative complexity to apply the weighted trailing average. Our current calculation of the simple trailing average return on debt requires third-party data provider cost of debt data only. Under a weighted trailing average, for each benchmark business we would also need its PTRM debt balance data to calculate the weights. Introducing an additional source of data would likely increase the risk for error and place more burden on the AER and the business to undertake the calculation and verification.

To implement a weighted trailing average, there are 2 primary methods for weighting:

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[531] CEPA, *Financeability of ISP projects*, January 2021, p. 6.

[532] Transgrid, *AER Rate of Return final Omnibus paper – Submission*, 11 March 2022, pp. 4-5.

[533] CEPA, *Financeability of ISP projects*, January 2021, p. 39.

- use forecast PTRM debt balances
- use actual debt balances based on the benchmark gearing assumption (that is, the product of the benchmark gearing and actual RAB reported in regulatory information notices (RINs)).

The benefit of using forecast data is that the weights can be determined in advance. This aligns with our ex-ante approach to regulation. However, actual capital expenditure may differ, both in timing and magnitude, from forecast capital expenditure. Our analysis of electricity NSPs' investments (see section 11.2.1.4) showed that forecast capital expenditure has consistently run above actual, sometimes by a large margin. We often also see projects delayed by a number of years.

For large new investments, NSPs may not – and often do not – follow their forecast PTRM capital expenditure profile. For example, Transgrid in its 2023–28 Revenue Proposal noted that $532.8 million of pre-approved forecast capital expenditure for the 2018–23 regulatory period will now be spent in the 2023–28 period.[534] A benchmark business in these circumstances is unlikely to have raised the new debt to finance the capital expenditure that did not occurr. Therefore, when the forecasts are of poor quality, a weighted trailing average based on the forecast PTRM debt balances might not be representative of the debt cost. This could undermine the benefit provided by using the weighted trailing average approach.

Further, the use of forecast capital expenditure in the return on debt weighting may give an incentive to NSPs to change investment timing in an inefficient way compared with what they submitted in their regulatory proposals. It may also incentivise NSPs to forecast inefficiently.

Instead of relying on PTRM forecasts, actual capital expenditure data could be used to determine the debt balance for which the weights would be based on. The downside of using actual data is that it is not known until after the expenditure is incurred, up to 2 years into the future when it is reported in the RINs. Hence, the trailing average return on debt would have to be estimated using the forecast PTRM debt balances and then adjusted for actual expenditure after it is known. Because we set the allowed rate of return ahead of the actual capital expenditure becoming known, a true-up mechanism would be necessary to account for the underestimations and overestimations observed in the difference between forecast and actual changes in RAB value. Such a mechanism may not align with our broader incentive-based framework for networks regulation.

Aside from the added complication, a true-up mechanism may pose a further issue of certainty for NSPs, because the use of actual capital expenditure to inform the weights would likely see the calculation of return on debt allowance straddle across 2 rate of return instruments. This may result in unexpected return on debt allowance outcomes for the NSP.

While use of actual data (rather than PTRM forecasts) would result in a better match between the allowance and debt costs, it would likely lead to increased complexity and may result in further uncertainty.

[534] Transgrid, 2023-28 Revenue Proposal, 31 January 2022, p. 93.

Treatment of new entrants

While some of the future large projects would be undertaken by the incumbent transmission NSPs, there is potential for new entrants into the sector, such as Marinus Link. Marinus Link supported adopting a weighted trailing average only for new businesses based on their capital expenditure profile because new businesses' debt financing activities may be materially different to existing businesses.[535]

However, under the current Instrument (and set to continue under our draft decision) the issue of potential mismatch between return on debt allowance and cost of debt could be partly mitigated by the transition period arrangement. Under this arrangement, for an NSP's first determination under the Instrument, its allowed return on debt is initially set at the prevailing rate of return on debt, and then each year 10% of it is reset (refreshed) to the new prevailing rate. This corresponds to the debt costs of a benchmark business that starts of by raising 100% of debt in year one and then refinances 10% of its debt balances in the following years.

To the extent that new entrants raise most of their capital in the early years of their determinations under the Instrument, the current arrangement of placing greater weight on prevailing cost of debt on those early years works to mitigate any potential difference between debt costs and regulatory return on debt allowance. Therefore, we consider that benefits of introducing weighted trailing average for new entrants are likely limited.

9.2.7.3 Scenario analysis and observations

To inform our decision, we have undertaken analysis that compares the status quo (simple trailing average) and a weighted trailing average approach.

Dr Lally advised that whether the departure from the NPV=0 condition is material would depend on:

- the difference between the prevailing return on debt and the trailing average
- the size of the new capital expenditure relative to RAB.[536]

Both of these need to occur for the departure from the NPV=0 condition to occur.

As part of its submission to our information paper, the QTC attached an example calculation of a weighted trailing average approach.[537] The spreadsheet model that forms part of the QTC's submission shows how a weighted trailing average based on PTRM debt balances might be calculated. In the QTC's example, weights are based on the percentage change in the PTRM debt balances. The QTC approach can be applied either prospectively using the PTRM forecast or retrospectively using the actuals.

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535 Marinus Link, *Rate of Return information paper – Submission*, 11 March 2022, p. 2.

536 Dr Martin Lally (Capital Financial Consultants), *The appropriate term for the allowed cost of capital*, 9 April 2021, pp. 32-33.

537 QTC, *Submission attachment - PTRM-weighted trailing average cost of debt example*, March 2022.

For the purposes of this analysis, we have used the QTC's approach to develop 3 indicative scenarios to help us assess the difference between simple and weighted trailing average approaches, with the scenarios reflecting changes in interest rates and RAB as conditions for departure from the NPV=0 condition as advised by Dr Lally.

The scenarios are:

- Scenario 1: Business-as-usual scenario – assumed stable RAB and PTRM debt balances, along with gradual increase in the prevailing return on debt each year from 3.53 in year 0 to 5.26% in year 5 (see Table 9.9).
- Scenario 2: Increasing RAB scenario – steady increase in the RAB over a 5-year regulatory period to be 50% above the starting RAB by year 5 in even annual increments. Same assumptions about the prevailing return on debt as Scenario 1. Reflecting investment in large new infrastructure projects, along with gradual increase in the prevailing return on debt.
- Scenario 3: Similar to Scenario 2, but with faster interest rate growth, with the terminal prevailing return on debt in year 5 of 7.26%, which is 200 basis points higher than in Scenario 2 (see Table 9.9).

The modelled scenarios' approach to setting the weights is based on the PTRM debt balance, which assumes that new additions to the RAB are financed by debt and equity in the proportion consistent with the benchmark gearing.

The 50% increase in RAB assumption adopted in Scenarios 2 and 3 was based on the current RAB value for transmission networks of $21.7 billion as of 2020[538] and AEMO's expected value of actionable network investments in the optimal development path of around $11 billion to 2028.[539]

Assumptions

ENA's submission to our 3 draft working papers on overall rate of return, equity and debt included a scenario testing model in Excel.[540] We based our calibration of the 3 scenarios described above on the ENA's scenario testing model assumptions about interest rates (taken up to 2023), debt risk premiums and RAB.

Table 9.9 sets out our assumptions about prevailing return on debt for each regulatory year and scenario.

Table 9.9 Assumed prevailing return on debt, 2023–2028 (%)

Scenario	2023 (Year 0)	2024 (Year 1)	2025 (Year 2)	2026 (Year 3)	2027 (Year 4)	2028 (Year 5)
Scenario 1	3.53%	3.88%	4.22%	4.57%	4.91%	5.26%
Scenario 2	3.53%	3.88%	4.22%	4.57%	4.91%	5.26%

538 AER, *State of the energy market 2021 - Full report*, 2 July 2021, p. 148.

539 AEMO, *Draft 2022 Integrated System Plan*, 10 December 2021, p. 61.

540 ENA, *ENA models – 2022 RORI scenario testing and calibrated DGM*, September 2021.

Scenario 3	3.53%	4.28%	5.02%	5.77%	6.51%	7.26%

Note: we made the following assumptions to calculate the prevailing return on debt:
1. 2023 prevailing rate is the average of the interest rates in the 4 scenarios presented in ENA's model.[541]
2. 10-year Commonwealth Government Security (CGS) yield of 3% by the end of year 5 for Scenarios 1 and 2.
3. 10-year CGS yield of 5% by the end of year 5 for Scenario 3.
4. A debt risk premium (DRP) of 226 basis points (bps), based on the average debt margin post the Global Financial Crisis as calculated by ENA.[542]
5. The prevailing rates in years 1–4 are estimated by linear interpolation from the current prevailing return on debt (year 0) to the end of year 5 prevailing rate for the relevant scenario.

To calculate the simple trailing average return on debt or the weighted trailing average return on debt, we need the historical on-the-day interest rate. Table 9.10 presents the historical on-the-day interest rates that we used in calculating the trailing averages.

Table 9.10 On-the-day interest rate, 2014–2022 (%)

Interest rate	2014	2015	2016	2017	2018	2019	2020	2021	2022
On-the-day rate	5.63%	5.00%	4.53%	4.22%	4.49%	3.46%	3.14%	2.89%	3.48%

Source: ENA models – 2022 RORI scenario testing and calibrated DGM, average of the four scenario for each relevant year in the Control sheet cells C38 to F46.

For Scenario 1, we have assumed no change to the PTRM RAB and debt balances across the period – for example, capital expenditure entering the RAB offsets depreciation.

Table 9.11 Scenario 1 closing RABs, debt balances and change in debt balances, 2023–2028 ($m real)

Scenario 1	2023 (Year 0)	2024 (Year 1)	2025 (Year 2)	2026 (Year 3)	2027 (Year 4)	2028 (Year 5)
Closing PTRM RAB	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Closing PTRM debt	$3,600	$3,600	$3,600	$3,600	$3,600	$3,600
Change in PTRM debt	n/a	$0	$0	$0	$0	$0

For Scenarios 2 and 3, we have assumed even annual increase in the RAB for each of the 5 years in the 2024–2028 regulatory period, so that the closing RAB in year 5 is 50% above the closing RAB in year 2023, and associated increases in the PTRM debt balances based on the benchmark gearing of 60%.

[541] ENA, *ENA models – 2022 RORI scenario testing and calibrated DGM*, September 2021, Control sheet cells C47 to F47.

[542] ENA, *ENA models – 2022 RORI scenario testing and calibrated DGM*, September 2021, Debt margin sheet cell N50.

Table 9.12 Scenarios 2 and 3 closing RABs, debt balances and change in debt balances, 2023–2028 ($m)

Scenarios 2 and 3	2023 (Year 0)	2024 (Year 1)	2025 (Year 2)	2026 (Year 3)	2027 (Year 4)	2028 (Year 5)
Closing PTRM RAB	$6,000	$6,600	$7,200	$7,800	$8,400	$9,000
Closing PTRM debt	$3,600	$3,960	$4,320	$4,680	$5,040	$5,400
Change in PTRM debt		$360	$360	$360	$360	$360

Results

Table 9.13 presents regulatory return on debt allowances for the simple trailing average approach (post transition) as well as QTC's submitted weighted trailing average approach given the scenario assumptions above. For Scenario 1, the regulatory allowances are the same for both approaches. This is because RAB remains unchanged throughout the period, so that only one of Dr Lally's 2 conditions for mismatch occurs.

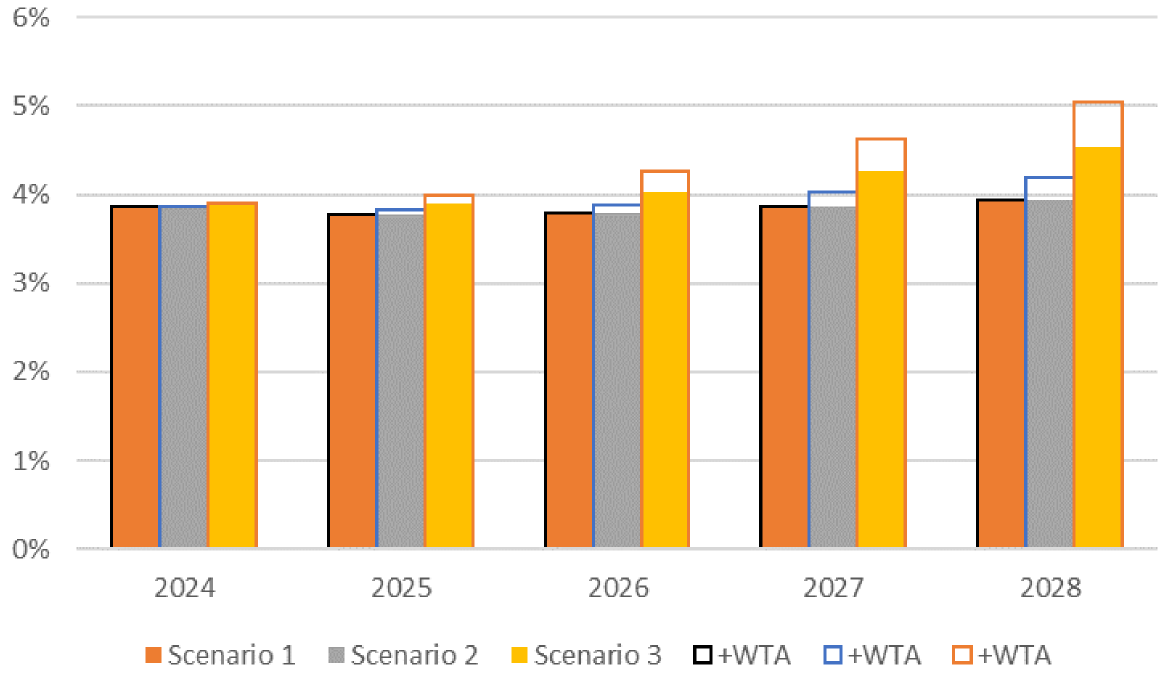
Table 9.13 Return on debt (%)

Return on debt (%)	2024 (Year 1)	2025 (Year 2)	2026 (Year 3)	2027 (Year 4)	2028 (Year 5)
Simple trailing average					
Scenario 1	3.86%	3.78%	3.79%	3.86%	3.93%
Scenario 2	3.86%	3.78%	3.79%	3.86%	3.93%
Scenario 3	3.90%	3.90%	4.03%	4.26%	4.53%
Weighted trailing average					
Scenario 1	3.86%	3.78%	3.79%	3.86%	3.93%
Scenario 2	3.86%	3.82%	3.89%	4.03%	4.19%
Scenario 3	3.90%	4.00%	4.26%	4.63%	5.05%

Figure 9.10 presents the difference between the simple and weighted trailing average return on debt regulatory allowances for each scenario.

The combined impact of a sharp increase in prevailing rate of return on debt and increasing RAB in Scenario 3 result in the weighted trailing average being 52 basis points higher than our simple average by year 5.

Figure 9.10 Simple trailing average and QTC proposed weighted trailing average (WTA) return on debt difference (%)



For each scenario, we also calculated the present value of 5 years' worth of the simple and weighted trailing average return on debt revenue allowances to analyse the difference.[543] We have focused our analysis on the next regulatory period but the differences between the simple and weighted trailing average will persist beyond the next regulatory period, even if the RAB remains stable at the new level.

Based on the assumptions above, we calculated the present value of the return on debt revenue allowances over the 5-year regulatory period in Table 9.14 below.

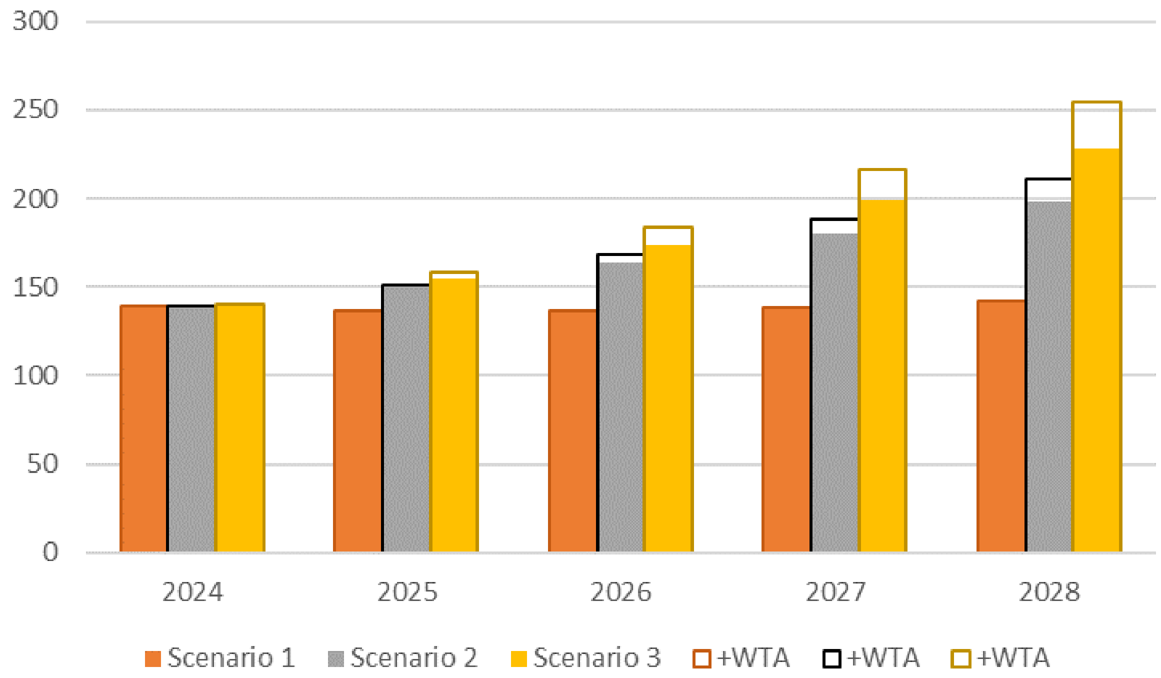
Table 9.14 Present value of return on debt revenue allowance (2023 $m)

Present value of return on debt revenue allowance 2024–2028 ($m)	Scenario 1	Scenario 2	Scenario 3
Simple trailing average	$662 m	$795 m	$858 m
Weighted trailing average	$662 m	$821 m	$913 m
Difference WTA and TA	$0.00 m	$26 m	$55 m
Difference WTA and TA	0%	3%	6%

Figure 9.11 presents the difference in the return on debt revenue allowance between the simple trailing average and QTC proposed weighted trailing average (WTA) approaches.

[543] The discount rate applied to this present value analysis is 4.48%, based on a prevailing return on debt in Year 0 of 3.53%, 5-year return on equity of 5.90%, and benchmark gearing of 60%.

Figure 9.11 Simple trailing average and QTC proposed weighted trailing average (WTA) return on debt revenue allowance difference ($m)



Observations

When only one of the two conditions advised by Dr Lally is present, such as in Scenario 1 (increasing interest rate and steady RAB), there is no difference between the weighted and simple trailing average approaches. Where the PTRM RAB and debt balances increase by 50% between year 1 and year 5 along with a moderate increase in prevailing rates to 5.26% (Scenario 2), the difference over the regulatory period is $26 million in present value terms. When this increasing RAB scenario is combined with faster increases in prevailing rates to 7.26% (Scenario 3) the difference over the regulatory period is more pronounced, at $55 million in present value terms.

From these scenarios we could observe the following:

- For a business with relatively steady RAB – which captures most businesses we regulate most of the time[544] – changes in interest rates will result in the same return on debt allowance for weighted and simple trailing averages.
- When a business experiences a significant increase in RAB and debt balances (for example, a 50% increase over a regulatory period) and a gradual interest rate growth, the effect of introducing weighted trailing average would likely result in a relatively minor difference in the return on debt revenue allowance over a 5-year regulatory period. In

[544] AER, *Rate of return, Overall rate of return, equity and debt omnibus, Final working paper,* December 2021, pp. 92-94.

present value terms, we estimate a difference of $26 million, or around 3% of the $795 million return on debt revenue allowance over a 5-year period.

- Where a 50% increase in RAB and debt balances is combined with faster growth in interest rates over a regulatory period, the difference between the simple and weighted trailing average approaches would be greater. We estimate a difference of $55 million over a 5-year period, or around 6% of the $858 million return on debt revenue allowance in present value terms.

The differences observed above are for the return on debt allowances component only and, when compared against the overall return on capital and allowed revenue, this impact will be less pronounced.

Therefore, to see a pronounced difference in the resulting revenue allowance in the next round of regulatory determinations under the 2022 Instrument, both large increases in prevailing interest rates and new capital expenditure needs to occur. This is only likely to arise for a small number of businesses that are expected to undertake large new projects in the coming regulatory period.

Over the past 10 years, the RBA F3 data series for yields on BBB-rated Australian corporate bonds with 10-year target tenor had a mean of around 5% and a maximum of around 7%.[545] We have created our scenarios in light of the current environment of rising interest rates, and the range of interest rates we model is similar to that observed in the RBA past 10 years of data. We do note, however, that even higher interest rates are possible. For example, according to the same RBA F3 data series, the yields on BBB-rated Australian corporate bonds had reached 13.26% at the peak of the Global Financial Crisis.[546] This is the highest value the RBA observed over the period from 2005 to 2022.[547] If the interest rates grow by more than assumed in our scenarios, the difference between the two approaches is likely to be more pronounced for those businesses experiencing significant changes in their debt balances.

While interest rates may be increasing in the coming regulatory period, for a pronounced difference in return on debt to arise, significant increase in debt balances needs to also occur. In the next round of regulatory determinations under the 2022 Instrument, only Transgrid is expected to have particularly large change in debt balances. We expect this change to be gradual, with the new projects going through regulatory investment tests and early stages of construction. This gradual pace of change in debt balances would limit the

[545] RBA, Aggregate Measures of Australian Corporate Bond Spreads and Yields – F3, Non-financial corporate BBB-rated bonds – Yield – 10 year target tenor between 31 May 2012 and 30 April 2022, accessed 03 June 2022.

[546] RBA, Aggregate Measures of Australian Corporate Bond Spreads and Yields – F3, Non-financial corporate BBB-rated bonds – Yield – 10 year target tenor 31 December 2008, accessed 03 June 2022.

[547] It is important to note that RBA bond yields prior to 2012 are based on a small number of observations.

impact of a weighted trailing average. We can therefore reconsider this issue as part of the 2026 rate of return instrument.

Further, when the RAB growth ceases over time as new infrastructure investments get commissioned, one of the two required conditions for departure from NPV=0 would no longer exist. This would result in progressive realignment between the weighted and simple trailing average return on debt outcomes over time. At year 10 after major new capital expenditure – that is, 10 years of stable RAB – the simple and weighted trailing average return on debt allowances will be the same again.

9.2.7.4 Trailing average approach options and our decision

In coming to our decision to retain the current simple trailing average, we also further assessed the feasibility of trailing average approach options presented to stakeholders in our final working paper[548]. These are:

- Option 1: Maintain the current simple trailing average approach.
- Option 2: Weighted trailing average that applies to all distribution and transmission network service providers. Weights are based on the debt issuance assumptions in the PTRM.
- Option 3: Option 2 with a pre-determined trigger – weighted trailing average only starts to apply when a large increase in the RAB (and therefore debt issuance) is forecast. Once the weighted trailing average is triggered, weights are based on the debt issuance assumptions in the PTRM.
- Option 4: Weighted trailing average that applies to all TNSPs. Weights are based on the debt issuance assumptions in the PTRM.

A fifth option was discussed during the concurrent evidence session of 10 February 2022:[549]

- Option 5: Separate large new projects from the stable RAB component. Start this separate RAB with the on-the-day approach, followed by a transition to a simple trailing average. Continue with the simple trailing average for the stable RAB.

Options 4 and 5 are inconsistent with NEL/NGL

Discussed during the concurrent evidence session[550] and with support from the CRG for further consideration[551], Option 5 has merits of transparency and simplicity by starting the

[548] AER, *Rate of return, Overall rate of return, equity and debt omnibus, Final working paper,* December 2021, pp. 87-99.

[549] Transcript of proceedings, Australian Energy Regulator Rate of Return Instruments Concurrent Evidence Session 2 of 4, February 2022, pp. 51-52.

[550] Transcript of proceedings, Australian Energy Regulator Rate of Return Instruments Concurrent Evidence Session 2 of 4, February 2022, pp. 51-52, 60, 71.

[551] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 103.

separate asset base for new investments with prevailing cost of debt. However, APA noted in its submission that such an approach may not be permitted by the NEL or NGL.[552]

Transgrid's submission proposed a tailored approach where, similar to Option 5, a separate RAB would be created for major new project capital expenditure. In addition, separate equity beta and gearing would be applied to this RAB – along with prevailing cost of debt – during the construction phase, and the value would be subsequently rolled into the standard RAB once commissioned.[553]

In reviewing the energy laws we consider that a tailored approach, such as the one proposed by Transgrid and the Option 5 approach, is unlikely to be consistent with the NEL, NGL, NER and NGR. This is because:

- One business cannot have different rates of return. The language of the NEL, NGL, NER and NGR indicates that the intention was that there would only be one rate of return per business, such that we would not be able to apply different rates of return on business. For example, s18I(1)(2) of the NEL states 'the way to calculate *the* rate', and in chapter 10 the NER definition of 'allowed rate of return' states 'for a Network Service Provider for a regulatory year means *the* rate of return calculated in the way stated in the applicable rate of return instrument for the Network Service Provider for the regulatory year'.
- There can only be one RAB per business. The way that the NER and NGR are drafted indicates that there is only one RAB. For example, clause 6.5.1(a) states 'The regulatory asset base for a distribution system owned, controlled or operated by a Distribution Network Service Provider is the value of those assets that are used by the Distribution Network Service Provider to provide standard control services...'

These provisions indicate that the intention was that there would only be one rate of return and one RAB per business. As a result, we would not further consider the tailored approach proposed by Transgrid or the Option 5 approach.[554] However, it is possible to construct a weighted trailing average that would mathematically deliver the same outcome as introducing a separate RAB.

Further, we also consider Option 4 – apply weighted trailing average to TNSPs only – would not be consistent with the NEL. Division 1B of the NEL expressly allows for the AER to apply different approaches for gas and electricity businesses but not between DNSPs and TNSPs. This indicates an intention that the law expected that the AER would adopt the same methodology for DNSPs and TNSPs. As a result, we would not further consider Option 4.

We consider Options 2 and 3 for applying weighted trailing average with or without a trigger to be possible under the NEL and NGL. For Option 3, we consider it would be feasible to

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[552] NEL, s18J(2); NGL, s30E(2); APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p. 60.

[553] Transgrid, *AER Rate of Return final Omnibus paper – Submission*, 11 March 2022, pp. 4-5.

[554] While having a separate RAB is not supported by the law, it can be mathematically shown that we can achieve the same (or similar) outcome as Option 5 by using a weighted trailing average approach consistent with Option 2 or 3.

include a statement in the rate of return methodology that states, for example, that if new capital expenditure is greater than a certain percentage of the RAB then a particular calculation will apply.

Other considerations

In submissions to our information paper, most stakeholders supported maintaining the current trailing average approach with the transition period. Stakeholders noted that the simple trailing average approach had the most merit, and the case for change had not yet been made.[555] Endeavour Energy submitted that a weighted trailing average approach would introduce complexity to existing well-established precedent and may not result in a better estimate.[556]

While the majority of stakeholders supported retaining the current simple trailing average approach, some stakeholders supported or provided conditional support for a weighted trailing average approach under Options 2 or 3. APA and QTC supported the adoption of a weighted trailing average approach under Option 2.[557] APA noted that, compared with the current simple trailing average approach, a weighted trailing average approach would seem to lead to a better estimate of the return on debt allowance. If this is the case, it should be applied to all NSPs without threshold (that is, Option 2). We took the QTC and APA submissions into account in formulating our decision and reasons set out above.

In relation to implementation, stakeholders submitted that to avoid any unintended consequences of incorrectly applying the weighted trailing average approach, detailed consultation is required on the specific application and implementation.[558] This is especially

[555] Jemena, *AER information paper – Submission*, 11 March 2022, p. 4; NSG, *AER Rate of Return information paper and Omnibus final working paper – Submission*, 11 March 2022, p. 13; AEC, *2022 AER Rate of Return Instrument review - Information paper and final Omnibus paper – Submission*, 10 March 2022, p. 2; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 24; AusNet, *Rate of Return 2022 information paper – Submission*, 11 March 2022, p. 3; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p. 13; AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, pp. 6–7; CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 97; Ausgrid, *Rate of Return 2022 information paper – Submission*, 11 March 2022, pp. 3-4.

[556] Endeavour Energy, *Rate of Return information paper – Submission*, 11 March 2022, p. 5.

[557] APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p. 57; QTC, *Submission - AER Rate of Return information paper and final working papers*, March 2022, p. 32; Marinus Link, *Rate of Return information paper – Submission*, 11 March 2022, p. 2.

[558] AusNet, *Rate of Return 2022 information paper – Submission*, 11 March 2022, p. 3; ENA, *Rate of Return Instrument review - AER Final Omnibus Paper and information paper – Submission*, 11 March 2022, p. 13; AGIG, SAPN, VPN, *2022 Rate of Return Instrument review - Omnibus papers final – Submission*, 11 March 2022, pp. 6–7; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p. 57-58.

so for applying Option 3 – the CRG noted that there may be some gaming opportunities with applying a threshold.[559]

Aside from the administrative complexity and practical implementation challenges, another point we have considered is that the network that is most likely to be impacted through a trailing average is Transgrid because it is likely to be undertaking large amounts of additional investment. Transgrid did not support the weighted trailing average.[560] We expect that Transgrid's RAB will build progressively over the next decade. As a result, one of the conditions (significant increase in the RAB) supporting a weighted average may not be prominent.

Transgrid's next regulatory determination is due in April 2023 and will be subject to the 2022 Instrument. The determination following that is due in April 2028 and will be subject to the 2026 rate of return Instrument. This gives us the opportunity to revisit the weighted trailing average if issues arise.

9.2.7.5 Assessment criteria

As discussed above, our consideration of issues shows that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. Where necessary, we have applied our assessment criteria to assist us to exercise our judgement. Table 9.15 sets out our assessment criteria and key areas where they have assisted us to make our decision.

Table 9.15 Criteria of draft decision on trailing average

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and are informed by sound empirical analysis and robust data.	Having a debt portfolio with staggered maturity dates, as modelled by the current trailing average approach, is critical to mitigating refinancing risk. This approach reflects economic and finance principles for achieving NPV=0 and market practice by NSPs.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose (b) promote simple over complex approaches where appropriate.	The current trailing averaging approach is fit for purpose and the estimation method is simple to implement.
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Market data used in calculating the trailing average return on debt is sourced from two reputable financial data providers (Bloomberg and Thomson Reuters) and the Reserve Bank of Australia. These datasets are robust, transparent and replicable.

[559] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p. 102.

[560] Transgrid, *AER Rate of Return final Omnibus paper – Submission*, 11 March 2022, p. 3.

Assessment criteria		Draft decision
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale.	Calculation to determine return on debt under the current trailing average approach is robust and does not involve any arbitrary filtering or adjustment of data.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	Data used to calculate the trailing average return on debt are sourced from two reputable financial data providers (Bloomberg and Thomson Reuters) and the Reserve Bank of Australia. The analysis is credible and verifiable and reflects latest data available at the time.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	As one-tenth of debt balance is updated with the on-the-day cost of debt annually, reflective of benchmark business financing practices, this ensures the trailing average return on debt continuously reflect changing market conditions and new information.
7	The materiality of any proposed change.	Proposed weighted trailing average approach, for the determinations made under 2022 RORI, is unlikely to result in material differences from the current trailing average approach, while adding significantly more complexity and uncertainty.
8	The longevity or sustainability of new arrangements.	Majority of NSPs has relatively stable RABs, making the current simple average approach most applicable. We currently do not consider the benefits of a weighted trailing average approach is sufficiently clear or necessary to make a change from our current simple trailing average approach. We intend to continue to monitor debt financing practices of the NSPs and revisit the issue in our 2026 Instrument review.

10 Imputation tax credits

Under the Australian imputation tax system, investors receive imputation credits for tax paid at the company level. For eligible shareholders, imputation credits offset their Australian income tax liabilities. The value of imputation credits (known as gamma or 'γ') needs to be factored into regulation to recognise that imputation credits benefit equity holders, in addition to any dividends or capital gains they receive.[561]

Because we use a post-tax framework with a rate of return that is after company tax but before personal tax, the value of imputation credits is not a WACC parameter.[562] Instead, it is a direct input into the calculation of a regulated firm's tax liability, via the corporate tax component of the building block model. This approach is consistent with standard Australian regulatory practice and is the approach prescribed in the National Electricity Rules (NER) and the National Gas Rules (NGR).

In the past, we have adopted the 'utilisation' approach for estimating the value of imputation credits. Under that approach, gamma is equal to the product of 2 parameters:[563]

- the distribution rate,[564] which is the proportion of imputation credits generated that is distributed to investors
- the utilisation rate, which is the utilisation value to investors in the market per dollar of imputation credits distributed.

In our review of the 2018 Instrument, the topic of gamma was considered in great depth. We adopted a gamma value of 0.585, which was based on an estimated distribution rate of 0.90 and a utilisation rate of 0.65.

- Our estimate of the distribution rate was informed by data in the financial statements of the top 50 Australian Stock Exchange (ASX) listed firms.
- The utilisation rate estimate was informed by the Australian Bureau of Statistics (ABS) wealth data applying the equity ownership approach.

In this draft decision, we propose to maintain our approach to estimating gamma and its 2 parameters and we have adopted the same values from 2018:

- gamma – 0.585 (= distribution rate x utilisation rate)
- distribution rate – 0.90
- utilisation rate – 0.65.

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561 In this document we use 'value of imputation credits and 'gamma' interchangeably.

562 The AER uses a nominal vanilla WACC.

563 See P. Monkhouse, 'The Valuation of Projects Under the Dividend Imputation Tax System', Accounting and finance, 1996, vol. 36(2), pp.185–212.

564 This is also known as payout ratio.

This reflects our view that the 2018 approach remains robust and appropriate because it is consistent with the Rules and will likely promote our legislative objectives. Our consultation to date also suggests that our overall approach is broadly supported by stakeholders. Further, we have not seen clear evidence that would warrant a change of approach.

One issue arising from the 2018 review was whether we could potentially use estimates from the Australian Taxation Office (ATO) to inform the value of the utilisation rate. This information was provided to us in an ATO note (2018 ATO note) close to the release of the 2018 final decision. Because there was insufficient time for us to properly assess and consult on this issue, we did not use this data in 2018.

As part of the 2022 review, we have requested further information and assistance from the ATO. In October 2021, we were provided with another note from the ATO (2021 ATO note), which includes the updated estimates which are broadly consistent with the 2018 ATO note. However, the 2021 ATO note does not include any additional information about the ATO's detailed data or methodology, which would enable us to adequately assess the suitability of these estimates. Therefore, we propose that we do not give weight to these ATO estimates.

We also consider it appropriate to maintain our assumption that non-resident investors derive zero value from imputation credits. This is supported by stakeholders in general and there has been no evidence that would persuade us to adopt a different assumption.

10.1 Draft decision

Our draft decision is to maintain our overall approach to estimating gamma.

We propose to adopt the same values from the 2018 Instrument for gamma (0.585) and its 2 parameters – the distribution rate (0.90) and the utilisation rate (0.65).

10.1.1 Distribution rate

Our estimated distribution rate (0.90) is informed by Dr Lally's updated analysis of the aggregate distribution rate using the data in the financial reports of the top 50 ASX listed firms over the period 2000 to 2020.[565] Dr Lally estimated the aggregate distribution rate to be 0.887, which is rounded to the nearest 0.05.

Table 10.1 shows Dr Lally's estimates since 2018. We note that his latest estimate is consistent with the previous estimates.

Table 10.1 Distribution rates for the ASX top 50

ASX top 50	2018 Instrument (2000–2017)	2019 update (2000–2018)	2021 update (2000–2020)
Imputation distribution ($m)	235,970	260,292	317,085
Tax payments ($m)	265,770	294,179	357,298

[565] https://www.aer.gov.au/system/files/AER-2021-Distribution%20Rate%20for%20Imputation%20Credits-Top%2050.pdf

Distribution rate	0.888	0.886	0.887

Comparator: Tables 1 and 2 (pages 5–7) of October 2018 Lally report.
Notes: The top 50 ASX companies were determined at 1 August 2018, consistent with the 2018 report.
Source: Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, 22 November 2019, p. 6; Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, 24 June 2021, p. 6.

We intend to update this estimate before our final decision.

10.1.2 Utilisation rate

Our draft decision is to adopt a utilisation rate of 0.65, which is informed by our estimates using the most recent ABS wealth data. Our analysis suggests a utilisation rate of between 0.62 and 0.70 for all equity over the period September 2000 to December 2021 and a most recent point estimate of 0.646. The averages of the point estimates for each quarter over the last 5 and 10 years are 0.645 and 0.647, respectively.

Table 10.2 shows our estimates of utilisation rate since 2018. We note that they are broadly consistent in that time period.

Table 10.2 Utilisation rates from the equity ownership approach (2000 to 2022)

Estimates	2018 Instrument (2000–2018)	2019 update (2000–2019)	2020 update (2000–2020)	2021 update (2000–2021)	2022 draft update (2000–2021 Dec)
Range of annual results	0.612–0.697	0.606–0.697	0.606–0.697	0.618–0.702	0.618–0.702
Most recent point estimate	0.638	0.643	0.639	0.647	0.646
Average over last 5 years	0.646	0.651	0.649	0.646	0.645
Average over last 10 years	0.643	0.658	0.646	0.646	0.647

Comparator: Page 366 of the December 2018 explanatory statement.
Notes: ABS data commences in September 2000 and runs to June 2018 (2018 review), June 2019 (2019 update), June 2020 (2020 update) and June 2021 (2021 update). We have recalculated the 2019 update figures using the latest ABS data revision.
Source: AER analysis; ABS statistical release series 5232.

As part of the current review we have consulted on:

- the suitability of the estimates in the 2 ATO notes
- our assumption about non-resident investors' valuation of imputation credits.

Our draft decision is not to use the ATO estimates and maintain our assumption that non-resident investors derive no values from imputation credits. These are discussed in sections 10.2.5 and 10.2.6.

10.2 Issues and considerations

10.2.1 AER assessment approach

Our overarching objective when setting the 2022 Instrument is to promote the legislative objectives as set out in the national electricity objectives (NEO) and national gas objectives (NGO). We consider that they focus on efficient investment in, operation and use of the regulated energy network infrastructure in the interest of end users.[566]

With that in mind, a key objective is to promote stability and predictability of our regulatory approach, which are highly valued by stakeholders. We consider this would promote efficient investment in and operation and use of the regulated energy network infrastructure and in turn promote the NEO and NGO.

In our consultation, stakeholders have also underlined the importance of stability and predictability, with the CRG proposing a 'high bar for change' principle as one of its 5 principles.[567]

We note that imputation credits is a topic that has been considered in great depth in the past, with our approach being extensively consulted on during the 2018 review. Our approach was also tested in a number of litigation processes[568] – the Full Federal Court found our approach open to us.[569] As a result, key aspects around gamma appear to have now settled and our overall approach endorsed broadly by stakeholders.

Given this, our consultation to date has primarily focused on a couple of discrete issues (in relation to our approach to estimating the utilisation) rather than seeking to revisit every aspect of our overall approach on gamma. The submissions we received also indicate that stakeholders are generally supportive of focusing on these issues.

Therefore, our assessment approach is to focus on those specific issues and any new argument/evidence that has emerged in our consultation. We do not consider it necessary to re-examine the conceptual and legal frameworks around imputation credits (our views on these are detailed in our 2018 decision documents).

10.2.2 Consultation

Our consultation on gamma suggests that our overall approach is broadly supported by stakeholders.

Overall rate of return draft working paper

[566] Our position paper 'Rate of return and assessing the long term interests of consumers' consider these issues in detail (https://www.aer.gov.au/system/files/AER%20-%20Rate%20of%20return%20and%20assessing%20the%20long%20term%20interests%20of%20consumers%20-%20Position%20paper%20-%2021%20May%202021_1.pdf)

[567] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.27.

[568] Detailed discussion of this can be found in AER, Draft rate of return guidelines, Explanatory Statement, July 2018, pp.404-405.

[569] Federal Court of Australia, *Australian Energy Regulator v Australian Competition Tribunal (No 2) [2017] FCAFC 79*, May 2017.

In our overall rate of return draft working paper (July 2021), we set out our preliminary view that we should maintain the overall approach of the 2018 Instrument. We sought views on the use of estimates in the ATO notes for estimating utilisation rate and our assumption around non-resident investors' valuation of imputation tax credits.[570]

Submissions from stakeholders (e.g. CRG, ENA and APGA) indicated broad support for maintaining our 2018 approach.[571] There was also a broad agreement among stakeholders (e.g. ENA, APGA and Ausgrid) that we should continue to assume that non-resident investors derive zero value from imputation credits.[572]

On the ATO notes, stakeholders in general did not express a definitive view but welcomed AER's investigation into this matter (e.g. ENA, APGA, Energy Queensland and Endeavour Energy).[573]

AER rate of return information paper

Our rate of return information paper (December 2021) set out our proposed position on the rate of return following a series of working papers.[574] The paper invited further submissions on various aspects of rate of return including gamma. We also published the 2021 ATO note when we released the information paper.

Only a small number of submissions commented on gamma related issues (CRG, APA and APGA).

- CRG considered that we should maintain our approach for estimating gamma and should not change our approach as a result of the ATO notes.[575]

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[570] AER, *Overall rate of return, Draft working paper*, July 2021, pp.39-45; AER, *Information paper and call for submissions*, December 2021, pp.32-33.

[571] CRG, *Advice to the Australian Energy Regulator, CRG Response to the AER's July 2021 Draft Working Papers: The Overall Rate of Return, Debt Omnibus and Equity Omnibus Papers, Volume 1: Technical*, September 2021, p.12; ENA, *Overall rate of return: Response to AER's Pathway to 2022 Rate of Return Instrument: Draft Overall Rate of Return Omnibus Working Paper*, September 2021, p.30; APGA, *APGA Submission to the AER: Rate of return omnibus papers*, September 2021, p.44.

[572] ENA, *Overall rate of return: Response to AER's Pathway to 2022 Rate of Return Instrument: Draft Overall Rate of Return Omnibus Working Paper*, September 2021, p.30; APGA, *APGA Submission to the AER: Rate of return omnibus papers*, September 2021, p.44; Ausgrid, *Submission: Overall rate of return*, September 2021, p.4.

[573] ENA, *Overall rate of return: Response to AER's Pathway to 2022 Rate of Return Instrument: Draft Overall Rate of Return Omnibus Working Paper*, September 2021, p.30; APGA, *APGA Submission to the AER: Rate of return omnibus papers*, September 2021, p.44; Energy Queensland, *Letter to AER on rate of return omnibus papers*, September 2021, p.1; Endeavour Energy, *Letter to AER on draft working omnibus papers: overall rate of return, equity and debt*, September 2021, p.4.

[574] We released Final Omnibus Working Paper in December 2021, which focused on six key issues we identified for the 2022 instrument. Gamma is not among those issues.

[575] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.125.

- APA, APGA and CRG considered that we should continue to assume non-resident investors derive zero values from imputation credits.[576]

Concurrent evidence session

In February 2022, we hosted a number of concurrent evidence sessions (CES) where the subject matter experts, including those nominated by the industry and the CRG, outlined their views on key priority aspects of the rate of return before the AER Board. The experts also had the opportunity to raise any other issues they considered relevant.

No issues relating to gamma were raised at those sessions. The transcripts of these sessions are available on the AER's website.[577]

10.2.3 AER conceptual approach

Our overall framework has been to adopt the 'utilisation' approach, under which the value of imputation credits is equal to the product of 2 parameters (distribution rate and utilisation rate).[578]

This utilisation approach is informed by the Monkhouse extension of the Officer framework,[579] where investors are considered to obtain a certain 'utilisation' value from distributed credits and no value from undistributed credits.[580]

This framework is consistent with the Rules, which requires the cost of company income tax be adjusted for the value of the imputation credits.[581] Clauses 6.5.3 and 6A.6.4 of the NER and rule 87A of the NGR set out the cost of corporate income tax rule, which includes an adjustment for the value of imputation credits as follows:

> The estimated cost of corporate income tax of a Distribution/Transmission Network Service Provider for each regulatory year (ETC_t) must be calculated in accordance with the following formula:

[576] APA, 2022 *Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.76; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p.27; CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.125.

[577] https://www.aer.gov.au/publications/guidelines-schemes-models/rate-of-return-instrument-2022/initiation

[578] This approach is referred to as the 'Monkhouse formula' as set out in P. Monkhouse, 'The Valuation of Projects Under the Dividend Imputation Tax System', Accounting and finance, 1996, vol. 36(2), pp.185–212.

[579] R. Officer, 'The cost of capital of a company under an imputation system', Accounting and finance, vol. 34(1), May 1994, pp.1–17.

[580] In the Monkhouse framework, the utilisation value is equal to the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors.

[581] Our 2018 decision documents discuss in detail the consistence between our approach and the Rules.

$$ETC_t = ETI_t \times r_t \times (1 - \gamma)$$

Where:

ETI_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of standard control/prescribed transmission services if such an entity, rather than the Distribution/Transmission Network Service Provider, operated the business of the Distribution/Transmission Network Service Provider, such estimate being determined in accordance with the post-tax revenue model.

r_t is the expected statutory income tax rate for that regulatory year as determined by the AER, and

γ is the value of imputation credits.

We note that the value of imputation credits is interrelated with the market risk premium (MRP). Accordingly, in our determination of the return on equity in this draft decision we adjust estimates of the MRP in a manner consistent with our determination of the value of imputation credits.

We have maintained this approach since the 2013 Guidelines.

In 2017 the Full Federal Court found this approach to be open to us and that it was not an error of construction for the AER to focus on utilisation rather than on implied market value.[582] In our 2018 review, most stakeholders were also supportive of this approach.[583]

In our current review, stakeholders have not proposed any alternatives. There has not been any new argument/evidence before us to suggest our approach is not appropriate or 'fit or purpose'.

As a result, our draft decision is to maintain our overall approach to estimating gamma.

10.2.4 Distribution rate

2018 Instrument

The 2018 Instrument adopted a distribution rate of 0.90. This was primarily informed by Dr Lally's analysis of the data in the audited financial reports of the top 50 ASX listed firms over the period 2001 to 2017.[584] Dr Lally estimated the average distribution rate to be 0.89. This was rounded to the nearest 0.05, which resulted in a value of 0.90.[585]

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[582] Federal Court of Australia, *Australian Energy Regulator v Australian Competition Tribunal (No 2) [2017] FCAFC 79*, May 2017, para.756.

[583] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.318.

[584] Ibid., p.309

[585] The rationale for rounding to the nearest 0.05 was discussed in the 2018 RoRI explanatory statement.

In estimating the distribution rate, we considered that an efficient network service provider should be based on listed firms.[586]

Other evidence we examined but did not give material weight to include:[587]

- an estimate of the aggregate distribution rate estimate from the financial reports of the top 20 ASX listed firms
- publicly available ATO franking account balance (FAB) data
- an analysis of the impact of foreign income on the aggregate distribution rate of the top 50 ASX listed firms.

Consultation

Our overall rate of return draft working paper (July 2021) proposed that we should continue to use financial report data from the top 50 ASX listed firms for estimating the distribution rate.[588]

We have not received any stakeholder submissions that raised any concern.

One notable observation (from the CRG) is that 'a high proportion of private owners are now private equity firms or Australian or overseas superannuation/pension funds' rather than being listed entities. The CRG did not consider this should invalidate our approach but proposed that we consider this issue in our review of the 2026 Instrument.[589]

AER consideration and conclusion

We consider it appropriate to maintain our 2018 approach given the following:

- we considered this matter in detail in the 2018 review and our approach was broadly supported by stakeholders
- in our current review, stakeholders have not raised any concern about maintaining the same approach as 2018
- we have not seen any evidence that suggests the current approach is not appropriate or there is a better alternative
- our reasons in the 2018 decision remain relevant and valid.[590]

Therefore, our draft decision is to adopt a value of 0.90 (rounded to the nearest 0.05)[591] for the distribution rate, informed by the final report data of the top 50 ASX listed firms.

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[586] We consider the distribution rate should be an industry-specific measure (see discussion on this in our 2018 decision).

[587] Our reasons can be found in the 2018 final decision.

[588] AER, *Overall rate of return, Draft working paper*, July 2021, p.42.

[589] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.125.

[590] AER, *Rate of return instrument, Explanatory Statement*, December 2018, pp.308-311.

[591] Reasoning for the rounding policy can be found in our 2018 instrument decision.

On CRG's comment that a high proportion of the owners are no longer listed entities, we agree with CRG's view and are open to considering its implications in future.

10.2.5 Utilisation rate

In estimating the utilisation rate we have been informed by the Monkhouse framework, where the utilisation rate is considered to be the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors.[592]

For an 'eligible' investor, each dollar of imputation credit received is assumed to be fully returned to the investor in the form of a reduction in tax payable or a refund.[593] Therefore, we have considered that eligible investors have a utilisation rate of 1. Conversely, 'ineligible' investors cannot utilise imputation credits and are assumed to have a utilisation rate of 0.

2018 Instrument

The 2018 Instrument adopted a utilisation rate of 0.65. This was informed by the ABS wealth data[594] applying the equity ownership approach.

The equity ownership approach estimates the value-weighted proportion of domestic investors in the Australian equity market. This reflects that, generally, domestic investors who are eligible to utilise imputation credits would have a utilisation rate of 1 whereas foreign investors would have a utilisation rate of 0.

In estimating the utilisation rate we also considered other evidence, including:

- the ATO estimate of the redemption rate of distributed credits
- implied market value studies
- two estimates in the 2018 ATO note.

We decided to base our final estimate on the equity ownership approach based on the ABS data because that approach:

- is well aligned with the interpretation of the utilisation rate in the Monkhouse framework
- employs a relatively simple and intuitive methodology
- uses a reliable and transparent source of data
- provides estimates of the utilisation rate for investors in all equity.

Consultation

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[592] J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp.18–20.

[593] This is the return to eligible investors before administrative costs, personal taxes and diversification costs.

[594] We have used data from the National Accounts of the Australian Bureau of Statistics (ABS) to estimate the domestic ownership share.

In our consultation we proposed to continue to use the equity ownership approach based on ABS wealth data to inform the value of the utilisation rate and not the other alternative estimates.[595] We also sought views on 2 specific issues:[596]

- whether we should be informed by the estimates in the 2018 ATO note
- whether we should continue to assume non-residents derive zero value from imputation credits.

We did not receive any submissions that raised concern about our continual use of the equity ownership approach based on ABS wealth data.

AER consideration and conclusion

We consider it appropriate to maintain our 2018 approach because:

- this matter was considered in detail in the 2018 review and our approach was broadly supported by stakeholders
- in our current review, stakeholders have not raised any concern about maintaining the same approach
- we have not seen any evidence that suggests our approach is not appropriate or there is a better alternative
- we consider that our reasons in the 2018 decision remain relevant and valid.[597]

On the 2 specific issues, our draft decision is that we should:

- not use the estimates from the ATO notes to inform the value of the utilisation rate
- continue to assume non-residents derive zero value from imputation credits.

Our reasons on those are set out the sections below.

Therefore, our draft decision is to adopt the same value of 0.65 from the 2018 Instrument, informed by the ABS wealth data (see section 10.1.2).

10.2.6 Estimates from the ATO notes

Background

The 2018 ATO note[598] contains 2 estimates based on ATO confidential data (over the period 2012–16), which may potentially inform the value of the utilisation rate:

- net franking credit usage

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[595] AER, *Overall rate of return, Draft working paper*, July 2021, p.45; AER, *Information paper and call for submissions*, December 2021, p.32.

[596] Ibid.

[597] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.311-313.

[598] https://www.aer.gov.au/system/files/ATO%20Note%20-%20Franking%20account%20reconciliation%20-%2011%20December%202018.pdf

- imputation credits distributed to resident versus non-residents as a percentage of imputation credits distributed.

In the 2018 review, we placed limited weight on this information from the ATO because there was insufficient time for us to assess and consult on this data.[599]

2021 ATO note

In March 2021 we requested further information and assistance from the ATO, including:

- extending the 2018 analysis to cover more income years
- whether there has been any change in the underlying methodology it used
- whether it could provide a public document on the underlying methodology for consultation.

In October 2021 the ATO provided a note in response to our request, [600] which provides:

- 2 years of additional data (now covers the period 2012–18) compared with the 2018 note
- minor revisions compared with the 2018 note (2016 'net usage' and 2015 'distribution to residents').

However, we note the ATO has not provided its detailed data or methodology for preparing its estimates.

Consultation

Our overall rate of return draft working paper (July 2021) sought stakeholder views on whether the data in the 2018 ATO note is suitable for informing the utilisation rate.[601]

Most stakeholders (ENA, APGA, Energy Queensland and Endeavour) did not express a concluded view but welcomed our investigation.[602] The CRG did not provide its view and stated it will give further considerations to gamma issues in response to the AER rate of return information paper.[603] Ausgrid supported the ATO data being given some weight, noting 'the ATO is the only organisation that holds actual data on how companies use imputation credits.'[604]

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[599] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p.313.

[600] ATO, *ATO Note - Franking account reconciliation*, October 2021.

[601] AER, *Overall rate of return, Draft working paper*, July 2021, p.45.

[602] ENA, *Overall rate of return: Response to AER's Pathway to 2022 Rate of Return Instrument: Draft Overall Rate of Return Omnibus Working Paper*, September 2021, p.30; APGA, *APGA Submission to the AER: Rate of return omnibus papers*, September 2021, p.44; Energy Queensland, *Letter to AER on rate of return omnibus papers*, September 2021, p.1; Endeavour Energy, *Letter to AER on draft working omnibus papers: overall rate of return, equity and debt*, September 2021, p.4.

[603] CRG, *Advice to the Australian Energy Regulator, CRG Response to the AER's July 2021 Draft Working Papers: The Overall Rate of Return, Debt Omnibus and Equity Omnibus Papers, Volume 1: Technical*, September 2021, p.12.

[604] Ausgrid, *Submission: Overall rate of return*, September 2021, p.4.

In December 2021 we released the AER rate of return information paper along with the 2021 ATO note for consultation.

Other than the CRG, few submissions commented on the 2021 ATO note. The CRG considered that the 2021 ATO note did not provide any sufficient information to warrant any changes.[605]

AER consideration and conclusion

We have reviewed the information in the 2 ATO notes. Our high-level observations are:

- the 2021 ATO note provides 2 years of additional data (now covers the period 2012–18) compared with the 2018 note
- there were some minor revisions in the 2021 note compared with the 2018 note
- the averaged value of the 2 measures in the 2021 note is similar to that in the 2018 note
- similar to the 2018 note, the 2021 ATO note has not provided the ATO's detailed data or methodology for the derivation of the estimates.

Table 10.3 below compares the average values of the 2 estimates from the 2 ATO notes.

Table 10.3 Averaged values from 2018 and 2021 ATO notes

Estimate	2018 note (2012–16)		2021 note (2012–18)	
	Net usage	Distribution to residents	Net usage	Distribution to residents
Average	0.538	0.626	0.539	0.630

10.2.6.1 ATO's two measures

The ATO defined the 2 measures as follows:

- Net franking credit usage: defined as the proportion of franking offset used by individuals, superannuation funds, self-managed super funds and charities compared to the net franking credits distributed. We consider this measure would take into account the imputation credits that are recycled within companies.
- Assumed imputation credits distributed to residents as a percentage of imputation credits distributed: defined as the proportion of franking credits received by individuals, superannuation funds, self-managed super funds, charities and companies to the total franking credits distributed. We consider this measure would not take into account the imputation credits that are recycled within companies.

We previously considered that the utilisation rate should take into account the imputation credits that are recycled within companies and the 'net franking credit usage' measure would be more consistent with that view.[606]

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[605] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.125.

[606] This is discussed in our overall rate of return draft working paper.

We maintain the above view given that we have not received any contrary information and stakeholders did not express any differing views.

Reasons for not placing weight on the ATO measures

Our draft decision is that we should not place weight on the 2 measures in the ATO notes for the following reasons:

- we did not receive information about the ATO's detailed data or methodology that would enable us to undertake a thorough investigation
- stakeholders did not provide substantive comments on the 2021 ATO note
- our approach of using ABS data remains robust and transparent and is broadly supported by stakeholders
- giving some weight to the ATO measures would unlikely lead to a material change to the overall gamma estimate.

We note that only one stakeholder (CRG) commented on the 2021 ATO note, who considered that 'the published ATO response appears to offer no further insights than its earlier note, but simply incorporates two extra years of franking distribution data. This data indicates stable ratios of franking distribution, but it does not constitute new evidence that would support a change in approach.'[607] We agree with CRG's view.

Table 10.4 compares the utilisation rate values estimated from the ABS data and the two ATO estimates.

Table 10.4 Gamma estimates based on 2022 estimates and ATO 2021 note

Estimates	2022 draft Instrument	ATO 2021 note	
		Distribution to residents	Net usage
Distribution rate[608]	0.9 (rounded from 0.887)	0.9	0.9
Utilisation rate	0.65 (rounded from 0.646)	0.65 (rounded from 0.63)	0.55 (rounded from 0.539)
Gamma	0.585	0.585	0.495

We note that:

- the 'distribution to residents' measure (0.63) is similar to AER estimates using ABS data (0.646)
- the 'net usage' measure leads to a lower estimate.

Based on these estimates, giving some weight to the ATO estimates is unlikely to result in a significant change in the value of gamma. An equal weighting of the ABS and 2 ATO estimates would result in a gamma value of 0.555, compared with 0.585 in the draft decision.

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[607] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.125.

[608] In the 2018 Instrument, we rounded our distribution rate and utilisation rate estimates to the nearest 0.05. Staff have similarly rounded the estimates in 2022 value to 0.9 and 0.65.

Given our preferred estimate is the ABS estimate, the ATO estimates should have received less than equal weight, which would have led to an even smaller difference.

10.2.7 Non-resident investors' valuation of imputation credits

Background

The utilisation rate in the 2018 Instrument was estimated using the equity ownership approach based on ABS wealth data. This assumes one dollar of distributed imputation credits is valued at one dollar by Australian resident investors and at zero by non-residents of Australia. Further, for all investors, including non-residents, we assume undistributed imputation credit are worthless.

Consultation

In the overall rate of return draft working paper (July 2021), we sought stakeholder views on whether non-resident investors assign a material value to imputation credits.[609]

There was broad agreement among stakeholders (e.g. ENA, APGA and Ausgrid) that non-resident investors should be assumed to derive no value from imputation credits.[610]

Our rate of return information paper (December 2021) further sought views on this issue. Again there was broad agreement (by CRG, APA and APGA) that the same assumption should be maintained.[611]

AER consideration and conclusion

The question of whether non-resident investors assign a material value to imputation credits is a complex task and requires examining a number of matters, including the following key issues:

- what countries non-resident investors principally come from
- what tax treaties these countries have with Australia and how their local tax laws operate.

To our knowledge, there is no publicly available information on the geographical distribution of non-resident investors.

In March 2021 we sought assistance from the ATO on this matter. The ATO advised that it was unable to provide the type of information that would be needed given data limitations

[609] AER, *Overall rate of return, Draft working paper*, July 2021, p.46.

[610] ENA, *Overall rate of return: Response to AER's Pathway to 2022 Rate of Return Instrument: Draft Overall Rate of Return Omnibus Working Paper*, September 2021, p.30; APGA, *APGA Submission to the AER: Rate of return omnibus papers*, September 2021, p.44; Ausgrid, *Submission: Overall rate of return*, September 2021, p.4.

[611] CRG, *Rate of Return Instrument information paper – Submission*, 11 March 2022, p.125; APA, *2022 Rate of Return instrument review information paper and final Omnibus paper – Submission*, 11 March 2022, p.76; APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p.27.

and the amount of work that might be required. Given this, we have not been able to undertake further analysis on this matter.

Notwithstanding this, we consider that our approach of using the ABS wealth data is a reliable, transparent and timely source of information for estimating the utilisation rate.

Further, there is broad support among stakeholders for assuming non-resident investors derive no value from imputation credits.

- APGA noted that 'this is an accurate reflection of reality'.[612]
- APA commented that 'no evidence has been put forward for either an imminent change in tax policy, or for a change to the assumption that non-resident investors assign no value to imputation credits'.

We also note that the Full Federal Court and the Independent Panel did not find error with this assumption in 2017 and 2018, respectively.

Given the above, our draft decision is to maintain the assumption that non-resident investors derive no values from imputation credits.

10.2.8 Summary

We have considered all available evidence before us in making this decision. We consider our approach remains appropriate. In particular, our reasoning for our overall approach in the 2018 review continues to be relevant and valid. Our approach has had broad support from stakeholders and no material concerns have been raised as part of our current consultation.

We have consulted on a number of discrete issues. There does not appear to be any clear evidence for changing our approach on either. Stakeholders also do not support any changes.

Therefore, we consider it appropriate to maintain our approach for estimating gamma. We consider this will promote our legislative objectives and is consistent with our proposed assessment criteria (see Table 5).

10.2.9 Assessment criteria

Our consideration of issues show that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. In this regard, where necessary we have applied our assessment criteria to assist us exercise our judgement. The table below sets out our assessment criteria and key areas where they have assisted us make our decision.

[612] APGA, *2022 Rate of Return Instrument information paper – Submission*, 11 March 2022, p.27.

Table 10.5 Criteria of draft decision gamma assessment

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data.	Our approach is consistent with the requirements of the Rules and informed by the Monkhouse extension of the Officer framework.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and consider the limitations of that purpose (b) promote simple over complex approaches where appropriate.	Our approach is broadly supported by stakeholders and has been found open to us by the Full Federal Court.
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	Our approach is robust, transparent and informed by reliable publicly available data.
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation (b) based on quantitative modelling that avoids arbitrary filtering or adjustment of data that does not have a sound rationale.	While gamma is not a direct input into the rate of return, our approach for estimating gamma is consistent with the broader building block model framework and our use of a nominal vanilla WACC.
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	Our approach is informed by publicly available data, including audited final reports and the public release of ABS national account data.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	We have been open to considering alternative approaches when supported by fresh and robust evidence (e.g. our consideration of ATO private data).
7	The materiality of any proposed change.	We maintained the same approach to estimating gamma as that of the 2018 Instrument. We also maintained the point estimate of 0.585.
8	The longevity or sustainability of new arrangements.	We consider our conceptual approach to estimating gamma will likely remain appropriate going forward.

11 Overall rate of return crosschecks

Crosschecks involve comparing estimates of the rate of return against other relevant information sources. They may provide a sense check on whether the calculated estimates appear reasonable and consistent with other sources of information. They can also provide additional information in situations where regulatory judgement may be required.

We can apply crosschecks at the overall rate of return level, at the return on equity level and at individual levels within the return on equity (for example, risk-free rate and MRP). In this section, we focus on possible crosschecks at the overall return on equity and rate of return levels. In chapter 5 we describe our foundation model approach, the 6-step process for determining the return on equity. In steps 4 and 5 of the foundation model approach, we look to broader indicators of the suitability of the return on equity. We explicitly consider these latter steps in this section, covering other information and their evaluation.

We then outline the sensitivity and scenario testing we have undertaken. We make a distinction between sensitivity analysis and scenario testing. We describe sensitivity analysis as an approach for observing movements in the rate of return to movements in the underlying parameters. We describe scenario testing as an approach for observing rate of return outcomes in different states of the world.

In the final section of this chapter we turn our mind to the decision in the round and step back and consider whether the decision as a whole is likely to contribute to the achievement of the NEO and NGO to the greatest degree.

11.1 Our draft decision

11.1.1 Role of crosschecks in determining overall rate of return

We use crosschecks as a sense check on our overall allowed rate of return and to assist in identifying potential issues. However, we do not use crosschecks in a formulaic way to determine the overall rate of return. Therefore, no crosscheck is used to directly determine parameter estimates for the allowed rate of return.

If we found the Instrument did not perform well in a crosscheck or future scenario, we would consider options for making changes and the trade-off with other issues that could also arise.

For example, if we were not satisfied that the decision in the round is likely to contribute to the achievement of the NEO/NGO, we would reconsider:

- CAPM input parameters (for example, equity beta)
- cost of debt assumptions
- broader adjustments (for example, the notional gearing assumption, revenue profile, and use of DGM to set MRP).

We are also conscious that apparent issues in the crosschecks may arise because of other factors in our broader regulatory framework and therefore a solution may involve an adjustment in other parts of our decision making. For example, concerns arising in respect of financeability might be due to our approach to estimating operating costs or the profile of depreciation, rather than in our approach to estimating the rate of return.

11.1.2 Most useful crosschecks

We consider that regulated asset base (RAB) multiples, financeability tests and scenario testing are the most useful. Our rationale for this decision is detailed in section 11.1.3 below. Other crosschecks are also discussed, though found to have lesser value.

11.1.3 Potential crosschecks and overall rate of return

In our December 2021 final working paper, we cautiously expressed the view that the outcomes from the 2018 Instrument remain broadly appropriate.[613] This view was supported by our initial review of crosschecks. The parameters maintained for the 2022 Instrument are supported when we consider:

- RAB multiples, given that network businesses have been consistently trading at a price range that represents RAB multiples of 1.2 to 1.6 since the 2018 Instrument and recent takeover offers indicate RAB multiples of 1.5 to 1.7[614]
- financeability tests, given that most firms are under the 2018 Instrument and based on our analysis of funds from operation to net debt there appears to be no material deterioration in financeability since the application of the 2018 Instrument[615]
- sensitivity testing of aspects of the 2022 Instrument (MRP and beta). We have also used scenario testing to assess our 2022 draft decision in potential ‘future states’ of the world, which demonstrates its potential to promote stability and manage volatility across different scenarios.

Though we have considered additional crosschecks (historical profitability, investment trends, other regulators’ rate of return and analysts discount rates), we found that these have less value and greater limitations. Therefore, they do not have a material role in informing our assessment of the overall rate of return.

As such, given our deployment of relevant crosschecks,[616] we consider our 2022 draft decision on the overall rate of return appears reasonable.

We are satisfied that we have exercised our judgement across parameters, methodologies and ranges such that the draft decision in the round will, or is most likely to, contribute to the achievement of the NEO/NGO. We developed this view through our own analysis, with the input of experts and engagement with stakeholders and consumers. We find that our draft decision has the potential to promote stability and manage volatility across different

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[613] That is, it is within the range of reasonable values for the rate of return.

[614] AER, *Electricity network performance report*, September 2021, p.33

[615] AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 22

[616] In particular RAB multiples and financeability tests.

scenarios and, therefore, promote efficient investment in, and efficient operation and use of, energy network services.

11.2 Issues and considerations

11.2.1 Role and usefulness of crosschecks

This section covers our consideration of the role and usefulness of each crosscheck. For this, we have also taken into account stakeholder submissions and expert reviews.

There are different potential roles for using crosscheck evidence to inform the rate of return:

- A formulaic approach – evidence is used to change the rate of return by means of a mathematical formula or other type of a mechanistic approach. For example, if an economic or financial indicator is outside a predetermined range by X amount, we adjust the rate of return (or a rate of return parameter) by Y%.
- Sense-check/contextual – evidence is used to gauge whether the regulatory allowance is likely to be sufficient. Alternatively, evidence is used to assist with identifying potential issues with our regulatory regime and areas of further research and inquiry. This approach is better suited for economic and financial indicators with relatively lower information content.
- No role – this approach would be appropriate for the empirical evidence that contains little or no information relevant to the rate of return.

In our December 2021 omnibus paper, our overall preliminary position was that crosschecks can be used in a sense check capacity.[617] We found that there was no new evidence that would support elevating any of the crosschecks to a higher status or to indicate they should be used in a formulaic role.

However, we did suggest a distinction to be made between the crosschecks we considered as part of our working papers, finding that:

- RAB multiples, financeability tests and scenario testing have limitations, but also have relevant informational value and are the most useful
- historical profitability, investment trends, other regulators' rate of return and other practitioners' discount rates have greater limitations and are less useful than those mentioned above.

The following sections cover our analysis of the theory and application of potential crosschecks to the overall rate of return instrument. We discuss all 7 crosschecks for information purposes and for completeness in providing all material we have considered.

[617] AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 22

Table 11.1 Role of crosschecks from preliminary position to draft decision

Role	Crosscheck	Our preliminary position (Dec 2021)	Our draft decision (Jun 2022)
Most useful cross checks	RAB multiples	Our preliminary position is that RAB multiples may be useful as a sense check and trigger for further investigation into the regulatory framework.	As per preliminary position
	Financeability tests	Our preliminary position is that we are open to using financeability tests in a contextual role.	As per preliminary position
	Scenario testing	Our preliminary position is that we are open to using scenario tests in a contextual role.	As per preliminary position
Less useful cross checks	Historical profitability	Our preliminary position is that historical profitability should have no role in informing the overall rate of return.	As per preliminary position
	Investment trends	Our preliminary position is that investment trends should have no role in informing the overall rate of return.	As per preliminary position
	Other regulators' rate of return rates	Our preliminary position is that other regulators' rate of return estimates should have no role in informing the overall rate of return.	As per preliminary position
	Analysts' discount rates	Our preliminary position is that analysts' discount rates should have no role in informing the overall rate of return.	As per preliminary position

Source: AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 124

11.2.1.1 RAB multiples

RAB multiples are a measure of the value of a firm compared with its RAB. RAB multiples can be calculated using:

- the existing share price of a business that has an equity ownership in a service provider, which can be observed continuously if the firm is listed on the share market (known as trading multiples or trading data)
- the purchase price when a large parcel of shares is exchanged, or through a takeover of the firm, observed at a point in time when a transaction of the service providers occurs (known as transaction multiples or acquisition data).

There were differing views on the role and usefulness of RAB multiples as a crosscheck. This disagreement arises because RAB multiples can be influenced by a range of factors beyond the regulated rate of return. These factors include:

- firms undertaking business activities beyond the regulated element (unregulated business)
- control premium, overpayment or 'winner's curse'
- incentive rewards and outperforming price control targets

- expected growth in unregulated business and/or incentive rewards or outperformance.

Responses to our final working paper[618] reflect this disagreement. Professor Partington noted that RAB multiples provide useful information and satisfy many of our assessment criteria.[619] Additionally, the CRG noted that RAB multiples are important, cannot be ignored or assigned to simply a role as a 'sense check'.[620]

We also refer to the perspectives of experts from evidence sessions on the validity of crosschecks. Mr James Hancock, during the evidence sessions on 17 February 2022, submitted that:[621]

- under certain assumptions an average multiple greater than (less than) 1 would suggest an overly generous (insufficiently generous) regulatory allowance
- high multiples lend credence to the idea that regulators have erred on the high side in past regulatory decisions.

Submissions from the ENA and Transgrid suggest that RAB multiples and acquisition activity provides limited usefulness on the adequacy of regulated returns.[622]

Stronger views also exist, such as those expressed in a submission by NSG,[623] who suggested that RAB multiples provide no information at all on the sufficiency of regulated returns. At the 17 February 2022 expert session, Mr Dinesh Kumareswaran submitted a similar view to the NSG, suggesting that observed RAB multiples generally provide no useful information on the reasonableness of the allowed rate of return.[624]

Overall, RAB multiples may not be used in a deterministic way and their application requires due care. We recognise there are other factors outside our rate of return that influence the value of the businesses we regulate. However, we do not accept that RAB multiples provide no useful information. We think there is value to be drawn from RAB multiples because they are a direct indicator of the value that investors place on the businesses we regulate. We think the rate of return these businesses derive from their regulated RABs is an important influence on their value.

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618 AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 129

619 Partington and Satchel, *Report to the CRG: AER Cross Checks*, March 2022, pp. 5, 9.

620 CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, pp.116-117.

621 James Hancock, *Presentation to AER for evidence session on RAB multiples*, February 2022.

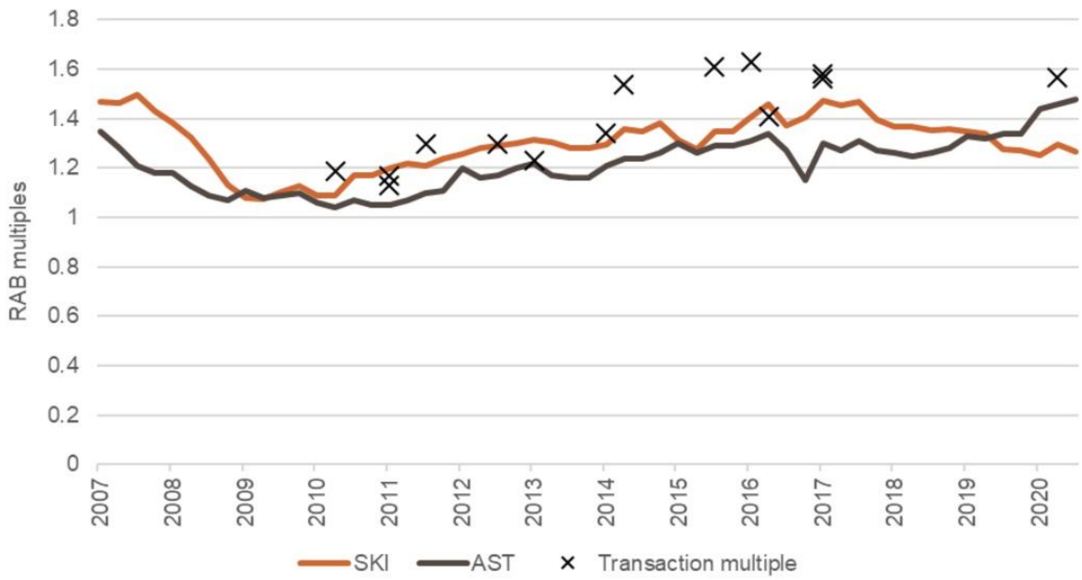
622 ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 126; TransGrid, *AER Rate of Return final Omnibus paper - Submission* 11 March 2022, p. 5; Grant Thornton, *Energy Networks Australia, RAB Multiple Project*, March 2022 p. 5.

623 NSG, *Response to AER Rate of return information paper and Omnibus final working paper*, 11 March 2022, p. 2.

624 Dinesh Kumareswaran, *Presentation to AER for evidence session on RAB multiples*, February 2022.

We have been tracking RAB multiples since 2007. In Figure 11.1 we use Spark Infrastructure and AusNet Services as examples to show performance over this period. Spark and AusNet derive around 72%[625] and 85%[626] of their revenue, respectively, from regulated activities. Observations from our tracking of RAB multiples are discussed in Table 11.2.

Figure 11.1 AER regulated networks – transaction and trading multiples



Source: AER, *Electricity network performance report 2021*, p.33
Note: These values as reported by Morgan Stanley and have not been adjusted for factors that may drive RAB multiples above 1. SKI is Spark Infrastructure, which holds ownership stakes in SA Power Networks (49%), Victoria Power Networks (49%) and TransGrid (15%). AST is AusNet Services, which owns a Victorian electricity distribution network, electricity transmission network and gas distribution network.

Table 11.2 RAB multiples observation and analysis

Observation	Interpretation
RAB multiples have varied over time from a low of almost 1.0 to a high of approximately 1.6.	RAB multiples materially above 1.0 demonstrate investor confidence that the overall calibration of the regulatory settlement is favourable (historically and prospectively). Although we use 1.0 as a benchmark here to demonstrate investor confidence, we note that different benchmark levels can be used to trigger further investigation. This is discussed in more detail in our recent Explanatory Note on RAB Multiples.[627]

625 Regulated revenue has been sourced using figures from Spark Infrastructure's *HY 2021 Fact Book*. This was derived by combining the distribution revenue for Victoria Power Networks and SA Power Networks with the transmission revenue for Transgrid, over the total revenue for all three companies. Total revenue includes distribution, transmission, semi-regulated, and unregulated revenue. We have taken this at an overall level, and not considered ownership stakes for Spark Infrastructure of these companies in our calculation.

626 AusNet Services, *Scheme Booklet and Grant Samuel's Independent Expert Report*, December 2021, p. 126.

627 AER, *Explanatory note – RAB multiples*, December 2021.

Transaction multiples have tended to be higher than trading multiples.	Despite differences in their levels, trading and transaction multiples provide a similar view overall.
After a period of decline seen across 2007-2009 during the global financial crisis, RAB multiples have generally shown an upward trend since 2010. This has been over the period where our regulated return on equity has been tracking lower with the risk-free rate.	We could have expected RAB multiples to trend downwards, not upwards, during periods of falling interest rates, because falling interest rates will lead to lower rates of allowed return for both debt and equity investors. An upward trend suggests that investors remain confident.

In our final working paper, we concluded:

> We cautiously note that the information would suggest our current and expected rates of return are at least sufficient (as part of the overall regulatory compensation to investors) and potentially higher than that needed to attract investment.[628]

Since that conclusion, we have also reviewed the acquisition of AusNet Services and the competing bids by Brookfield and APA. We note that an independent report by Grant Samuel dated 21 December 2021, refers to a RAB multiple for the Brookfield acquisition of Ausnet of between 1.53x and 1.61x.[629] We think this acquisition activity indicates strong investor interest in the assets we regulate. This activity supports the conclusion we reached in our working paper and potentially supports a stronger conclusion.

We also considered the findings of a report provided by ENA from Grant Thornton,[630] which examined the extent to which RAB multiples can be used in assessing the adequacy of allowed regulatory returns. Grant Thornton suggested that RAB multiples do not provide an adequate benchmark to consider the adequacy of the regulatory rate of return based on, but not limited to, the following:

- future positive NPV projects, which can involve both regulated and unregulated activities
- assumed regulatory returns over the life of the asset as opposed to a 5-year time horizon and terminal value assumptions
- differing required rates of return from those underpinning the regulatory pricing
- variations in cashflows from regulatory returns from those underpinning pricing determinations, including incentive payments
- other investor-specific assumptions.

Further, Grant Thornton submitted that a combination of the above factors, and possibly others, has led to observed RAB multiples in excess of 1.0x. As such, they suggest that the use of RAB multiples as a measure by which to determine the adequacy of regulated returns

[628] AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 131.

[629] AusNet Services, *Scheme Booklet and Grant Samuel's Independent Expert Report*, December 2021, p. 3.

[630] ENA, *Grant Thornton expert report*, March 2022.

can be misleading and may result in returns on the standalone regulated assets being insufficient to attract investment and financing over the longer term.

- We accept that the factors identified by Grant Thornton are relevant to our consideration. However, we have seen, for a number of years, that the businesses we regulate have been traded at multiples well above 1.0. Further, we have seen vigorous competition among investors for these assets. In this context, it is difficult to conclude there is a material under-remuneration of investors. We consider RAB multiples indicate that investors are confident in the current and future regulatory returns as being sufficiently high to remunerate their costs. Further, it could be argued that our current and expected rates of return are sufficient (as part of the overall regulatory compensation to investors) and potentially higher than that needed to attract investment.

In addition to reviewing raw RAB multiples, we have been undertaking work to disaggregate some of the components implicit in RAB multiples. We recently published a report prepared by CEPA undertaking this analysis. We have not yet had the opportunity to test the findings of the CEPA work with stakeholders and so have not given it weight in this draft decision.

11.2.1.2 Financeability tests

Financeability refers to a service provider's ability to meet its financing requirements and to efficiently raise new capital.

Financeability tests consider whether a business is able can raise debt capital, and fund interest costs, at a given credit rating. In practice, credit assessments are undertaken by rating agencies and are informed by subjective judgements and financial metrics. Therefore, it is not possible to precisely replicate rating agency views by conducting a hypothetical assessment for a benchmark. As such, regulators typically condense their analysis to a review of financial metrics against a benchmark rule of thumb. We have previously raised concerns about potential changes to gearing if such a rule of thumb was to be used.[631] However, we ultimately found that the allowed rate of return is relatively invariant to changes in gearing and that under our modelling assumptions allowed regulated revenue would decrease slightly if gearing assumptions were lowered.[632]

The most common ratio used is funds from operations to net debt (FFO to net debt). It is a measure of free cashflow and tends to be assessed against a benchmark of 7%. This analysis is limited because:

- it does not include the subjective component undertaken by rating agencies
- the 7% benchmark is itself subjective
- financeability is actively managed by the firm to optimise debt costs – it is especially sensitive to the choice of amount of debt compared to equity. In the past few years, we have seen regulated firms actively choose a higher level of debt, recognising this could lead to a credit rating downgrade.

[631] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p. 403.

[632] AER, *Rate of return instrument, Explanatory Statement*, December 2018, p. 404.

In 2018 we calculated FFO to net debt for each of the businesses we regulate at our benchmark gearing of 60%.[633] This analysis showed variation across businesses, but 21 out of 29 were able to meet the 7% rule of thumb.

When we repeated this analysis, for our final working paper using 2021 data and based on submissions from regulated networks, we found that 24 of the 32 firms met the 7% rule of thumb. We had expected to see a deterioration in the results as our return on equity had tracked lower with a lower risk-free rate. As shown in Table 11.3 below, based on FFO/net debt analysis, financeability has not deteriorated under our 2018 Instrument. Results suggest that other changes (such as higher depreciation and revenue adjustments) have offset the decline in return on equity.

Table 11.3 Update of 2018 Instrument FFO/net debt analysis

Measure	2018	2021 (2018 firms)	2021 (all firms)	2021 (firms not in 2018 analysis)
Number of firms	29	29	32	3
Average FFO/net debt	8.44%	8.32%	8.33%	8.42%
Industry average return on equity	7.06%	5.86%	5.78%	5.00%
Number of firms with less than 7% FFO/net debt	8	7	8	1
Number of firms with higher FFO/net debt compared to 2018	–	12 out of 29	–	–
Average increase in FFO/net debt	–	0.89%	–	–
Average decrease in FFO/net debt	–	-0.82%	–	–

Source: AER, *Rate of return final omnibus paper*, Table 17, p.127
Note: Net debt is estimated as the average of opening and closing debt proportion (60%) of the RAB. Average change in FFO/net debt is the simple average of the difference between each firm's 2018 estimate and 2021 estimate. We estimated each firm's FFO/net debt as the average over the relevant 5-year period.

There were differing views on the role and usefulness of financeability tests as a crosscheck.

Several stakeholders noted that they should be part of the suite of crosschecks to determine whether the regulatory allowance supports the credit rating.[634,635,636,637] In contrast the CRG

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[633] Calculation of financeability metrics use benchmark gearing of 60%, rather than actual gearing.

[634] Ausgrid, *Rate of Return 2022 information paper – Submission,* 11 March 2022, p. 4.

[635] GIIA, *Response to AER Final Omnibus Paper,* 11 March 2022*,* p. 4.

[636] APGA, *APGA Submission to the AER: Rate of return final omnibus paper and information paper*, 11 March 2022, p. 325.

[637] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 139.

suggested that there is limited usefulness of financeability tests in the context of the Rate of Return Instrument.[638]

We also heard different views on the relevance of financeability from the experts at the concurrent evidence session on 17 February 2022.[639] One expert, Mr Dinesh Kumareswaran, argued that there are generally 2 reasons why a business might fail the regulatory financeability test – that the depreciation allowance is too low or that the allowed return on capital/equity is set too low. [640]

Conversely, Mr Jonathan Mirrlees-Black, argued that financeability results are not an indicator of WACC because a breach of a credit agency metric is not evidence by itself that our assessment of the cost of capital for a business is too low. For example, it could signify a high capital investment profile, inappropriate debt structure or an aggressive dividend policy.[641]

We agree that financeability may play a useful contextual role, though we are aware of limitations, such as:

- a potential absence of clarity about a regulator's role in addressing financeability issues
- a lack of a simple and universally acceptable methodology for financeability assessments
- rating agencies' assessment of cashflows (expected vs actual) may be inappropriate for regulatory purposes
- issues with using the actual costs of a service provider for financeability assessments, which we have previously considered and decided that it would not be appropriate. This is because our objective is to provide an efficient allowance for the benchmark firm and actual costs may not be efficient.[642]

Since we published our financeability analysis in December 2021,[643] stakeholders have not raised issues that would suggest we need to revisit our analysis or reconsider our interpretation of the results.

Given the above, our draft decision is that financeability tests can inform the rate of return in a contextual role. At this time, our analysis does not suggest that financeability has emerged as a problem under our 2018 Instrument.

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638 CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 105.

639 AER, *Concurrent evidence sessions 4 – proofed transcript*, February 2022.

640 AER, *Concurrent evidence session 4 – proofed transcript*, February 2022, p.19

641 Dr Jonathan Mirrlees-Black, *Presentation for expert evidence sessions*, February 2022, p. 24.

642 AER, *Rate of return and cashflows in a low interest rate environment*, May 2021, p. 82.

643 AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 124.

11.2.1.3 Historical profitability

Historical profitability measures are backward-looking measures of actual returns earnt by businesses.

With expanded reporting of historical measures, we have developed a view of the return on regulated equity. This measure illustrates the final returns to equity holders after all expenses and allows for a comprehensive comparison of the NSPs' actual returns against expected returns. It is a ratio based on net profit after tax (NPAT) rather than EBIT. This means that the measure will also capture returns arising because of differences between:

- actual tax expense and the networks' forecast tax allowance
- actual interest expense and the networks' forecast return on debt allowance.

Some stakeholders note that profitability has little value and can be excluded, given they do not provide information on the expected rate of return.[644] Further, they suggest that fundamental problems exist using accounting profitability as a crosscheck, related to cost allocation, accounting profit measures (which differ from economic profit) and gaming problems.[645]

At the concurrent evidence session on 17 February 2022 there was similarly broad agreement that using profitability as a crosscheck may not be a useful or helpful exercise. Professor Partington suggested that use of the accounting return on equity or assets for regulatory or investment decisions is generally discouraged because they have limited applicability to either the rate of return that investors earn or the rate of return that investors require.[646] Further, Professor Partington suggested that while profitability may have temporary value, the potential to manipulate accounting profits or to begin gaming through the adoption of income reducing policies ultimately makes the measure useless.[647]

Similarly, Mr Dinesh Kumareswaran suggested that practical problems, such as the reliability of business information, needs to be understood when using profitability to inform the reasonableness of the allowed return in future periods.[648] In addition, Mr Kumareswaran suggests that, even if historical information about profitability is reliable, it provides limited useful insight into expected returns.[649]

644 APA, *APA submission on the Rate of Return Information Paper, Omnibus Paper, and Expert Evidence*, 11 March 2022, p. 66; ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 140; Partington and Satchel, *Report to the CRG: AER Cross Checks*, March 2022, pp. 36-40.

645 Ibid.

646 AER, *Concurrent evidence session 4 – proofed transcript*, February 2022, p. 32.

647 Ibid.

648 AER, *Concurrent evidence session 4 – proofed transcript*, February 2022, p. 15.

649 AER, *Concurrent evidence session 4 – proofed transcript*, February 2022, p. 16.

However, the CRG noted that profitability could have a role and be used as a qualitative ‘conditioning variable’ given its importance to consumers in evaluating the overall framework.[650]

When we examine the possible use of historical profitability in a contextual role, we acknowledge that there are strengths to using the actual profitability of regulated businesses:

- It informs the historical effectiveness of our regulatory framework and the total return achieved by businesses.
- It is relatively easy to understand and compare over time (at first glance).
- It can potentially help to identify areas that require further investigation.
- It may be helpful in identifying whether the business’s actual cost of debt has been systematically higher or lower than the cost debt applied in the rate of return.

However, we found that the use of historical profitability carries limitations, including:

- confusing actual returns with expected returns
- ‘inherent inertia’ with the application of the Instrument
- circularity and feedback-loop issues.

We can observe these limitations when we employ the return on regulated equity measurement, mentioned above, over a relevant time period (2014 to 2020). Findings, seen in Figure 11.2, suggest that:

- average electricity network returns on regulated equity declined materially
- despite this, electricity networks achieved returns on regulated equity that exceed forecast returns on equity by approximately 4.2 percentage points.

This occurred against a backdrop of declining forecast returns on equity. This decline has progressed as:

- interest rates have declined, including the rates on Commonwealth Government Securities based on which we base the risk-free rate
- we have applied the 2013 Rate of Return Guideline and, from 2020, have begun to apply the 2018 binding Rate of Return Instrument. So far, the 2018 Instrument has applied to 5 DNSPs and one TNSP.

We also note that the difference between forecast and real returns was higher in the earlier years and narrowed materially after the introduction of the 2013 Rate of Return Guideline.

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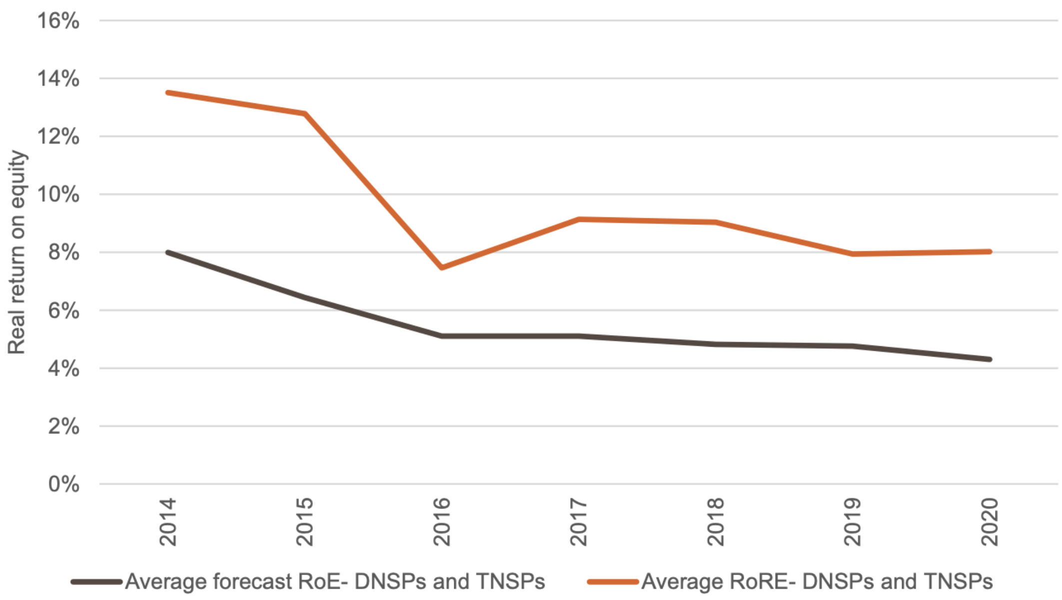
650 CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, pp. 109, 119-120.

Figure 11.2 Real returns on regulated equity compared to forecast returns on equity – DNSPs and TNSPs



Source: AER, *Electricity network performance report 2021,* September 2021, p.64

In summary, our analysis of this crosscheck clearly shows return on regulated equity declining with interest rates in combination with the progressive application of the 2013 Rate of Return Guideline and the 2018 Instrument. However, it also shows average returns significantly above our regulated return due to a range of factors, including the incentive framework we operate.

Therefore, we would suggest that analysis of historical profitability does not provide an insight into whether lower returns on equity, of themselves, are appropriate or problematic. This is mainly due to historical profitability being a backward-looking measure of actual returns earnt by businesses rather than expected returns. Most stakeholders are also supportive of our December position on the limited use of historical profitability as a crosscheck.

Given the above, our draft decision is that we do not consider that useful conclusions about the rate of return can be drawn from analysis of historical profitability.

11.2.1.4 Investment trends

Examining investment trends may be useful when considering the rate of return because:

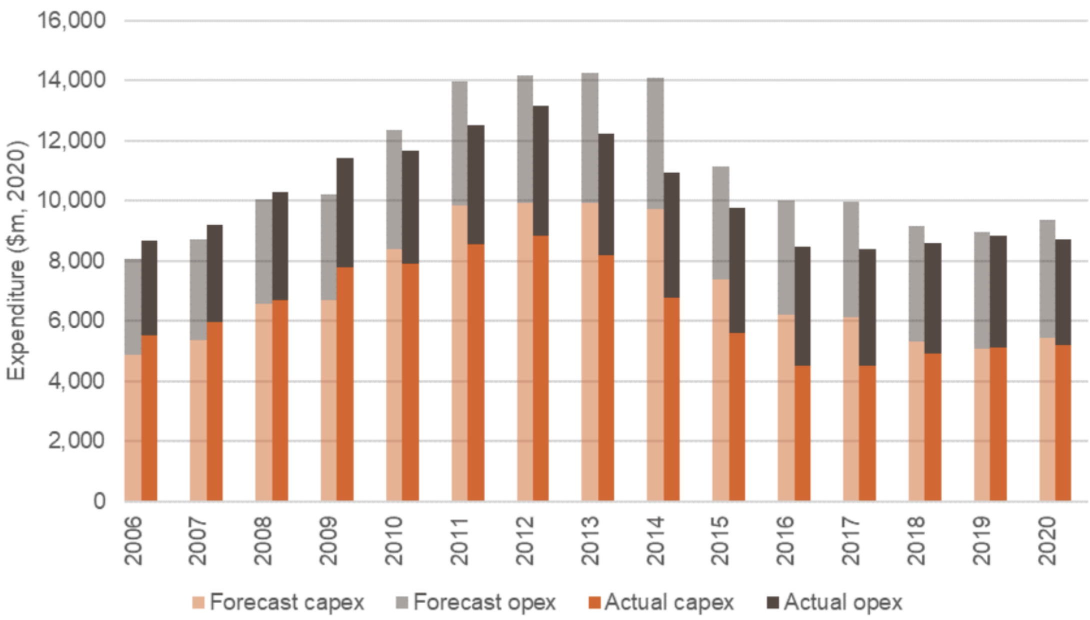
- an allowed rate of return that is too high may encourage inefficient overinvestment
- an allowed rate of return that is too low may discourage efficient investment.

We have previously considered whether investment trends may provide some indication about whether the allowed rate of return in past regulatory determinations was too high or too low. However, stakeholders agree with our December position, which is that investment trends are of little value as crosschecks and can be excluded,[651] though they should be reported for completeness.[652]

Our examination of investment trends suggests that the key issue with their use is that investment levels are determined by many factors and rate of return is only one of these factors.

External factors have contributed to substantial swings in network investment over the past 15 years (Figure 11.3). These external factors include changes in reliability standards and the mandatory roll-out of smart meters. This was then followed by declines in demand and subsequent excess capacity in networks.

Figure 11.3 Total expenditure – DNSPs and TNSPs



Source: AER, *Electricity network performance report 2021*, September 2021, p.17

Looking forward, a period of substantial investment in transmission networks is required to support the shift to renewable energy sources. Therefore, it is not possible to draw conclusions about the rate of return from this information.

Notwithstanding the findings above, we found there is broader information available to suggest an overall supportive investment environment. For the past decade we have seen frequent changes of ownership of the networks. In each case, these transactions have taken place at more than the value of the underlying regulated asset base. Most recently, we have

651 APA, *APA submission on the Rate of Return Information Paper, Omnibus Paper, and Expert Evidence*, 11 March 2022, p. 65.

652 CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 104.

seen the sale of Spark and AusNet Services. In the latter case, there was competitive bidding in the takeover process between Brookfield and APA.

In addition, in 2020, Transgrid[653] and ElectraNet[654] submitted rule changes to the Australian Energy Market Commission (AEMC) to allow for changes to their return profiles to support the financeability of their upcoming investment in the new South Australia to New South Wales interconnector. The AEMC concluded that changes to the rules were not needed for Transgrid[655] and ElectraNet[656] to support the financeability of the project.

This broader information suggests a supportive investment environment for the networks we regulate.

Given this analysis, our draft decision reflects our continued view that useful conclusions about the rate of return cannot be drawn from investment trend information. Therefore, we do not think they should be used as overall rate of return crosscheck.

11.2.1.5 Other regulators' rate of return decisions

Consideration of other regulators' rate of return can provide us with an indication of the required rate of return because regulators can share similar objectives and tasks when setting the rate of return for regulated businesses. Other regulators' decisions may be useful to compare with our rate of return, when businesses have similar risks and when those regulators have similar objectives to us.

Stakeholders have identified potential issues, including:[657]

- geographical differences in risks, taxes, costs and data
- business differences in risks and challenges
- differences in methods, objectives, context and capture.

Stakeholders also identified potential benefits, including: [658]

- congruency in tasks and objectives

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[653] TransGrid, *Rule change proposal – making ISP projects financeable*, September 2020.

[654] ElectraNet, *Rule change proposal – making ISP projects financeable*, October 2020.

[655] AEMC, *Participant derogation – financeability of ISP projects (TransGrid)*, April 2021.

[656] AEMC, *Participant derogation – financeability of ISP projects (ElectraNet)*, April 2021.

[657] Partington and Satchel, *Report to the CRG: AER Cross Checks*, March 2022, p. 5; CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 104.

[658] APA, *APA submission on the Rate of Return Information Paper, Omnibus Paper, and Expert Evidence*, 11 March 2022, p. 65; ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 135; APGA, *APGA Submission to the AER: Rate of return final omnibus paper and information paper*, 11 March 2022, p. 25; GIIA, *Response to AER Final Omnibus Paper,* 11 March 2022*,* p. 2; Endeavour Energy, *Rate of return information paper and call for submissions*, 11 March 2022, p. 5.

- potential to gain an indication of the rate of return expected by investors
- identifying red flags
- identifying innovation and options.

At the concurrent evidence sessions on 17 February 2022, there was broad agreement that a crosscheck with other regulators' decisions may be useful. For example, Mr Toby Brown, co-author of the Brattle report on this topic,[659] acknowledged that, despite differences in jurisdictions and businesses regulated, all regulators share a similar task in estimating the cost of equity and setting the return for authorised revenues.[660] As such, bearing the approaches of other regulators in mind could be a useful source of evidence or of additional matters to consider.[661]

Mr Kumareswaran supported the suggestion that other regulators' decisions would be a useful crosscheck because all are essentially engaged in the same task. Additionally, Mr Kumareswaran suggested that other regulators' decisions might also use different data, models and methods to those we use, thereby doing something different and producing different results.

In responses to our information paper questions on our return on equity crosschecks under steps 4 and 5 of our foundation model approach, the ENA and NSG submitted that international regulators provide a useful crosscheck on the return on equity.[662] In contrast, consumer groups such as the CRG recommend maintaining the same crosschecks we applied in the 2018 Instrument, noting the limitations of comparing other cost of equity reference points. In the CRG's view, for other cost of equity reference points to be meaningful and comparable they need to have been produced under similar assumptions as we have applied in our return on equity estimates.[663]

Other regulators' estimates of the expected return on equity are typically used for similar purposes to ours, to protect consumers from excessive costs. However, other regulators' decisions can be relatively infrequent and can have limited comparability due to different regulatory frameworks and regulated businesses. Consequently, these estimates play a limited role in our return on equity estimation process.

From our examination of the use of other regulators' return on equity and rate of return as a crosscheck, we note a range of factors that limit the suitability of this type of information.

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[659] The Brattle Group, *International approaches to regulated rates of return – a review for AER*, September 2020.

[660] AER, *Concurrent evidence session 4 – proofed transcript*, February 2022, p. 7.

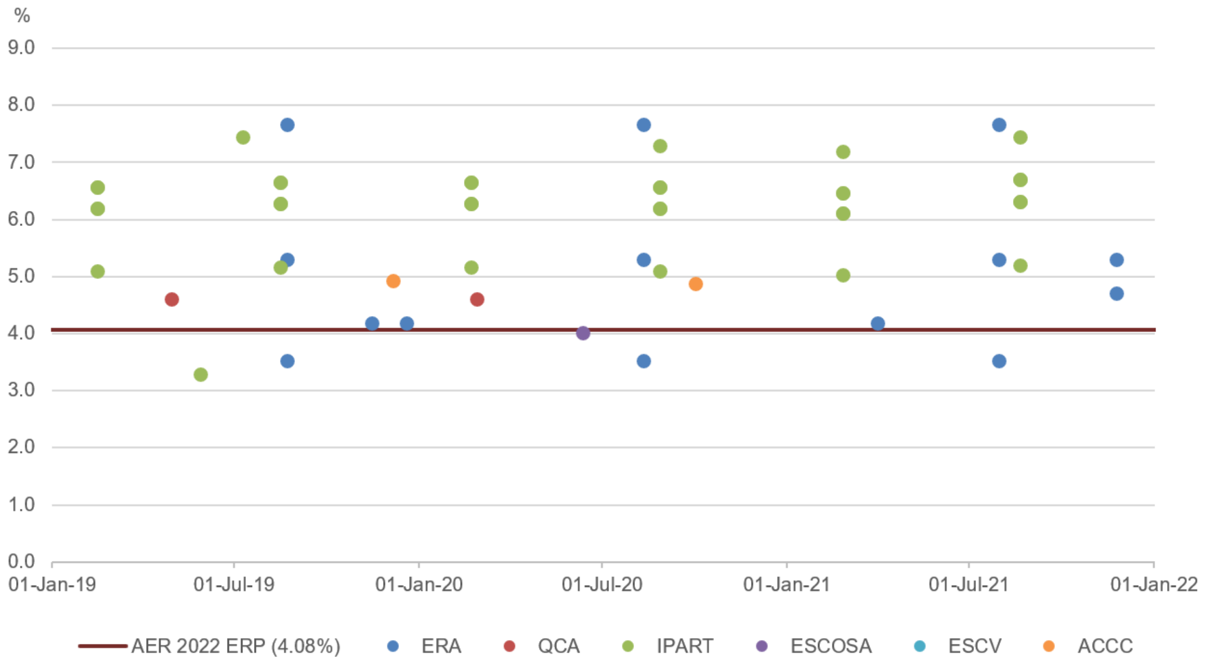
[661] Ibid

[662] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, pp. 138-139; NSG, *Response to AER Rate of return information paper and Omnibus final working paper*, 11 March 2022, p. 11.

[663] CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper,* March 2022, pp. 126-127.

Figure 11.4 shows how our estimate of the equity risk premium (ERP) of 4.08% compares against other regulators. With the exception of the ERA, other Australian regulators do not set revenue determinations for regulated distribution and transmission energy network services.

Figure 11.4 Other regulators' ERP estimates



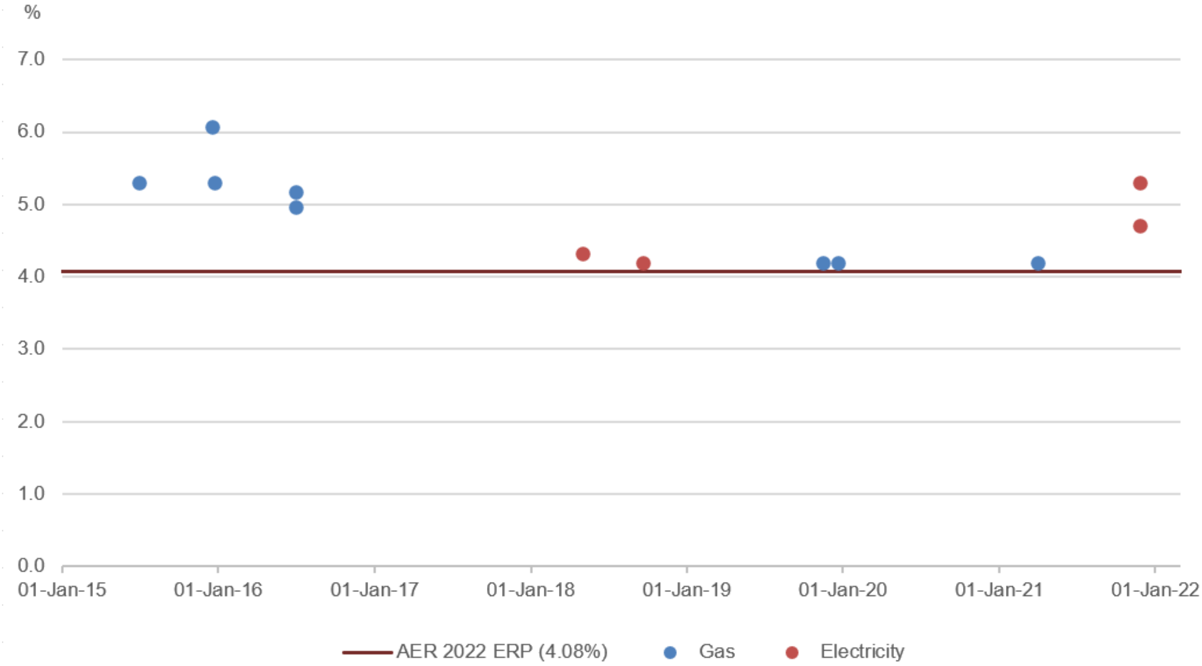
Source: ERA, Determination of Pilbara networks rate of return - Horizon & Alinta, 24/11/21; ERA, Determination of Public Transport Authority, Arc Infrastructure and Pilbara Railways, 30/7/21; ERA, Dampier to Bunbury Natural Gas Pipeline, 1/4/21; ERA, Determination of Public Transport Authority, Arc Infrastructure and Pilbara Railways, 11/8/20; ERA, Goldfields Gas Pipeline Access Arrangement for 2020 to 2024, 19/12/19; ERA, Mid-West and South-West Gas Distribution Systems access arrangement for 2020 to 2024, 15/11/19; ERA, Determination of Public Transport Authority, Arc Infrastructure and Pilbara Railways, 22/8/19; IPART, WACC biannual updates, 15/02/19-20/8/21; IPART, Rate of return and remaining mine life from 1 July 2019, 9/7/19; ESCOSA, SA Water Regulatory Determination 2020, 11/6/20; QCA, Queensland Rail's 2020 Draft Access Undertaking - Decision, 27/2/20; QCA, Seqwater Bulk Water Price Review 2018-21, 29/4/19; ACCC, Decision on Australian Postal Corporation 2019 price notification, 6/12/19; ACCC, Public inquiry on the access determination for the Domestic Mobile Terminating Access Service - Final report, 2/10/20.

When assessing other regulators' return on equity estimates, our approach is to consider the strengths and limitations of the information and give weight to the relative merit rather than mechanistically calculating an outcome based on whether the estimates are higher or lower than our ERP.

The limitations in comparing other regulators' return on equity estimates are largely driven by methodological differences between regulators. For example, for the time period shown in Figure 11.4, the ERA adopted a term of 5 years for its return on equity, whereas our term was 10 years.

However, differences between regulators also reflect differences in the industries that are subject to regulation.[664] Although the regulatory purposes for setting a rate of return may be the similar, the compensable risks being assessed by regulators are not necessarily the same across different industries. Of the other Australian regulator estimates we look at, only the ERA regulates energy network services. As a result, we have specifically looked at the ERA's determinations for gas and electricity networks since 2015 as shown in Figure 11.5. Our ERP is lower than other regulators such as the ERA, likely because of methodological differences and a lack of a like-for-like risk comparison.

Figure 11.5 ERA's ERP estimates over time



Source: ERAWA, ATCO Gas, 30 June 2015, ERAWA, Goldfields Gas Pipeline (Draft), 17 December 2015, ERAWA, Dampier to Bunbury Natural Gas Pipeline (Draft), 22 December 2015, ERAWA, Dampier to Bunbury Natural Gas Pipeline (Final), 30 June 2016, ERAWA, Goldfields Gas Pipeline (Final), 30 June 2016, ERAWA, Access Arrangement for the Western Power Network (Draft), 2 May 2018, ERAWA, Access Arrangement for the Western Power Network (Final), 20 September 2018; ERA, Dampier to Bunbury Natural Gas Pipeline, 1/4/21; ERA, Goldfields Gas Pipeline Access Arrangement for 2020 to 2024, 19/12/19; ERA, Mid-West and South-West Gas Distribution Systems access arrangement for 2020 to 2024, 15/11/19; ERA, Determination of Pilbara networks rate of return – Alinta & Horizon, 24/11/21.

The information in Figure **11.6** compares the return on equity that would be produced using our draft Instrument[665] with the return on equity of other Australian regulators.

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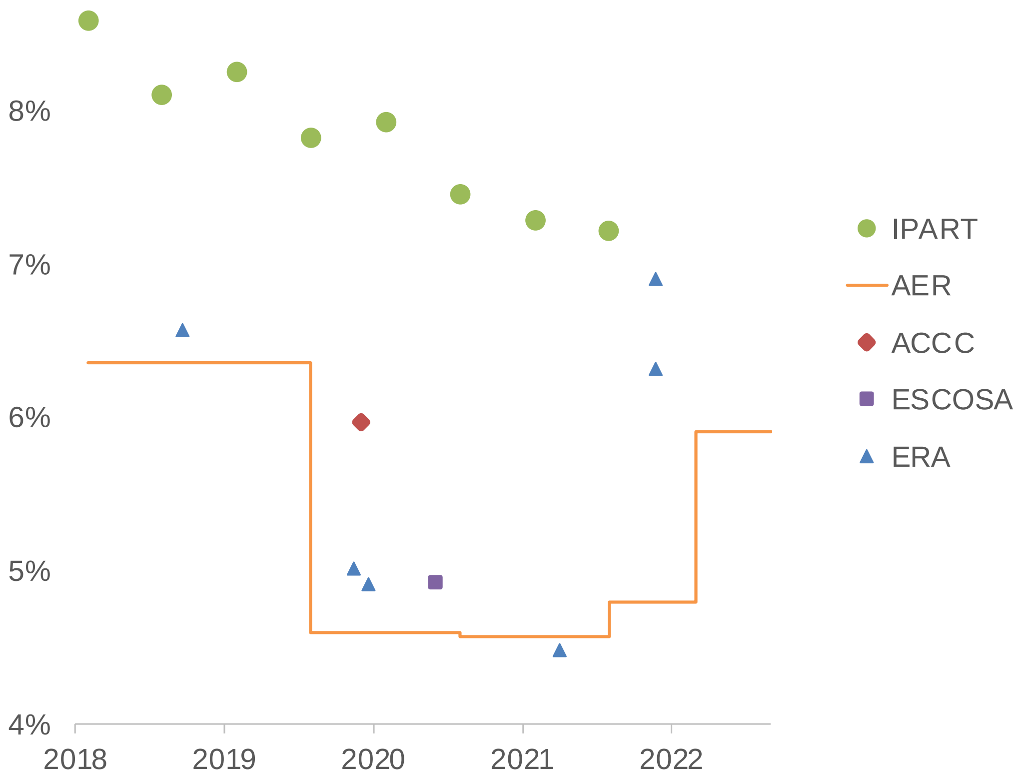
[664] AER, *Better Regulation, Rate of Return Guideline*, December 2013, appendix B, pp. 30-31; AER, Draft decision, *TransGrid transmission determination 2018 to 2023, Attachment 3 - Rate of Return*, September 2017, pp. 235-236 - footnote 953; AER, *AusNet Services distribution determination final decision 2016-20, Attachment 3 - Rate of Return*, May 2016, p. 247 - footnote 985.

[665] Using data as at month end February 2022.

Figure 11.6 Return on equity comparison – AER and local regulators



Note: The AER values for 2018 to 2021 are based on the indicative returns from the annual update report from December 2021. AER's 2022 value is 5.9%, using 5-year term values as follows: risk-free rate of 1.8%, MRP of 6.8% and equity beta of 0.6. The risk-free rate value of 1.82% reflects data up to Feb 2022.

In view of the methodological differences when conducting comparisons. on balance, it is reasonable to not give other Australian regulators much weight under our consideration.

In Table 11.4, we see a comparison with international regulators, based on a table in the Brattle Report,[666] which shows the impact of a changing risk-free rate and MRP on our position relative to others.

Table 11.4 Brattle's comparison of regulators' equity decisions plus our draft position for the 2022 instrument

Regulator	Decision year	MRP	Equity beta	RFR	TMR*	ROE (post tax)
STB (USA)	2018	6.91%	1.11	3.02%	9.93%	13.86%
FERC (USA)	2020	8.60%	0.84	2.70%	11.30%	10.05%
ARERA (ITALY)	2019	5.50%	0.706	3.59%	9.09%	7.47%
OFGEM (UK)	2019	7.32%	0.76	1.25%	8.57%	6.80%
OFWAT (UK)	2019	7.89%	0.71	0.61%	8.50%	6.19%

666 The Brattle Group, *A review of international approaches to regulated rates of return: Prepared for the AER*, 1 June 2020.

AER	2022 Draft Instrument	6.81%	0.60	1.82%	8.63%	5.91%
NZCC (NZ)	2019	7.29%	0.65	1.12%	8.41%	5.87%
ACM (Netherlands)	2016	5.05%	0.74	1.28%	6.33%	5.02%
AER	2020 (Energex)	6.10%	0.60	1.03%	7.13%	4.69%

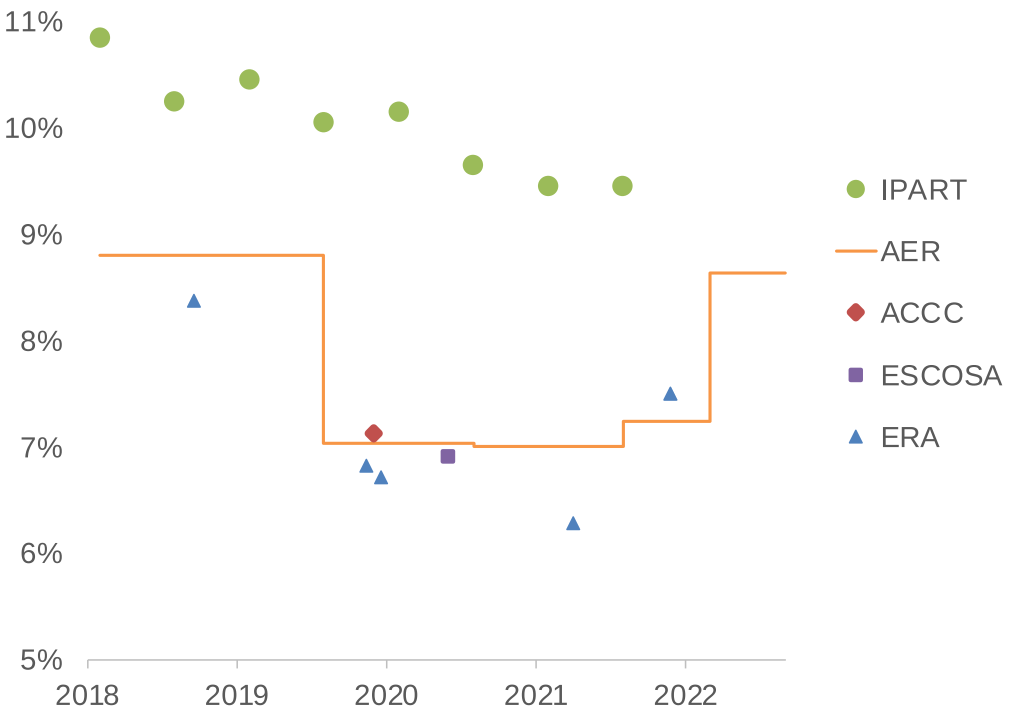
Note: Inflation assumed to be 2% if not stated by each regulator. STB (Surface Transport Board USA primarily regulates freight rail): Uses 2 equally weighted methods to determine return on equity (ROE). FERC: Uses 3 equally weighted methods to determine ROE. MRP: Market risk premium. RFR: Risk-free rate. TMR: Total market return (nominal).

In addition to the quantitative comparisons covered above, we also considered the rationale and methods used by different regulators, as documented in the Brattle report.

We highlight that the numerical results can be misleading for two reasons in particular:

- First, comparing regulatory decisions is very sensitive to when the comparison takes place. For example, when the risk-free rate is low, our return on equity will, all else equal, be lower than other regulators who take a different approach to the relationship between risk-free rate and MRP. Similarly, when the RFR is high, our ROE will, all else equal, be higher than those other regulators. We can see this movement demonstrated in Table 11.4 which provide comparisons of our total market return against international regulators and Figure 11.7 compares against local regulators. These demonstrate how changes to the risk-free rate, even when MRP stays constant, can move our results relative to comparators.
- Second, other regulators' decisions will reflect the key issues noted by stakeholders, such as geographical and business differences, or variations in regulatory methodologies.

Figure 11.7 Total market return comparison – AER and local regulators



Source: AER analysis,
Note: The AER values for 2018 to 2021 are based on the indicative returns from the annual update report from December 2021. AER's 2022 value is 8.6%, using 5-year term values as follows: risk-free rate of 1.8%, MRP of 6.8%

After considering other regulators' decisions, both in terms of the quantitative results and the methods used, we consider our December 2021 position holds – there is limited value in the use of other regulators' rate of return as a crosscheck.

11.2.1.6 Analysts' discount rates

Discount rates used by market analysts and valuation reports may be an indication of the rate of return expected by investors.

There are differing views from stakeholders on the role and usefulness of analysts' discount rates. For example, the ENA notes that independent expert reports can provide direct evidence of the material inadequacy of the current level of the allowed return on equity.[667] Stronger support can be found from the NSG, viewing the use of market analyst and valuation expert estimates as the most critical crosscheck.[668]

However, in contrast, APA suggests that there is limited usefulness.[669] The CRG go further in noting that there is a potential lack of comparability as well as methodological issues. One such issue is that market practitioners may use a long-run or blended risk-free rate rather than our current approach of the prevailing risk-free rate. [670]

Our analysis finds that there may be issues with comparability and methodology, when we consider using analysts' discount rates as a crosscheck for our overall rate of return.

In our evaluation of the return on equity crosschecks, we consider broker reports. From these, we can derive a range for their estimated equity risk premiums.[671] We use the range informatively since there may be a degree of circularity between our decisions and broker estimates. This is due to the potential for broker estimates to be affected by our decisions. We place greater weight on more recent reports since broker reports can provide targeted and timely information on returns for regulated utilities. We consider both the current assumptions on required returns and changes over time, as tracked by the firms providing the reports. Given concerns about the comparability of the estimates at a point in time across

[667] ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 132.

[668] NSG, *Response to AER Rate of return information paper and Omnibus final working paper*, 11 March 2022, p. 11.

[669] APA, *APA submission on the Rate of Return Information Paper, Omnibus Paper, and Expert Evidence*, 11 March 2022, p. 66.

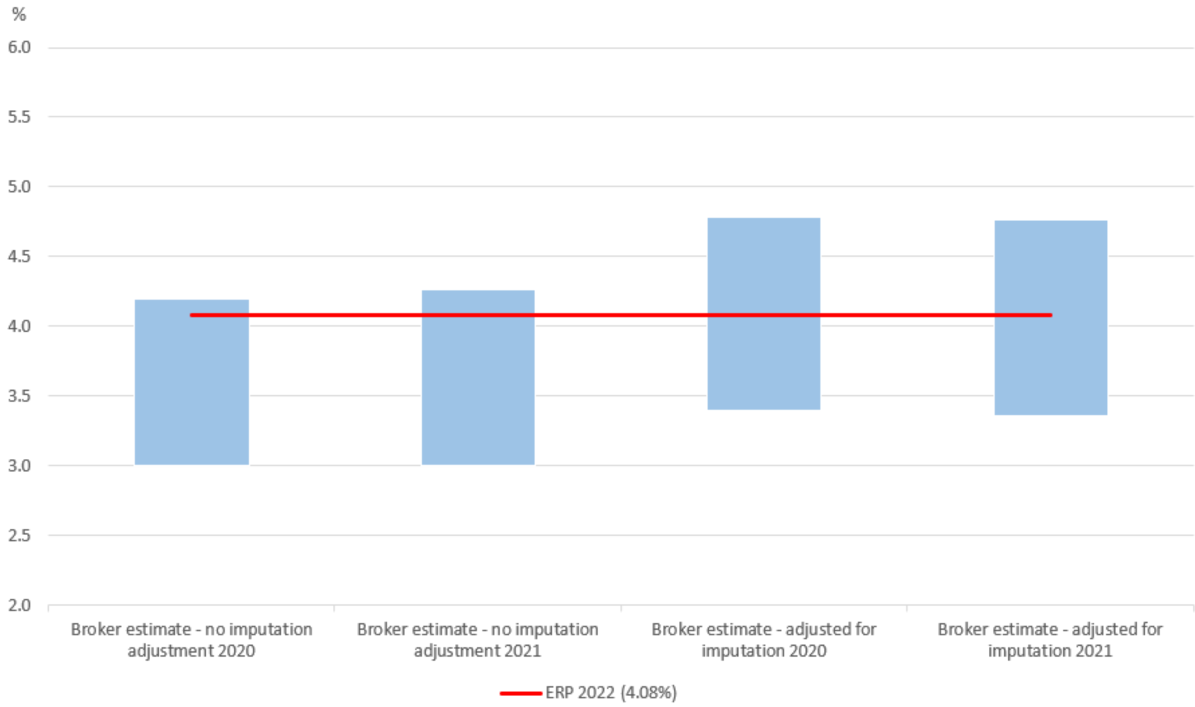
[670] CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, pp.123, 125.

[671] AER*, Rate of return Guideline 2013, Explanatory Statement*, December 2013, p. 30.

broker reports, examining trends over time may provide information on current returns relative to long-term averages.

Figure 11.8 shows broker equity risk premium estimates. Our draft ERP estimate of 4.08% is within the range estimated from broker reports.

Figure 11.8 Broker ERP ranges for 2020 and 2021



Source: AER analysis of broker reports that include a valuation for AusNet Services, Spark Infrastructure, APA Group, and/or DUET Group.

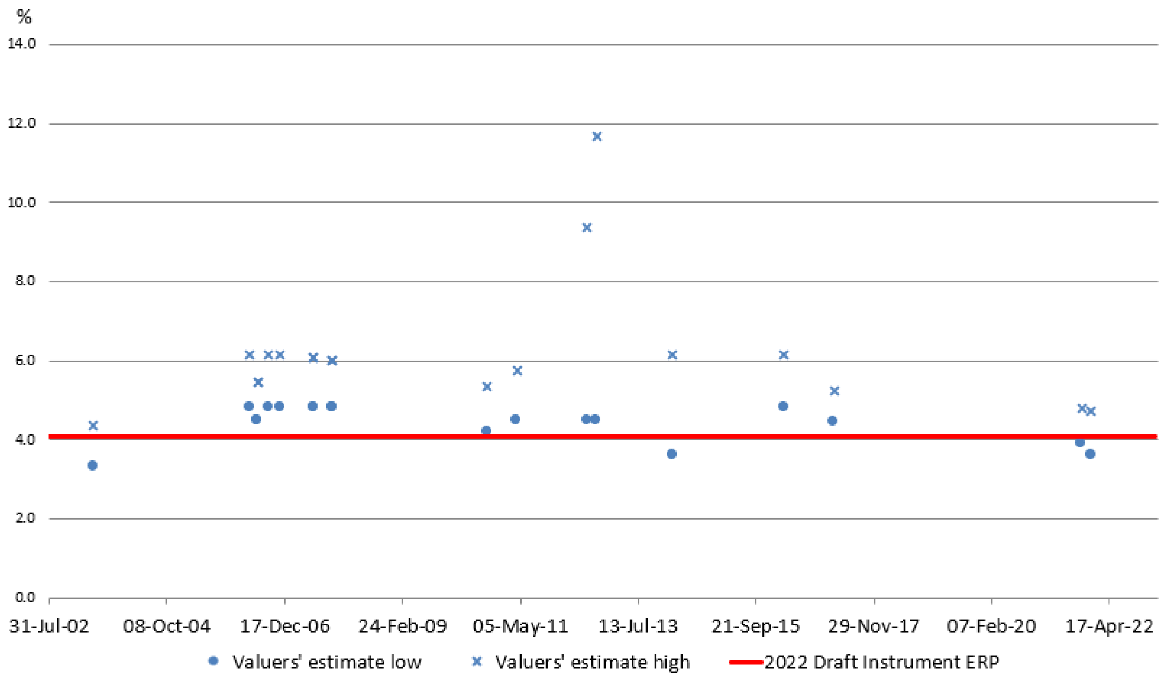
Independent valuation reports can also provide information on the discount rate used for valuing energy network businesses and detailed explanation. However, we note the limitations with these estimates due to:

- concentration of available reports across a few valuation firms and the limited number over a long period of time[672]
- the estimates including uplifts applied by values that could reflect a range of factors that do not warrant inclusion in the rate of return as required by our legislative objectives (for example, non-systematic risks, term structure of the chosen equity proxies and the relevant investment period exceeding the term of the proxies)
- lack of clarity around adjustments for dividend imputations.

[672] There have been only 21 relevant independent valuation reports spanning a period going back to 1991. Only 15 reports included a discounted cashflow analysis with information on a return on equity estimate. These 15 reports were provided by only four independent valuation firms, with 10 of the 15 reports being provided by Grant Samuel & Associates.

The equity risk premium ranges from independent valuation reports are shown in Figure 11.9.

Figure 11.9 Independent valuation reports estimates



Source: AER analysis of reports from Thomson Reuters
Notes: We have shown the equity risk premium based on a nominal vanilla WACC. Expert reports using a different WACC form have been adjusted accordingly. This equity risk premium ('valuers estimate-high') also reflects the impact of any discretionary uplifts applied by the independent valuer.

Recognising the limitations highlighted above, we consider it reasonable to place no weight on the equity risk premium estimates from independent valuation reports estimates.

As such, we consider the December position holds – that there is limited value in comparing our decision with analysts' discount rates or independent valuation reports.

11.2.1.7 Sensitivity testing

Table 11.5 provides a list of sensitivity tests, with the subsequent section providing additional detail on each of these. These sensitivity tests across multiple facets of the Instrument are then used to inform the subsequent discussion on how the Instrument might fare in different states of the world, which we then describe as scenario tests.

Table 11.5 Sensitivity tests

Test undertaken	Description	Results
1) MRP	Comparing outcomes of the following MRP options: • historical excess returns (HER) • combined HER and 3-stage DGM.	Under the HER approach, if interest rates change by ±3%, we estimate: • an ROE impact of ±3% • a household bill impact of ±$96. Under the combined HER and 3-stage DGM approach, if interest rates change by ±3%, we estimate: • an ROE impact of ±2.3% • a household bill impact of ±$74.

2) Beta	Using differing beta values to examine the impact on: • ROE • revenues • household bills.	We estimate that each ± 0.1 change in beta has the following impacts: • ± 0.7% on ROE • ± 2.2% on revenues • ± $22 per year on household bills.
3) Term	Using a 10-year and 5-year term to examine the impact on ROE.	Based on observed spreads between 10-year and 5-year government bonds, we estimate that the change from 10-year term to 5-year term will: • reduce the ROE by approximately 0.3% • reduce household bills by approximately $10 per year. However, the impact over short periods could be between $1 and $26 per year.

Note: Our calculation of bill impacts is based on an assumption that a 1% change in the ROR results in an 8.2% impact on NSPs' unsmoothed revenues. Assuming a 50% network component of the $2,000 average household bill, this results in a 4.1% bill impact. This calculation ignores demand impacts.

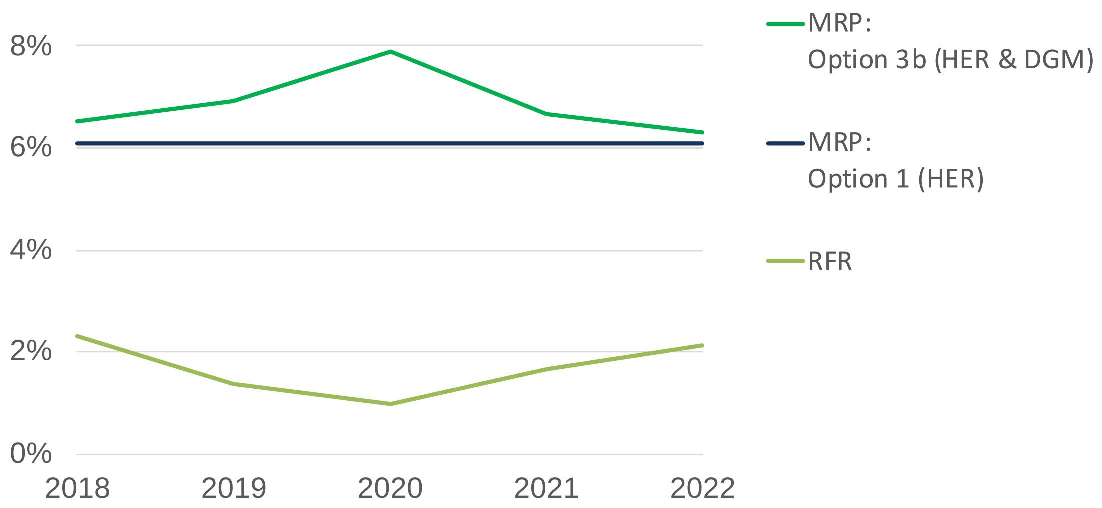
1) MRP test – How does the return on equity vary with the risk-free rate?

For this sensitivity test, we explore movements in the return on equity for differing values of the risk-free rate under the 2 approaches for setting the market risk premium, namely:

- setting a fixed MRP based on historical excess returns (HER) (Option 1)
- allowing the MRP to vary based on a combination of historical excess returns and our 3-stage dividend growth model (Option 3b).

The difference in MRP across the prior regulatory period, based on the approach used, is shown in Figure 11.10.

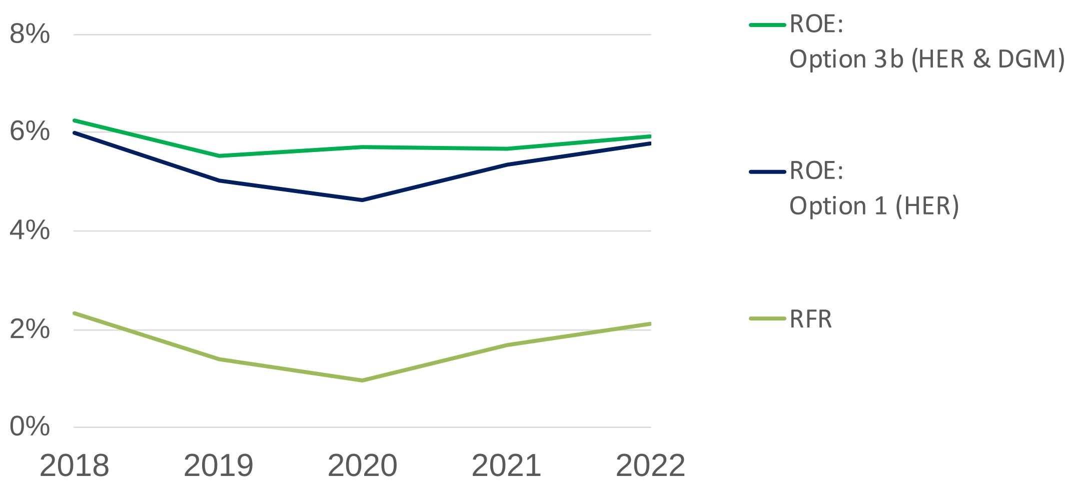
Figure 11.10 Comparison of MRP for Option 1 and Option 3b



Source: AER analysis
Note: Option 1 uses AER's value of 6.1% for MRP from the 2018 Instrument, Option 3b uses an average of the annual figures from our historical excess returns and 3-stage dividend growth model. RFR uses annualised 10-year CGS yields from 2018 to 2021, and the 20-day average for 2022, as at the end of February 2022.

Based on current market rates at this time, we find that the return on equity is similar under our 2 options for determining the MRP. However, the ROE was more volatile under Option 1 than it would have been under Option 3b (as shown in Figure 11.11)

Figure 11.11 Comparison of ROE for Option 1 and Option 3b



Source: AER analysis
Note: Option 1 resulted in a lower return on equity for most of the 2018 Instrument years, although rising risk-free rate values in 2022 bring both options to approximately the same level. ROE is derived using the MRP values detailed in Figure 11.10, and a beta value of 0.6.

Option 3b would also have produced a more stable and higher return on equity than Option 1. We estimate that the return on equity could have been approximately 0.46 percentage points higher, on average, over the 2018 to 2022 period. This would have increased household bills by an estimated $15 per year.

If the risk-free rate changes in the future, the HER and DGM combination approach is likely to generate a more stable return on equity. For any given risk-free rate at any given point in time, a ±3% change could cause the return on equity to change by ±2.3% for the HER and DGM combination approach compared with a ±3% change for the HER approach (see Appendix D for further detail). The extent of stability depends on how the DGM reacts to changes in the risk-free rate over time.

2) Beta test – How does the return on equity vary with beta?

We considered whether there was evidence to support an equity beta between 0.5 and 0.7. The 2018 Instrument used an equity beta of 0.6. We estimate that each ± 0.1 change in beta has the following impacts:

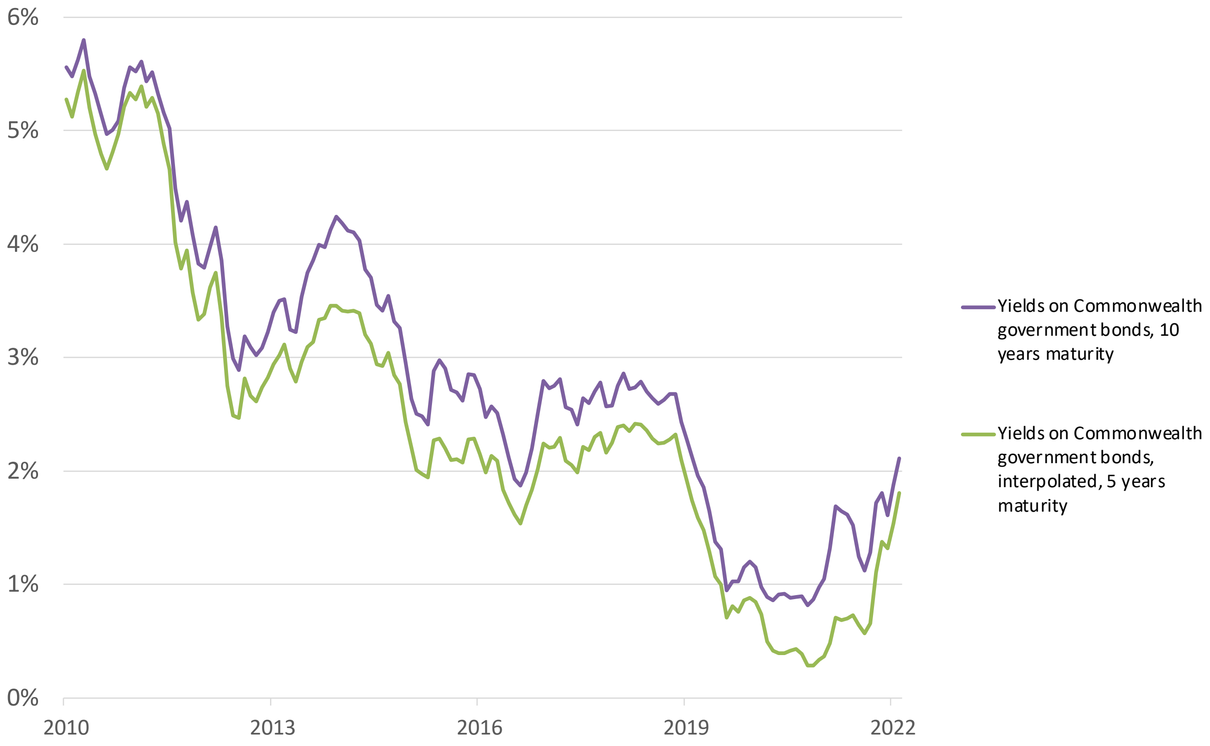
- ± 0.7% on ROE
- ± 2.2% on revenues
- ± $22 per year on household bills.

Overall, we are satisfied that an equity beta of 0.6 is supported by the evidence.

3) Term test – How does the return on equity vary with the term of the return on equity?

For this sensitivity test, we analysed the difference between the 10-year and 5-year government bonds to estimate the plausible impacts of using a 5-year term compared with a 10-year term for the return on equity. Results are shown in Figure 11.12, with subsequent discussion below.

Figure 11.12 Yields for 10-year and 5-year government bonds



Source: RBA
Note: This graph uses monthly data from the RBA statistical tables to demonstrate the difference in yields for 10-year and 5-year government bonds. This is for illustrative purposes and therefore uses a different dataset and method to that used to calculate regulatory allowances.

Based on the observed spreads from 2010 to 2022, the difference between the 10-year and 5-year government bonds was approximately 0.5% on average. To reflect this in the SL CAPM, we assume the risk-free rate is 0.5% lower under a 5-year term compared with a 10-year term. When combined with our MRP estimation being 0.3% higher, a beta of 0.6 and gearing of 60%, the return on equity would be 0.3% lower if this average persists in the future. This would in turn reduce household bills by $10 per year.

If we refer to the period 1988 to 2022 the difference between 10-year and 5-year government bonds was smaller, at approximately 0.3% on average. Using the same method outlined above, this would suggest a smaller reduction in household bills of $3 per year.

However, we are also conscious that the impact of changing term from 10 years to 5 years is uncertain. Based on the history shown in Figure 11.12, the difference between the 10-year and 5-year government bonds has been as low as 0.2% (the 'low sensitivity') or as high as

1% (the 'high sensitivity'). These scenarios are relatively short-lived, but if they do occur the impact would be:

- in the low sensitivity scenario, the return on equity would be only 0.02% lower, which would have a smaller impact on household bills of $1 per year
- in the high sensitivity scenario, the return on equity would be 0.48% lower, which would have a larger impact on household bills of $26 per year.

11.2.1.8 Scenario testing

Scenario testing is a technique where we project outcomes under the draft Instrument based on potential movements in underlying inputs and parameters. Scenario testing allows us to model the rate of return (and regulated revenue) across a range of scenarios.[673] This exercise can also help stakeholders to better understand the impact of alternative proposals on prices levels, price stability and price changes over time.

The outcome of most interest for this review is variations in the return on equity, but with some assumptions these results can be extended to the overall rate of return, revenues and prices.

There has been some debate among stakeholders about the value of this type of analysis and the methodology that should be employed. The strengths of scenario testing are that:

- it allows stakeholders, including us, to see the rate of return under different conditions and assumptions as well as to examine how it responds to changes in the underlying parameters
- it may act as a sense check for our rate of return if properly implemented especially because the Rate of Return Instrument is fixed for the duration of its application (that is, 4 years).

The ENA and CRG note that scenario testing is important for testing whether the Instrument is robust,[674] and agree that scenario testing can be a useful crosscheck.[675]

Feedback in submissions also highlighted the importance of ensuring the Rate of Return Instrument is robust considering its binding nature over 4 years.[676] By contrast, APA questioned the value of scenario testing within this inflexible scheme set by the national energy laws.[677]

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673 AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 141.

674 ENA, *Rate of Return Instrument Review: Response to AER's Final Omnibus and Information papers*, 11 March 2022, p. 140.

675 CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 104.

676 AGIG, *Response to AER Rate of Return Final Working Papers*, p. 7; Endeavour Energy, *Rate of return information paper and call for submissions*, 11 March 2022, p. 6.

677 APA, *APA submission on the Rate of Return Information Paper, Omnibus Paper, and Expert Evidence*, 11 March 2022, p. 63.

Stakeholders also suggested that any scenario testing should ensure that the Rate of Return Instrument is responsive to a wider set of scenarios to reflect market dynamics,[678] with care being taken in the process of selecting the relevant forecasts to ensure scenario testing is applied symmetrically. They also suggested we should clarify how to interpret the output of scenario testing.[679]

Our analysis finds that scenarios can help to explore potential issues, although these do not necessarily provide definitive solutions.

As such, we have developed scenario tests to allow us and stakeholders to see how the Rate of Return Instrument operates in different states of the world, including the impact on consumer bills through time. We have tested 3 possible states of the world – a low interest rate environment, a high interest high inflation environment and a low growth environment. We do not express any view about the likelihood of these scenarios. We have chosen them because they span a range of environments.[680]

Table 11.6 shows the features of the 3 scenarios, with full detail provided in subsequent sections.

Table 11.6 Summary of how Instrument would navigate scenarios

Scenario / state of the world	2022 draft Instrument	Modified 2022 draft Instrument
Higher interest rates and higher inflation rates	For the reasons explained in section 11.2.1.8.1about the practical and periodic updates of the rate of return instrument and the periodic nature of regulatory determinations, we find that energy consumers are protected in the short term from rises in interest rates and inflation rates. Our change from a 10-year term to a 5-year term should reduce consumer bills, and partially offset the long-term impact of higher interest rates and higher inflation rates. However, the change from a 10-year term to a 5-year term is justified on its own merits (as described in section 6). We are not making the change because of the long-term impact of high interest rates or high inflation rates.	We note that our proposed MRP approach (see section 7) means that the return on equity would increase in step changes every 5 years as each regulatory determination falls due, to reflect the higher interest rates. We considered other approaches to estimating the MRP, such as the use of a DGM model. We note that these may result in consumer bills that are even less sensitive to high interest rates. However, as we explain in section 7, our objective when setting the MRP is to set the most appropriate value that best reflects the cost of equity, rather than to maximise stability of consumer bills. This means that the most appropriate ROE is the one that best reflects the cost of equity, not the one that maximises stability. We also consider our approach to debt is robust to this scenario.
Low interest rate scenario	We find that the 2022 Instrument would navigate the low interest rate scenario well, considering it shares many aspects with the 2018 Instrument. The previous	We note that our proposed MRP approach means that the return on equity would decrease, as each

[678] GIIA, *Response to AER Final Omnibus Paper,* 11 March 2022, p. 3.

[679] CRG, *Advice to the Australian Energy Regulator: CRG Response to the AER's December 2021 Information paper*, March 2022, p. 104.

[680] We acknowledge other scenarios, such as a more rapid increase in interest rates, could be considered. However, we believe that the current combination of scenario and sensitivity testing is sufficient to provide a view of how the 2022 instrument would perform.

Scenario / state of the world	2022 draft Instrument	Modified 2022 draft Instrument
	Instrument was applied during a period of low interest rates and low inflation. Demand from investors, as measured in our RAB multiples, actually increased.	regulatory determination falls due, to reflect the lower interest rates. We also consider our approach to debt is robust to this scenario.
Low growth scenario	We find that the 2022 Instrument is robust to this scenario.	A low growth scenario could be associated with increasing or decreasing interest rates and with increasing or decreasing risks for investors. The instrument will reflect this in various ways. Our proposed MRP approach means that the return on equity changes, as each regulatory determination falls due, to reflect changes interest rates. However, our approach to beta uses long-run averages, and therefore brings a stability to the Instrument. Therefore, the overall impact of low growth, and the associated impact on the Instrument, will depend on the overall impact on interest rates and risk metrics such as beta.

11.2.1.8.1 Higher interest rates and higher inflation rates

Currently, there is global concern that the impacts of supply disruptions, rising shipping costs and other global and domestic inflationary factors could lead to an environment of higher inflation and higher interest rates.

In Australia, inflation is growing at its fastest pace in 20 years, with renewed RBA forecasts warning that core inflation could reach 4.6% by the end of 2022, an increase of 200 basis points on the previous year end result.[681] This, alongside other considerations, led the RBA to raise interest rates by 25 basis points in May 2022.[682]

Possible impacts on consumers and the wider economy include:

- increases in cost of living (due to rising costs of fuel, food and energy)
- decreased value of consumer savings
- increases in mortgage costs (when central banks react to curb inflation) and general borrowing rates (including on-the-day interest rates and risk-free rates)
- reduced investment potential leading to lack of job creation.

We considered what this would mean for our Rate of Return Instrument and the wider context in which the Instrument would apply. We examined whether our current decisions are likely to best achieve the National Electricity Objective (NEO) and National Gas Objective (NGO) in such a scenario.

In terms of higher interest rates, the Rate of Return Instrument will reflect these in 2 primary ways.

[681] RBA, *Forecast table of key macroeconomics variables*, May 2022.

[682] RBA, *Statement by Philip Lowe, Governor: Monetary Policy Decision*, May 2022.

- First, the allowance for debt costs will increase each year to reflect a 10-year trailing average. As the rates increase, the trailing average cost of debt will increase. In the past, consumers did not benefit as the interest rates came down due to the higher rates being fixed in the Instrument. By contrast, by using a trailing average of market rates, the outcome will be symmetrical. We have applied this approach since 2013 and, while it does not reflect the forward-looking opportunity costs, all stakeholders are aware of the reasons and benefits of this approach. We consider this approach is appropriate to closely reflect company costs on an ongoing basis.
- Second, the allowed return on equity will increase at the time of each regulatory determination during the life of the Rate of Return Instrument. A periodic update at each regulatory price/revenue reset (generally, every 5 years) using market data at the time the determination is made, means that energy consumers will not see interest rates reflected in energy bills until each reset falls due (once every 5 years). We believe that setting the return on equity at each decision point, based on the most recent market data for SL CAPM and crosschecks, is a fair approach. This approach helps to secure that consumers' bills closely reflect costs, as estimated at each determination. The key benefit of this approach is that it allows us to consider the best information at regular intervals without overlying on mechanical updates, which would not be appropriate (or possible) when judgement is required.

Therefore, consumers' energy bills are not particularly sensitive to high interest rates over the short term.

In terms of higher inflation rates, as noted in our discussion paper, these are reflected in allowed revenues, network costs and the RAB. Higher inflation rates will automatically lead to higher RAB values, rather than allowed revenues in each relevant year. This means that energy consumers will not see current inflation rates reflected in short-term bill increases. Instead, inflation rates will lead to higher RAB values, which are then recovered from consumers in subsequent years over a longer period of time.

Overall, we consider that our overall rate of return decisions are robust to a high inflation and high interest rate scenario because the Instrument:

- automatically reflects market conditions for corporate debt rates through the trailing average debt mechanism
- reflects changing equity markets at each regulatory determination
- reflects inflation over the long term (via additions to RAB) and protects consumers from short-term spikes.

When energy consumers are experiencing large increases in their other costs of living (for example, fuel and mortgage costs) it is beneficial that the cost of energy network services are not increasing to the same degree. It is also appropriate that essential energy services have these stable features.

We would also note that using the alternative MRP option covered in our sensitivity tests (combined HER and 3-stage DGM) could reduce a potential impact on consumers of materially higher interest rates, which could be welcome respite for consumers in this scenario when costs of living are increasing materially. However, our objectives under the

NEO and NGO require us to set appropriate allowances, which we expect will be higher in some periods than others.

Further, if higher interest rates or higher inflation rates cause network costs to materially deviate from allowed revenues, this could cause problems for both consumers and for network companies if either:

- consumers pay too little (this could deter investment)
- consumers pay too much (investors would receive windfall profits).

Therefore, we consider the overall Rate of Return Instrument is sufficiently robust against the risks outlined in this scenario.

11.2.1.8.2 Lower interest rate

In our September 2021 working paper[683] we examined whether we are setting the appropriate rate of return and cashflows in a low interest rate environment.

Interest rates paid on debt by government and corporate issuers have substantially declined over the past decade. Such declines have been widespread, occurring for both shorter-term debt (for example, debt maturing in less than a year) and longer-term debt (for example, those maturing in 5 to 10 years). Such changes in interest rates are important to the AER, the networks we regulate and their customers. Changes in interest rates affect both the level of revenues and prices that we allow the regulated networks to charge. The costs that networks face in providing services and, ultimately the prices consumers pay, are also affected.

In a low interest rate environment, we observe that our return on debt estimates (BBB rated debt) have declined in line with the decrease in interest rates (as shown in Figure 11.13).

683 AER, *Term of the rate of return and rate of return and cashflows in a low interest rate environment*, September 2021.

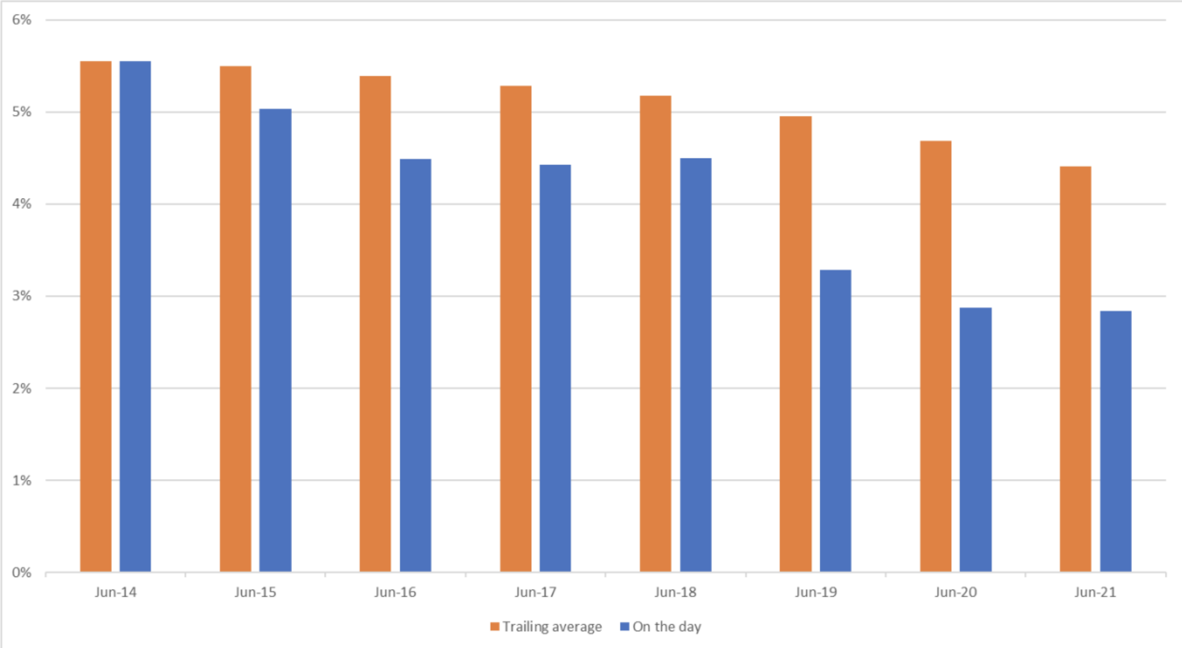
Figure 11.13 Comparison of AER BBB estimate and AER risk-free rate

Sources: RBA; Bloomberg; AER

The trailing average return on debt allowance has usually exceeded the on-the-day rates due to a downward trend in interest rates (as shown in Figure 11.14). However, as covered in our December 2021 working paper, the simple trailing average approach remains the most appropriate method.[684]

[684] AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 99.

Figure 11.14 AER BBB+ return on debt, 10-year trailing average approach vs on the day return on debt (June 2014 to June 2021)



Source: RBA, Bloomberg, Thomson Reuters
Note: The whole month of June is used as averaging periods for both approaches. The trailing average is calculated by applying equal weights to each annual return on debt estimate feeding into it, other than the first year where the transition commenced. We selected 1 July 2014 as the starting point for the transition, with the corresponding averaging period of one month (June 2014). As such, this example is still transitioning to the 10-year trailing average, with June 2021 being the 7th year.

Therefore, our position remains that our current approach to estimating the return on debt remains appropriate in a low interest rate environment. This is a view shared by the NSPs and the AEC.

We also considered changes to the cost of equity in this scenario.

Our estimates of the cost of equity have also declined from 2010 to 2021 because they are directly linked to Commonwealth Government Securities (CGS). This lower estimate has also had an impact on networks' cashflows. This can be attributed to lower estimates of return on equity and our RAB indexation adjustments to cashflows.

For NSPs, the return on equity is updated at the time of each regulatory determination during the life of the Instrument, the impact of which would be a reduction in the calculated return on equity. As such, consumers may see a reduction in prices they pay, though this would only be at the time of our regulatory determination for each NSP.

Stakeholders previously suggested a floor to the risk-free rate to ensure the real risk-free rate does not become negative.[685] The proposed benefits to this approach are that it would not

[685] CRG, *The Overall Rate of Return, Debt Omnibus and Equity Omnibus paper — Volume 1: Technical*, 3 September 2021, pp. 86-87.

require a discretionary change to implement and could be built into the existing formula.[686] Additionally, the floor would provide some stability and robustness to the Instrument and prevent short-term market movements from having an effect on the networks and investors.[687] However, a floor would not operate symmetrically and could distort investment signals. Further, for Australia, the RBA has considered that negative nominal interest rates are improbable in the future.[688] On this basis, we have decided not to contemplate a floor to the nominal risk-free rate, including a basis for such, for the estimate of the cost of equity.[689]

We note that the 2018 Instrument was applied during periods of low interest rates and low inflation. During this time, we note that demand from investors, as measured in our RAB multiples in Figure 11.1, actually increased. This gives us confidence that the 2022 Instrument would, given our proposal to use the same approach for risk-free rate and MRP, also be reasonable.

Therefore, we consider our approach to return on equity in a low interest environment, we find that our approach remains appropriate.

11.2.1.8.3 Low growth scenario

We considered what a low growth scenario could mean for our Rate of Return Instrument.

Possible impacts of this scenario on consumers and the wider economy include:

- decrease in business and consumer spending (as economic activity slows)
- increases in unemployment (as businesses look to reduce costs)
- changes in debt and equity markets. For example, the Dividend Growth Model (DGM) suggests that equity prices will fall as growth falls. In this case, investors may look for safe stocks in a 'flight to safety' and demand for network assets may actually increase.

Overall, it is unclear how a low growth scenario would impact on the Rate of Return instrument as low growth can be associated with various impacts on interest rates, inflation rates and risk metrics such as ERP and beta.

However, we can observe how the 2018 instrument performed across time. In all of our determinations since the 2013 Guidelines we have had regard to the ERP margin over the Debt Risk Premium (DRP) as a relative indicator.[690] As seen in Figure 11.15 below, the comparative and relative positions of the ERP of our draft decision and DRP show that a

[686] Ibid.

[687] Jemena, *Submission on the rate of return omnibus papers,* 3 September 2021, p.9; Endeavour Energy, *Draft working omnibus papers: Overall rate of return, equity and debt*, 3 September 2021, p.8; ENA, *Estimating the cost of equity: Response to AER's Pathway to 2022 Rate of Return Instrument Draft Equity Omnibus Working Paper*, 3 September 2021.

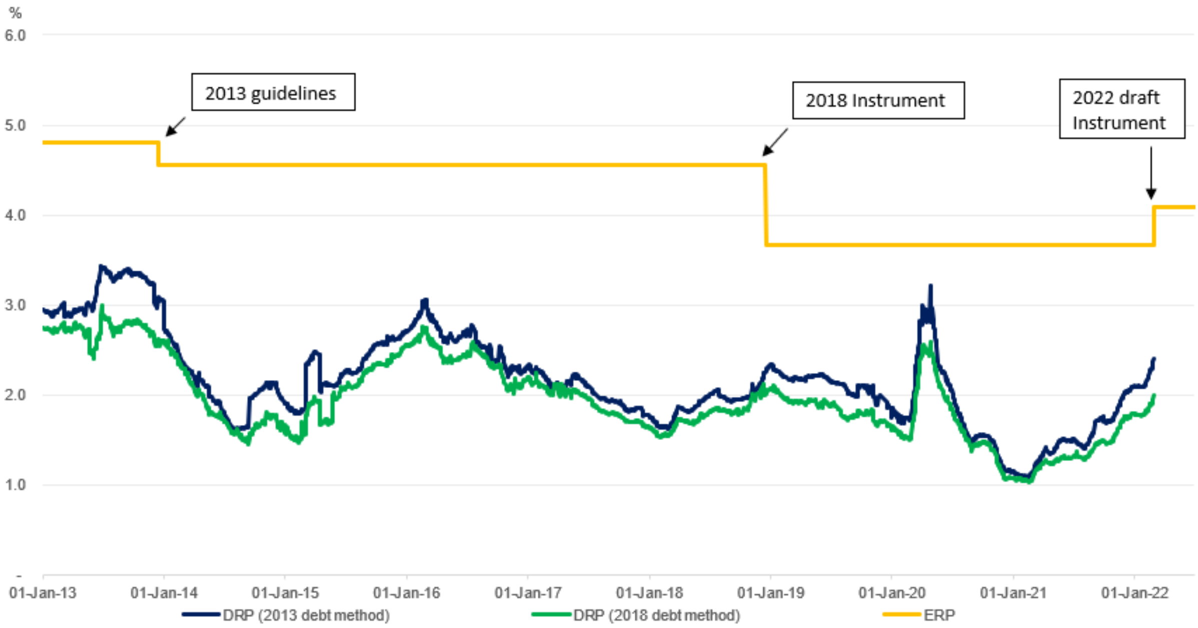
[688] *Monetary Policy During COVID* – speech by RBA Deputy Governor Guy Debelle, May 2021; *Unconventional Monetary Policy: Some Lessons From Overseas* – speech by RBA Governor Philip Lowe, November 2019

[689] AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p.68.

[690] AER, *Better Regulation, Rate of Return Guideline*, December 2013, appendix B - p. 33.

visible spread has been maintained over this period from 2018. This could give us confidence that the 2022 instrument would be robust through a low growth scenario.

Figure 11.15 Comparison of ERP and DRP



Source: AER analysis; Bloomberg; Thomson Reuters; RBA

We also take comfort from our approach to estimating beta. As covered in our December 2021 working papers[691] our approach of placing most weight on the longest-period estimates, means that the Instrument will reflect long-run rather than short-run market data.

A key reason for our approach of using long-term estimates is that we consider the beta for the benchmark business is likely to remain relatively stable over the long term. This view is reinforced by revenues and share prices of the Australian regulated energy businesses having shown a relatively high degree of stability during recent times of market volatility, such as COVID-19 and recent takeover bids. A fundamental reason that these firms have high-level stability in their revenues and cashflows is because they have strong natural monopoly characteristics and operate in a stable regulatory framework. Therefore, we find that our current approach will promote stability and predictability through this scenario by using beta estimates from the longest period available to control for short-term fluctuations in growth, or impacts of growth that are not easily observed.

Therefore, we believe the Instrument is sufficiently robust against the risks outlined in this scenario.

Overall, our draft decision is that scenario testing can be used to inform the rate of return in a contextual role.

[691] AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, pp. 104-107.

11.2.2 Assessment criteria

Our consideration of issues show that we are required to exercise our discretion about the evidence and methods that are available for us to make our decision. Where necessary we have applied our assessment criteria to assist us exercise our judgement. Table 11.7 sets out our assessment criteria and key areas where they have assisted us make our decision.

Table 11.7 Criteria of draft decision crosschecks assessment

Assessment criteria		Draft decision
1	Where applicable, reflective of economic and finance principles and market information (a) estimation methods and financial models are consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data.	• Our assessment of the overall rate of return through crosschecks considers relevant and verifiable market information, and reflects well-accepted economic and finance principles. • For some individual crosschecks, such as RAB multiples, we have sourced independent insights to support their use. • The crosschecks broadly support continuation of the 2018 Instrument.
2	Fit for purpose (a) the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and consider the limitations of that purpose (b) promote simple over complex approaches where appropriate.	• Our draft decision is informed by the use of: – market data – financial models – other evidence (expert views, independent analysis). • Our approach uses simple methods for estimation and testing. • Where individual crosschecks do not meet this criterion, they have less of a role in informing our decision, namely: – historical profitability – investment trends – information from other practitioners (other regulators and analysts).
3	Implemented in accordance with good practice (a) supported by robust, transparent and replicable analysis that is derived from available credible datasets.	• Our approach to applying crosschecks is based on robust, transparent and replicable market-based analysis in accordance with good practice. • Where individual crosschecks do not meet this criterion, they are excluded from a role in informing our decision. Information from other practitioners has less value.
4	Where models of the return on equity and debt are used these are (a) based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation	• Models underlying crosscheck analysis of overall rate of return are based on robust quantitative modelling and avoid arbitrary adjustments without sound rationale.

	(b) based on quantitative modelling that avoids arbitrary filtering or adjustment of data that does not have a sound rationale.	
5	Where market data and other information is used, this information is (a) credible and verifiable (b) comparable and timely (c) clearly sourced.	• Market data and other evidence used for crosschecks are from credible and verifiable and reflect latest data available at the time.
6	Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.	• Crosschecks have used the latest information available and consider shorter-term outcomes to the extent they reflect changing market conditions. • Where individual crosschecks do not meet this criterion, they are excluded from a role in informing our decision. Information from other practitioners (e.g. other regulators and analysts) has been excluded on this basis because there are issues with comparability and difficulties in updating to reflect changes.
7	The materiality of any proposed change.	• Most of the 2018 Instrument remains appropriate. The change we are proposing to the term on equity is important for the integrity and consistency of our approach.
8	The longevity or sustainability of new arrangements.	• The draft Instrument is largely a continuation of the 2018 Instrument. Our scenario testing shows that the draft Instrument is robust to a range of potential states of the world.

11.2.3 Our findings on our overall rate of return

When we consider the findings of our analysis of our overall rate of return, we find that RAB multiples, financeability tests and scenario testing provide value as a sense check and in a contextual role.

Though we reviewed historical profitability, investment trends, other regulators' rate of return and other practitioners' discount rates, we consider they offer little value. We consider these findings when we assess our overall rate of return using our assessment criteria, as seen in Table 11.7.[692]

Subject to the limitations of the crosschecks we examined, they do not appear to suggest major concerns with our current approach to the rate of return, seen through performance of the 2018 Instrument, in the context of the total compensation provided to investors.

[692] AER, *Overall rate of return, equity and debt omnibus - final working paper*, December 2021, p. 129.

Notwithstanding the performance of the 2018 Instrument noted above, we have decided to change the term of equity for our 2022 Instrument from a 10-year term to one that matches the regulatory period, typically 5 years. The rationale for this decision can be seen in more detail in chapter 6.

In conclusion, after our sense check of our draft rate of return using the methods outlined above, we are satisfied that our decision in the round will, or is most likely to, contribute to the achievement of the NEO/NGO.

While we acknowledge that in coming to our draft 2022 Instrument position, we have exercised our judgement across the parameters that inherently have a reasonable range and/or methodological choices, our crosschecks provide us a level of comfort.

If we found the Instrument did not perform well in a future scenario, we would consider options for making changes, and the trade-off with other issues that could also arise.

For example, if we were not satisfied that the decision in the round is likely to contribute to the achievement of the NEO/NGO, we would reconsider:

- SL CAPM input parameters (for example, equity beta)
- cost of debt assumptions
- broader adjustments (such as the notional gearing assumption, revenue profile and use of DGM to set MRP).

However, our view remains that we do not consider that the evidence available supports the application of a bias towards a higher or lower expected rate of return.[693]

If the rate of return is upwardly biased:

- investors will be overcompensated for the risk involved in supplying capital to networks, so will show increased willingness to invest in regulatory assets in comparison with other investments in the economy
- networks will have an incentive to overinvest in regulated assets over the longer term, increasing the regulatory asset base above the efficient level
- energy consumers will pay inefficiently higher prices, which will distort energy consumption decisions and downstream investment decisions. This will result in efficiency losses where consumers use less energy network services than otherwise and non-monetary impacts such as disconnection of vulnerable consumers.

If the rate of return is downwardly biased:

- investors will be undercompensated for the risk involved in supplying capital to networks, so will show reduced willingness to invest in regulatory assets in comparison with other investments in the economy

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693 AER, *Rate of return: Assessing the long-term interests of consumers – position paper*, May 2021, p. 13.

- networks will not be able to attract sufficient funds to be able to make the required investments in the network – over the longer term there will be declines in quality, reliability, safety and/or security of supply of electricity or gas
- consumers of energy will pay lower prices, at least in the short term, but will wear the risk of adverse outcomes for quality, reliability, safety and/or security of supply of energy services. Lower prices will also distort energy consumption and downstream investment decisions (though in the opposite direction to the previous case). This new level of downstream investment will be inefficient for the Australian economy.

11.2.4 The decision in the round

We now step back and ask ourselves how this draft decision as a whole is sitting. In particular, we consider whether the NEO and NGO would be better advanced by continuing the 2018 Instrument (with parameters updated for latest data) or whether we can improve against the objectives by making changes.

Continuing the 2018 approach has aspects to commend it. Much of the data we have available to inform our decision is at similar levels now compared with 2018. Further, there is a level of support for the 2018 approach from the cross checks. The CRG has submitted that we should employ a principle of a high bar for change. While we do not use the same terminology proposed by the CRG, we do accept the general principle. Stability and predictability of the regulatory framework and its application is important for both investors and consumers. Stability and predictability promote efficient investment because investors and consumers can make commitments with confidence. They can reasonably foresee how they will be treated under the regulatory framework.

In contrast, we have identified one change we think would lead to a superior outcome – adjusting the term we use for estimating the return on equity. Although, this change may not shift the final rate of return by a large margin at this point in time, it will promote consistency in the regulatory framework. Without this change there is a risk that the inconsistency in our approach will cause material distortions. The change to the term of equity is also supported by the same basic propositions that led us to change our approach to estimating expected inflation.

We have also identified an option for estimating the market risk premium that may give a more stable return on equity through time (although that is not our preferred choice). This option involves using a combination of historical excess returns and outcomes from a dividend growth model to vary the market risk premium at each regulatory decision. This option may introduce a more forward-looking element if dividend growth models are able to reflect future changes in market conditions. This option also means our return on equity may not move one-for-one with the risk-free rate.

However, we think our current approach to estimating the market risk premium is a safer option because it is a well understood approach and can be readily estimated in advance. It has the desirable property of allowing the return on equity to vary with movements in market conditions (as reflected in movements in the risk-free rate). Our current approach also avoids implicitly introducing a relationship between the market risk premium and risk free rate when such a relationship cannot be estimated with confidence.

To assist in resolving these choices we have returned to our overarching principle:

> an unbiased estimate of the expected efficient return, consistent with the relevant risks involved in providing regulated network services.

We consider that the approach in the 2018 Instrument has delivered outcomes that are consistent with the relevant risks. As such, we think the NEO and NGO are best advanced by largely continuing our current approach. Minimising change is likely to promote stability and predictability and therefore, efficient investment.

However, using a 10-year term to estimate the return on equity is not consistent with the first element of the principle (an unbiased estimate). Using a 10-year term is likely to lead to a biased outcome because our task is to set an efficient return for the next regulatory period.

In this draft decision we have chosen to change our approach to estimating the return on equity to use a term that matches the length of the regulatory period (typically 5 years), but otherwise apply the approach in the 2018 Instrument. This approach achieves a balance. By largely leaving our current approach in place we are able to promote stability and predictability. At the same time, making the change to the term of the return on equity removes a source of bias in our approach.

Appendix A List of submissions

The following stakeholders made submissions in response to our call for submissions in our Information Paper.

1) Kevin Cox
2) Global Infrastructure Investment Association (GIIA)
3) Australian Energy Council (AEC)
4) Ausgrid
5) TransGrid
6) Network Shareholders Group (NSG)
7) Marinus Link
8) Joint submission – Australian Gas Infrastructure Group (AGIG), SA Power Networks (SAPN), Victoria Power Networks (VPN)
9) Endeavour Energy
10) Jemena
11) AusNet
12) APA Group (APA)
13) Consumer Reference Group (CRG)
14) Queensland Treasury Corporation (QTC)
15) Energy Networks Australia (ENA)
16) Australian Pipelines and Gas Association (APGA)

Appendix B Submission summaries

The tables below summarise the key points made by stakeholders in response to the questions we asked in our Information paper on the 6 key topics.

In addition, we have also listed the key points the Consumer Reference Group (CRG) makes in relation to their findings from their consumer engagement/research.

Consumer Reference Group findings

CRG's consumer engagement/research

Key points	Summary of submission	AER consideration
Consultation and engagement in general	• The CRG has continued detailed discussions with energy consumers, consumer representatives, and independent investors on both high-level and technical matters related to the RoRI (p. 40). • This consultation has particular focus on stability of approach, as noted in the September 2021 CRG submission. • Findings detailed in the recent CRG submission, indicate that consumers: ○ value stability of approach for the regulatory framework ○ are suspicious of changes and conscious of who derives benefit from changes ○ are conscious of how changes are considered and communicated by the AER ○ generally, value stable prices, with a preference for lower prices.	• Section 2.3.2: CRG consumer principles
Consumer views moulded CRG advice	• The CRG note that their views are consistent with, and informed, by evidence from consumers, consumer representatives and independent investors. (p.9 and chapter 2)	• Section 2.3.2: CRG consumer principles
Consumer-orientated principles	• Consumers and consumer representatives strongly support the CRG's consumer-oriented principles.(p.20). Of particular relevance to CRG advice in their submission are the following principles: ○ the AER's rate of return decisions should promote confidence of consumers in the regulatory process ○ risk should be allocated to the party best able to manage it ○ there should be a high bar for change, and proposals for change should be supported by persuasive evidence, compelling reasoning, and broad consensus	• Section 2.1.5: Criteria we have developed to help guide our judgement • Section 2.3.2: CRG consumer principles

<table>
<tr><th>Key points</th><th>Summary of submission</th><th>AER consideration</th></tr>
<tr><td>Has the outcomes achieved the AER’s objectives</td><td>Whilst assessing outcomes is a difficult task, the AER should consider this question if it is to enhance consumer confidence (p. 21). One of the tests is:
Feedback from consumers on their confidence in the AER’s regulatory processes and decisions, their priorities and trade-offs between price and reliability of supply, price, and future investment.</td><td>Section 2.3.1: Risk-cost trade off</td></tr>
<tr><td>Consumers and independent investors alike support the AER in its role</td><td>The CRG note that most consumers support the AER in its role (p. 27), regardless of the level of awareness consumers have of the AER.
<table><tr><th>Consumer type</th><th>Supportive of AER in its role</th><th>Aware of AER</th></tr><tr><td>Commercial</td><td>83%</td><td>90%</td></tr><tr><td>Residential</td><td>59%</td><td>75%</td></tr></table></td><td>Section 2.3.2: CRG consumer principles</td></tr>
<tr><td>The AER must give weight to consumer-oriented principles</td><td>The CRG has established and tested consumer-oriented principles to guide its advice to the AER (p. 27), which are supported by consumers, and believe consideration of these to be integral to the AER achieving its statutory objectives.</td><td>Section 2.1.5: Criteria we have developed to help guide our judgement
Section 2.3.2 CRG consumer principles</td></tr>
<tr><td>Consumers support a focus on the long-term</td><td>The CRG (p. 30) found that:
Consumers generally believe ‘long term’ to be a period of 10 years or more
Consumers, consumer representatives, and independent investors consider a ‘long term’, and associated benefits, to be beyond a 5-year regulatory period (p. 31)
Independent investors consider investment in a regulated network as a long-term proposition (p. 32)</td><td>Section 2.1.5: Criteria we have developed to help guide our judgement
Section 2.3.2 CRG consumer principles
Section 6.2.1.6: Whether a 10-year equity term is consistent with market practice and academic literature</td></tr>
<tr><td>Consumers are generally satisfied with current service levels</td><td>The CRG point to findings of the ECA Consumer Sentiment Survey to note that consumers are satisfied with current electricity and gas services (p32), with proportions of satisfied customer being consistently high.</td><td>Section 2.3.2: CRG consumer principles</td></tr>
</table>

Key points	Summary of submission	AER consideration

Maintain a stability of process	• The CRG (p33) suggest that stability of frameworks is critical as it enhances consumer confidence through:
	  ○ Certainty
	  ○ Reduced risk of gaming by networks
	  ○ Reduced regulatory capture
	  ○ Reduced requirements for debate with networks, given resource and capacity constraints
		• Section 2.3.2: CRG consumer principles

Consumers are sensitive to price changes	• On consumer sensitivity to price changes (p. 34), the CRG note that even small changes to prices could create behavioural changes in residential (97%) and commercial consumers (90%), primarily in attempting to use less energy. This is especially true for vulnerable customers. • The CRG (p. 37) also found that residential and commercial consumers generally favour affordable energy over a highly reliable supply, though commercial customers are more balanced and view both as critical.	• Section 2.3.1: Risk-cost trade off
Importance of stability of approach	• The CRG (p.58) posit that there should be a high bar for change with a requirement for strong justification and demonstration that it is in consumers' interests. • Thus, a stable regulatory framework is in customers' long-term interests, with the long-term interests of consumers best served by considering the RoR parameters across broad economic cycles. • As noted in the CRG Submission from September 2021, a long-term approach is also aligned with the interest of long-term investors (pension funds, private equity and governments) that increasingly dominate the sector, and is promotive for investor confidence. • CRG advise the AER to maintain the 2018 RoRI approach (p9), noting the feedback from consumers and investors of their value in stability in process and outcomes.	• Section 2.3.2: CRG consumer principles

Term

Summary of submissions to Term issues

Question posed in information paper or additional issues	Summary of submissions	AER consideration
Should the same principle/s (such as NPV=0) be used to assess the term for the return on equity and the term for expected inflation? If so, how do the principles we applied in our 2020 Inflation Review	• The CRG does not support Lally's proposition that the term for the risk-free rate must match the length of the regulatory Period. The appropriate term for the risk-free rate remains wholly a matter of judgement. While previous reviews consistently found in favour of a ten-year term, the AER left few realistic options on the table when it decided in December 2020 to shorten the estimation term for inflationary expectations. On that basis alone, the CRG accepts the AER should now align the term for the risk-free rate with the estimation term for inflationary expectations (CRG, p. 42).	• Section 6.2.1.3: Whether the choice of benchmark term makes a difference

translate to the term of the return on equity?	• If the AER moves to a five-year term for return on equity, the AER needs to explain how such changes interact with all the other parameters in the rate of return to ensure there is a clear and consistent conceptual framework that underpins its overall decision on the rate of return (CRG, p. 14). • For the NPV=0 principle to apply, the regulator must act consistently in all regulatory periods and set the regulatory allowance equal to the expected cost of capital in that regulatory period. (CRG, pp. 48-49). • The terms for regulatory inflation and the allowed return on capital should be assessed independently and do not need to align with each other (ENA, p. 9, p. 23). • The return on debt and equity should be assessed independently and do not need to align with each other (ENA, p. 23). • The allowed rate of return on equity and debt should be set to match the market cost of capital (ENA, p.9). • The NPV=0 principle requires that the regulatory allowance should match the return that is required by investors. It is supported by adopting the following approach: for debt (equity), the regulatory allowance should reflect the term that determines the return that debt (equity) investors require; and for inflation, the regulatory figure should ensure that what is 'taken out' equals what is expected to be 'put back in' (ENA, p. 26). • Lally's advice is that a 5-year term should be used for inflation regardless of the term adopted for the allowed return on capital. He specifically noted that a 5-year term for inflation should be used even if the AER were to continue with a 10-year term for the allowed return (ENA, p.24). • Setting the allowed return equal to the required return in the market creates the proper incentive for efficient investment in the regulated asset (ENA, p. 42). • Support the AER's objective, the NPV=0 principle and its assessment criteria for assessing evidence (Endeavour Energy, p.2). • Term for debt, equity and inflation do not need to align (Ausgrid, p. 1-2). • The objective should be to reflect what equity investors actually require instead of what academic experts consider investors ought to require. (Transgrid, p. 7, Networks Shareholder Group [NSG], p. 5). • The NPV=0 principle is not relevant to assessing the term for the return on equity component of the allowed rate of return when the rate of return on equity is estimated using the Capital Asset Pricing Model. (APA, p.5).	• Section 6.2.1.5: Re-examining the evidence related to the NPV=0 principle • Section 6.2.1.6: Whether a 10-year equity term is consistent with market practice and academic literature • Section 6.2.1.7: Example: Whether a 10-year equity term satisfies the NPV=0 condition • Section 6.2.1.10: Consistency with other WACC parameters and expected inflation
Should the term for equity match to the length of the regulatory period or the underlying asset lives?	• CRG is unconvinced by Lally's report, but submits the AER should align the term of the risk-free rate with the term of expected inflation: • The CRG does not support that the term for the risk-free rate must match the length of the regulatory period. The appropriate term for the risk-free rate remains wholly a matter of judgement. While previous reviews consistently found in favour of a ten-year term, the AER left few realistic options on the table when it decided in December 2020 to shorten the estimation term for inflationary expectations. On that basis alone, the CRG accepts the AER should now align the term for the risk-free rate with the estimation term for inflationary expectations (CRG, p. 42). • Lally's report does not 'prove' the term of the regulatory allowance for equity should match the length of the regulatory period. The report's mathematical model demonstrates that the regulatory allowance must match the regulator's estimate of the investors' true discount rate for the NPV=0 principle to be satisfied. This is true by construction rather than a proof (CRG, p. 56).	• Section 6.2.1.2: Term premium • Section 6.2.1.4: Case for a 5-year term based on the reset frequency • Section 6.2.1.6: Whether a 10-year equity term is consistent with market practice

	• Lally's report contends that the regulatory valuation problem is analogous to the pricing of a floating rate bond. The CRG finds this analogy does not support Lally's proposition and might support the opposite conclusion (CRG, p. 56). • If Lally's proposition is correct, then the AER has been systematically overpricing the cost of capital over multiple rounds of regulatory resets. If so, it should be possible to identify some tell-tale signs of this mispricing. The AER has not attempted this analysis (CRG, p. 56). • No definitive proof has been proffered in support of either matching the term to the length of the regulatory period or applying a long-term (ten-year) risk free rate. Until a proof or evidence can be found in support of one proposition or another, the preferred term for estimating the risk-free rate inescapably remains a matter of judgement (CRG, p. 57). • The AER does not appear to have applied its assessment criteria in the final working or when formulating questions in Information paper. Consumers deserve a better explanation than they have received to date about the reasons for the AER's preferred position on the risk-free rate and the impact it will have on users of electricity and gas (CRG, p. 58-59). • The term of the risk-free rate has no obvious bearing on how other WACC inputs should be estimated (except for the HER approach to estimating the MRP) (p. 42). The AER should consider ripple effects of changing the term on other parts of the regulatory framework beyond CAPM and WACC (p. 58). • The regulatory model would be internally inconsistent if the term of the risk-free rate differed from the estimation term for inflationary expectations. Consistency is required for the term of risk free rate and inflation because both inputs into AER's estimated cost of capital relate to unobservable expectations held by investors. Therefore, the CRG on this basis alone, submits the AER should align the term of the risk free rate with the term of expected inflation (CRG, pp. 61-62). • Industry and investor stakeholders submitted that 10-year term for RoE should be maintained: • There should be a high bar for change, noting standard commercial practice, recommendation from leading textbooks, decisions from the AER and other regulators and lack of stakeholders call for change, a 10-year term should be retained (ENA, p. 39-40). • Standard commercial practice: • A 10-year (or longer) risk free rate is standard commercial practice. Notably a 10-year rate was adopted in the two recent transactions that involve businesses regulated by the AER (AGIG/SAPN/VPN, p. 3, QTC, p. 3, Grant Thornton report to ENA, p. 13, ENA, pp. 7, 40, 42, 47-54). • The 10-year maturity is the deepest market in Australia, and hence the 10-year rate is the standard benchmark for risk free rate (Grant Thornton report to ENA, p. 33, NSG, p. 3). • Long-term infrastructure investors do not value network businesses as the present value of five years of regulatory allowances plus the end-of-period RAB (GIIA, p. 2-3, Transgrid, p. 7, Grant Thornton report to ENA, p. 9-10, NSG, p. 2-3, Australian Pipeline & Gas Association [APGA], p. 6-9). • Precedence/Absence of new evidence:	and academic literature • Section 6.2.1.7: Example: Whether a 10-year equity term satisfies the NPV=0 condition • Section 6.2.1.8: The length of regulatory control period other than 5 years • Section 6.2.1.9: Benchmark equity term and relevance of the CAPM • Section 6.2.1.10: Consistency with other WACC parameters and expected inflation • Section 6.2.1.12: Regulatory precedent • Section 6.2.1.13: Response to other issues raised in submissions

	• Dr Lally's view on 5-year term is not new; in the past reviews AER applied a 10 year term and in 2018 noted that a 10 year term reflects the actual investor valuation practices and academic works, is consistent with the theory of SL CAPM and best contributes to the achievement of the NEO and NGO (Ausgrid, p. 1-2, GIIA, p. 2-3, Transgrid, p.7, Jemena, p.2, QTC, p. 29, AGIG/SAPN/VPN, p. 3, Endeavour Energy, p.3, ENA, p. 39). • A 10-year (or longer) risk free rate is standard regulatory practice (AGIG/SAPN/VPN, p. 3, QTC, p. 3, ENA, pp. 7, 40, 42, 47-54). CAPM: • CAPM parameters should not be considered in isolation. As a long-term view is taken when evaluating the MRP, a long-term view should also be taken when evaluating the risk free rate to accurately represent the return (NSG, p. 2-3, Grant Thornton report to ENA, p. 33). • A 10-year term is consistent with the SL CAPM and reflects actual practice of investors, thus meeting NPV=0 criterion (Ausgrid, p. 2, Endeavour Energy, p.3, Jemena, p.2). • If the CAPM is used to estimate the return on equity component of the allowed rate of return, there is no term to be associated with the risk free rate and no term to be associated with the estimated rate of return on equity. Estimation of the risk free rate of return for application of the CAPM should use extensively traded government bonds with the longest terms to maturity, such as Australian Government bonds with terms to maturity of 10 years or longer (APA, p. 6-13, ENA, p. 64). This is because transferring wealth over longer horizons by rolling over short bonds is risky and risk averse investors would prefer longer-term bonds (APA, p. 13). Regulatory framework: • A 5-year term ignores the opportunity to earn incentive revenues in future years and asset pricing theory that assumes investors have regard to reinvestment opportunities when developing their investment portfolios (Endeavour Energy, p.3, ENA, p. 65, APGA, p. 10). • The term of the risk free rate should not be different for an unregulated or regulated firm, as under the CAPM a firm's risk characteristics are captured by the equity beta (QTC, p. 29). • The regulatory framework allows networks to propose, and AER to determine, a control period of varying length. Therefore, setting a 5-year term for equity would be inconsistent with the framework. (Endeavour Energy, p.3) • Time horizon of cash-flow analysis used in the PTRM is set equal to the remaining economic life of assets, keeping with the regulatory objective of providing a commercial return over the life of the assets not over the life of a regulatory control period (Endeavour Energy, p.3, Jemena, p.2). • A longer term is consistent with AER's PTRM: If it were assumed that equity investors refinanced the entire equity portion of the RAB at the end of every regulatory period – as is implied by Dr Lally's modelling assumptions – then the PTRM would need to compensate for that equity raising. But it does not. (APGA, p. 9-10). • The allowed rate of return is used for more than determining the return on capital. It is used to discount cashflows that extend beyond the 5-year regulatory period. For example, AER's Connection charge guidelines for electricity retail customers requires the use of the WACC to discount revenues, and AER's recent determinations sought networks to project long-run marginal cost over at least the next 10 years which requires discounting back, generally using the allowed rate of return (APGA, p. 10-11). Other:	

	• The difference between a 5-year and 10-year RFR on RoE is marginal when adjusted for the MRP (AEC, p.2). • A shorter term is likely to decrease investment attractiveness of the Australian energy market, especially at a time of increased investment needs (GIIA, p. 2-3, Transgrid, p. 7). • A long-term Commonwealth Government Security (CGS) with a coupon that is reset every 5 years to equal the 5-year CGS yield would likely be priced at a significant margin above the 5-year CGS yield on each reset date. (QTC, p. 3). • The AER's long-term floating rate bond analogy does not support matching the term of the risk-free rate in the CAPM with the length of the regulatory period. Instead, it shows that the allowed return on equity needs to be based on a risk-free rate that is higher than the prevailing 5-year CGS yield in order to achieve NPV=0. Excluding the margin from the return on equity allowance will produce an NPV<0 outcome. QTC does not consider the long-term rate-resetting bond analogy to be a suitable or practical way to determine the term of risk-free rate. (QTC, p. 3, p. 32).	
Should the EICSI (and resulting WATMI) be used to inform the term for the return on debt? And if so, how?	• Term for RoD should not change: • No compelling evidence to lower the term from 10 years based on WATMI data. It cannot be used to deterministically set a benchmark term unless drivers are fully understood (Ausgrid, p. 3, Transgrid, p. 7, ENA, p. 32, APGA, p.21). • Maintaining a 10-year benchmark term would avoid the need to implement a new set of bespoke transition mechanisms (Transgrid, p. 7, AGIG/SAPN/VPN, p. 6). • Current approach of benchmark 10-year term and BBB+ credit rating is effective, as shown by the almost exact matches between industry debt cost data and regulatory allowance (AGIG/SAPN/VPN, p. 3). • No evidence of material outperformance, with 4 basis points variances well within the bounds of estimation error (AusNet Services, p. 2-3, Endeavour Energy, p. 4). • Current industry data shows an average 10.2 year term at issuance (excluding NSW firms that have been recently privatised) (AusNet Services, p. 3, ENA, p. 32). • CEG computed WATMI for ENA shows with subordinated debt either included or excluded, the resulting WATMI is close to 10 (ENA, p. 32). • The EISCI and WATMI are calculated from data for a small number of businesses and cannot be regarded as indicators of an industry term to maturity. EISCI and WATMI are firm specific, reflecting their unique circumstances and not a benchmark service providers can aspire (APA, p. 15-16). • Data shows low levels of non-term outperformance. There are challenges in adjusting for term. There are costs and risks involved in such a change and the benefits of adjusting for term is relatively small (CRG, p. 95).	• Section 9.2.1.1 Using the EICSI and WATMI for estimating the benchmark term
If we do change the term for the return on debt how should this be implemented?	• Transition would be complex, with firms still in transition to the 10-year TA. A change to the RoD term would mean firms in the midst of transition would have to undergo another transition, resulting in three separate tranches of debt tenor (ENA, p. 35).	• Section 9.2.1.1 Interaction with the trailing average

Market risk premium

Summary of submissions to MRP issues

Question posed in information paper or additional issues	Summary of submissions	AER consideration
Is the DGM likely to be a better estimator of a forward looking MRP than the historical excess returns approach and is it suited for application in our regulatory task?	• The DGM is well-suited to determining a forward-looking MRP estimate that is conditional on prevailing market conditions. It is also consistent with the observations of experts that MRP moves over time. (APGA, page 22) • The DGM approach has a strong theoretical basis and provides useful evidence about the forward-looking MRP. DGM specifications that are economically sensible, and which address the AER's previous concerns should be used to inform the MRP allowance in the 2022 RoRI (ENA, page 84). • Time variation of expected returns was not well understood. There is, currently, no model of time varying excess returns which might replace the use of historical excess returns. Therefore, estimation of a forward looking MRP should use both the historical excess returns approach and the DGM (APA, page 19). • The DGM approach has a strong theoretical basis and provides useful evidence about the forward-looking MRP. DGM specifications that are economically sensible, and which address the AER's previous concerns should be used to inform the MRP allowance in the 2022 RoRI. (ENA, Page 146) (SAPN, AGIG, United Energy Powercor and United Energy, page 5). • If the DGM is to be used to inform the relationship between the market risk premium (MRP) and risk-free rate, it would appear that any such approach would have to be mechanistic, ie. Adjust the MRP with the risk-free rate. In such circumstances the AEC would be concerned with the use of the DGM. (AEC, page 2). • The CRG remains of the view that DGMs provide little useful evidence for the AER's regulatory task. It's well understood that DGMs are theoretically attractive as they purport to represent current market expectations of future returns. In practice, they require the use of input assumptions that are inherently contestable and contentious, resulting in outcomes with a very wide confidence interval. The sensitivity of DGM estimates is predicated on their use of constant long run estimates of growth. The DGM in practice has yet to advance to the point at which it can deliver a robust standalone estimate of the MRP. (CRG, page 69,72). • The estimate of the MRP is more likely to reflect prevailing market expectations if it reflects information from DGM estimates. The options are to make a discretionary adjustment or a calibrated adjustment. (NSG, page 18)	• Section 7.2.2.3: Is the DGM likely to be a better estimator of a forward-looking MRP than the HER approach and what is the best way to apply the DGM in our regulatory framework?
Is the use of both the historical excess returns and the DGM approaches likely to provide a better estimate of a forward looking MRP?	• The AER should not rely on just historical averages when estimating the MRP, it should consider the DGM as well. The DGM and HER measure different things. The DGM provides conditional value, while historical excess returns provide an unconditional mean. Therefore, there is no basis for limiting consideration of DGM estimates to the range obtained from historical excess returns. This is even more so where that range reflects the difference between geometric and arithmetic means. The geometric mean is inconsistent with the way that the AER determines the allowed rate of return and should not be used to determine the MRP. (APGA, page 18,22)	• Section 7.2.2.3: Is the DGM likely to be a better estimator of a forward-looking MRP than the

	• The MRP allowance should not be set (explicitly, or in effect) on the basis of the HER evidence alone. That approach embeds the strong assumption that the MRP is effectively constant over time, which is inconsistent with the evidence and advice before the AER. The DGM approach has a strong theoretical basis and provides useful evidence about the forward-looking MRP. (SAPN, AGIG, United Energy, Powercor and United Energy, page 5) • The use of both historical excess returns and the DGM is likely to provide a better estimate of the forward-looking MRP. The historical excess returns approach and the dividend growth model are different ways of estimating the forward looking MRP: there is no reason to confine DGM estimates to a range set primarily by reference to historical excess returns. The DGM estimates should not be confined in this way (APA, page 25) • The MRP allowance should not be set on the basis of the HER evidence alone. That approach embeds the strong assumption that the MRP is effectively constant over time, which is inconsistent with the evidence and advice before the AER. The MRP allowance in the 2022 RoRI should be set by having real regard to all relevant evidence. The AER should apply its regulatory judgment, considering the strengths and weaknesses of each piece of evidence to produce an MRP allowance at the time of the RoRI. (ENA, page 89,91) • The 2022 RoRI must include an approach for producing the best estimate of the allowed return on equity across a wide range of market conditions that cannot be known when the final RoRI is made. The AER should use a diversified approach that gives meaningful weight to the HER, the wright approach and the calibrated DGM proposed by ENA. (QTC, page 1) • Assuming a good, unbiased estimate of the prevailing MRP was derived from some DGM-based method, it would only be a good estimate when paired with the prevailing risk-free rate at the same time. But the AER's approach means that the point estimate will be paired with future, different risk-free rates. If there is indeed a relationship between the risk-free rate and MRP, then the total equity allowance at that time will be wrong. For customers this risk is highly asymmetric. Risk-free rates are close to historical lows at present, but the resurgence of inflation makes it virtually certain that rates will rise over the next year or two. A higher risk-free rate combined with an MRP predicated on a low risk-free rate will result in a high return on equity. Accordingly, the CRG is unequivocal that such an approach is not in customers' interests – in the short or long-term. (CRG, Page 73)	HER approach and what is the best way to apply the DGM in our regulatory framework? Is the DGM likely to be a better estimator of a forward-looking MRP than the HER approach and what is the best way to apply the DGM in our regulatory framework?
Can the use of Energy Networks Australia's proposed calibrated DGM and /or multiple DGMs address the concerns we have had in the past about using DGMs to estimate the MRP? If so, what is an appropriate method to weight the outputs from the different models?	• There is little benefit in using many DGM models, but rather think that the AER should use the best one. At present, that appears to be the ENA model because it was developed specifically to address the AER concerns with other versions of the DGM. (APGA, page 22) • Have regard to DGM specifications that are economically sensible, for instance those provided by the ENA, to inform a genuinely forward-looking MRP estimate. This should be as a primary or equal piece of evidence with HER estimates rather than being limited to select an estimate from within a range of HER estimates which is inconsistent with its purpose and value (Endeavour, page 4) • The Energy Networks Australia calibrated DGM addresses a number of the AER's previous concerns about the DGM and can be used in MRP estimation. (APA, page 26) • The calibrated DGM should receive significant weight because it adopts the AER's preferred specification, with a small modification to address the issues raised by the AER in 2018. The negative relationship between the RFR and MRP is an outcome of the market data and not an assumption of the model. The calibrated DGM makes no assumption at all about the relationship between the MRP and the risk-free rate. The model simply estimates the	• Section 7.2.2.3: Is the DGM likely to be a better estimator of a forward-looking MRP than the HER approach and what is the best way to apply the DGM in our regulatory framework?

	required total market return from time to time and the MRP is obtained by deducting the risk-free rate at that time. When the model is applied to the data, the outcome is that the required total market return is more stable than the risk-free rate. That is, when the risk-free rate falls, the required total market return tends to fall, but not by as much. This manifests as a negative relationship between the MRP and risk-free rate (ENA, page 69,82) • No, it cannot. The CRG appreciate the efforts made by the AER and ENA to address previous concerns of the DGM, however they do not consider that the concerns have all been resolved sufficiently for DGMs to produce robust estimates suitable for the AER’s regulatory task. They note that the calibrated DGM ‘decouples’ the DGM result from the long-term growth rate, however the analysis conducted by Woollahra Partners suggests there is at least one independent variable short in the regression model: leading to potential for omitted variable bias and future analysis and investigation is therefore useful. Further analysis appears unlikely to be satisfactorily resolved for the 2022 instrument. (CRG page, 71) • Give weight to the DGM to capture the inverse movement with the RFR. Prefer to remove AER discretion in the adjustment by considering the ENA calibrated DGM approach. (NSG, page 8)	
Is there a reliable way to estimate changes in the market risk premium through time?	• Support ENAs approach of adjusting the MRP for movements in the risk-free rate based on the weights of sources used to inform the MRP and the best available estimate of the relationship between the MRP and risk-free rate. (APGA, page 22,23) • APA is unaware of any reliable way to estimate changes in the market risk premium through time. (APA, page 27) • The true MRP is unknowable, and all estimation methods have their weaknesses. There is no version of the DGM that is appropriate as the estimator of a forward looking MRP. (CRG, page 63)	• Section 7.2.2.1: Does the MRP vary through time, and can it be modelled? • Section 7.2.2.2: Is there a quantifiable relationship between the risk-free rate and MRP?
Is the practice by some market practitioners of modifying the risk-free rate and using that estimate with a long term MRP suitable for our regulatory task?	• The core principle appears logical in that the type of risk–free rate should match the type of MRP. A conditional or current risk-free rate should be paired with a conditional or current MRP. Similarly, a long run average risk-free rate should be paired with an historical average MRP. Although the AER has previously ruled out using a long run risk-free rate, the principle should inform the type of MRP it uses. (APGA, page 23) • Any market practice of using a modified risk-free rate to estimate a longer term MRP is unlikely to be suitable for the AER's regulatory task. (APA, page 28) • The practice of modifying the risk-free rate and using that estimate with a long term MRP at the instrument carries significant issues. Firstly, it entails abandoning a longstanding approach to using the prevailing risk-free rate. This has the merit of being one of the few variables that can be robustly estimated using a mechanistic approach and so something would be lost if the AER moved away from that approach. It would also be incompatible with the NPV=0 condition, regardless of the debate over whether a five- or ten-year term better satisfies the condition. Alternatively, the AER could retain the current risk-free rate approach and update the MRP at the same time it updates the risk-free rate for each new regulatory period. However, this requires specifying the MRP estimate mechanically, which - even to the extent it can be done – is too fundamental a change to be introduced at the Draft Instrument stage. (CRG, Page 65)	• Section 7.2.2.4: What is the role of surveys in informing our MRP?

Which of the three proposed options listed in our final rate of return omnibus working paper would lead to the better estimate of the MRP for our regulatory task?	• The third option of using the DGM and HER together. The second option is logically flawed, and the first option misses out forward-looking information. We also favour reflecting changes in the MRP as market conditions change following the ENA approach. (APGA, page 23) • More weight should be given to the DGM when estimating the MRP, therefore option 3 is the most reasonable option. The third option allows the AER to bring the HER and DGM methods together in a complementary way. The HER method provides estimates about the long run average MRP bases on the AER's assessment of the most representative time period. The DGM is used to signal whether the prevailing MRP is higher or lower that the long-run average and by how much. The AER would apply its regulatory judgement as to the weight to apply to each. (Ausgrid, page 2) • The MRP allowance should be set by having real regard to all relevant evidence. The AER should apply its regulatory judgment, considering the strengths and weaknesses of each piece of evidence to produce an MRP allowance at the time of the RoRI. (SAPN, AGIG, United Energy Powercor, and United Energy, page 5) • The historical excess returns approach and the DGM are different ways of estimating the forward looking MRP. There is no reason to confine DGM estimates to a range set primarily by reference to historical excess returns. APA is of the view that DGM estimates used alongside using the arithmetic mean of historical excess returns should lead to better estimates of the MRP. The AER should only use the arithmetic mean when estimating the HER (APA, Page 25, 29) • An approach that updates the MRP to reflect changes in the risk-free rate is most likely to produce internally consistent estimates of the allowed return on equity. However, the ENA accepts the AER has ruled out that approach. Best practice requires exercise of judgment at each decision, but this is not possible under binding instrument. Therefore, within the set of approaches that remain under consideration, ENA's view is that an approach that fixes the MRP for the duration of the RoRI is likely to be the only viable approach. However, there is no basis for using DGM (or other) evidence to select an estimate from within the range of HER estimates. The primary value of the DGM evidence is not in identifying which historical average might be more informative, but in identifying market conditions where the prevailing MRP might be different from the historical average (ENA, page 90,91) • QTC does not consider the three preliminary options in the Rate of Return Information Paper to be sufficiently diversified to be capable of producing the best estimate of the allowed return on equity. The option that should be reconsidered by the AER before making the draft 2022 RoRI is a weighted average of the HER, Wright and calibrated DGM approaches. A weighted average approach is consistent with the recommendation to the AER by Dr. Martin Lally at the Concurrent Evidence Session on the MRP should be adopted. (QTC, page 4) • Support weight being given to sensible specifications of the DGM. Exclusive reliance on long-term historical average figures produces a constant market risk premium (MRP) that cannot possibly reflect the prevailing market conditions (TransGrid, page 8) • The AEC believes that the current approach using the MRP is consistent even if it is not perfect. No superior approach has been identified, and there are good reasons identified in the Sapere Report to the CRG to rely on the unconditional MRP. (AEC, page 2) • The AER should have regard to all relevant evidence but not applying it in a mechanistic way or that is inconsistent with the broader context within which it exists. Hold alternative approaches to a standard of better rather than perfect; and connect the preferred method to the current regulatory framework and market practices	• Section 7.1: Draft decision • Section 7.2: Issues and considerations

	rather than esoteric theory or hypothetical constructs. Recommend further consideration is given to developing a broader implementation method given it is likely to produce a better estimate of the return on equity. It is likely to be in the long-term interests of customers and investors to reduce the volatility the fixed approach creates in current and forecast market conditions. (Endeavour, page 2,3) • The AER could specify a mechanistic formula for estimating the MRP that took account of a range of estimation methods. Then it could update the formula before the start of each regulatory period, resulting in an MRP that was consistent with the prevailing risk-free rate that is used for that reset. However, there are challenges with this approach, including the requirement to appropriately specifying the models to be used in the formula and determining the weights to give them. Each model should be specified in a way to minimise bias. There is a good deal of 'devil in the detail' of specifying a formula for MRP, making it a likely source of disagreement among stakeholders, lobbying and ambit claims. The CRG also noted that we are we are very late in the process to introduce a formula and even though our current approach it not perfect, we should retain it an put most weight on long-run HER data. Therefore Option 1 - the continuation of the current approach – would lead to the better estimate of the MRP for the AER's regulatory task (CRG, page 65, 74,75) • AER should adopt a long run historical RFR with a long run MRP so that the estimate is stable over time and less volatile to changing market conditions. If the 10-year CGS is adopted, apply an approach that enables the MRP to be adjusted to normalise current market conditions to long term expectations of market conditions (NSG, page 8)	
AER's current approach	• AER's current approach to fix the MRP results in volatile and lottery type outcomes which are inconsistent with delivery of the NEO and NGO objectives of long-term economic efficiency. During the concurrent sessions the experts unanimously agreed that market risk premium moves with time. (Jemena, page 2,3) • The CRG recognises the challenges the AER faces in arriving at the best estimate of the MRP. Given many of the issues are fundamentally irresolvable, it is reasonable for the AER to maintain its current approach in the absence of any evidence that it has produced detrimental outcomes for consumers, either directly or indirectly. (CRG, page 68) • The 2018 RORI is producing historically low equity returns below that of international comparators and which is out-of-step with academic literature and market practices. In a transitional period for the Australian energy industry, it is critical that the 2022 RORI, which is binding and applies for several years, produces a rate of return that is robust to a range of future market scenarios and capable of attracting the substantive investment required to support the efficient decarbonisation of the Australian economy. (Endeavour, page 2) • The AER's 2018 RORI set regulated equity returns too low and are an outlier compared to the returns allowed by other regulators of comparable assets in Australia and overseas. Market practitioners consider the parameters in the CAPM (MRP, RFR and equity beta) as a package to estimate the equity return required for the expected risk. They do not assess parameters in isolation and accept the resulting outcome without review and crosschecks to ensure the overall investment return is reasonable. Furthermore, Investors' expectations of return on equity do not change in lock step with changes in the RFR as is the AER's current assumption. There is no evidence that this reflects market practice, nor is it supported by the expert panel. Retaining this approach sets a dangerous precedent for future (NSG, Page 2,3)	• Section 7.2.1: The HER as a forward-looking estimate • Section 11.2.1.5: Other regulators' rate of return decisions

	• AER's current methodology results in outcomes lower than those adopted by other comparable regulators and is unlikely to deliver the transformational levels of investment needed in Australian energy infrastructure in the years ahead. (GIIA, Page 3)	
Survey evidence	• Do not rely on survey evidence to inform the estimate of the MRP as it is of low quality. It is not clear how its ongoing use in any capacity is consistent with the AER's evidence assessment criteria. To the extent that survey evidence is used, it is important to consider the whole of the response and not just part of it, and to consider only contemporaneous surveys (Endeavour, page 4, ENA, Page 94). • Surveys and financial market indications likely to contain considerable noise and possible bias, however they may have some value when combined with other approaches. Often these indicators are impacted by short term spikes. Given the economic dislocation of the last two years: encompassing a once in a century global pandemic, energy crises in multiple continents, an unexpected resurgence of inflation and now war in the Ukraine, could provide a fundamentally misleading indicator of a forward looking MRP for the next decade. (CRG, Page 72)	• Section 7.2.2.4: What is the role of surveys in informing our MRP?
Variable growth DGM	• While the proposal of incorporating a variable growth DGM estimate may appear to have the potential to improve the overall MRP estimate, much appears to rest on the choice of variable growth path. The AER's approach of using the risk-free rate as a proxy for growth rates was not supported by the experts in the concurrent expert sessions. Further analysis appears unlikely to be satisfactorily resolved for the 2022 instrument (CRG, page 71). • The type of 'variable growth rate' DGM considered in the Final Omnibus paper should receive no weight. There is no basis for the assumption that the current government bond yield for years 1 to 10 is a reasonable estimate of the perpetual growth in corporate dividends from year 11 and beyond. (ENA, page 69)	• Section 7.2.2.3: Is the DGM likely to be a better estimator of a forward-looking MRP than the HER approach and what is the best way to apply the DGM in our regulatory framework?
Arithmetic vs Geometric	• Only arithmetic means should be used for the HER approach. Geometric means have no role to play in the AER's regulatory task. There is compelling evidence to support the exclusive use of arithmetic means when implementing the HER approach to estimating the MRP. Leading textbooks explain why the arithmetic mean should be used and the geometric mean should not. A Harvard Business School case makes the same point. Dr Lally has explained why the arithmetic mean must be used in reports to the AER and the recent Concurrent Evidence sessions. (SAPN, AGIG, United Energy, Powercor and United Energy, page 6, ENA, page 71,75, APA, page 29, Endeavour, page 3. • The superiority of arithmetic averages is predicated on the assumption that returns are serially uncorrelated. This is by no means a given, and if this assumption does not hold then the best estimate of future returns will lie between the arithmetic and the geometric average The CRG considers that there is scope for future work on whether there is evidence for or against autocorrelation, and - assuming autocorrelation cannot be ruled out - how to weight the geometric and arithmetic averages. In the meantime, the geometric mean should continue to be given some weight, meaning that arithmetic averages should be considered at or above the upper bound of reasonable estimates (CRG, page 69)	• Section 7.2.1: The HER as a forward-looking estimate

Mathews (2019) HER estimates	• Disregard the Mathews (2019) HER estimates for the reasons set out in Dr Wheatley's consideration of the discussion paper and Mathews own recommendation that the Lamberton data should be preferred to his. Mathews' analysis is so affected by a range of fundamental problems that no regard should be given to it. (Endeavour, page 3, ENA, page 77).	• Section 7.2.1: The HER as a forward-looking estimate
Inflation and MRP	• The AER may need to consider further the implications of a material risk of rising inflation on its MRP. Increasing inflation will lead to higher risk free rates. Under the current approach increases in risk free rate do not impact the MRP, this is not unfair on consumers who have benefited from the fixed long-term MRP being combined with historically low risk-free rates. If the approach is changed such as using DGM, then as interest rate increases the MRP will drop. These impacts on the MRP could be a fruitful use of scenario testing. If they are still open options, the scenarios should include five- and ten-year risk-free rates, and HER and DGM estimates of MRP (CRG, Page 75)	• Section 7.2.2.3: Is the DGM likely to be a better estimator of a forward-looking MRP than the HER approach and what is the best way to apply the DGM in our regulatory framework? • Section 11.2.1.8: Scenario testing
The relationship between the risk-free rate and MRP and Wright approach	• There is at least as much evidence to support the use of the Wright approach as for the historical excess returns approach. The AER should have some regard to the Wright approach. Different standards of assessment have been applied to the evidence for the HER and Wright approaches at this stage of the process (ENA, page 88, QTC, page 2) • There is a theoretical basis for a negative relationship and such a relationship can be observed. This was further supported in the Independent Expert Reports which recognised market evidence and theory that an inverse relationship exists. The AER should give weight to the DGM to capture this inverse relationship. NSG also prefers to remove AER discretion in the adjustment by further considering the ENA calibrated DGM approach. (NSG, page 8,9)	• Section 7.2.2.2: Is there a quantifiable relationship between the risk-free rate and MRP? • Section 7.2.3: Total market returns approach (TMR or Wright approach)

Equity beta

Summary of submissions on equity beta issues

Question posed in information paper or additional issues	Summary of submissions	AER consideration
Do you agree with our preliminary position to maintain our current approach to estimating the equity beta in the 2022 Instrument?	• Broadly agree; but AER should give smaller weight to delisted firms and firms with a small proportion of regulated revenue. Firms with a higher proportion of revenue that is regulated tend to have lower beta. (CRG p.76) • For the 2022 RORI, AER should do nothing that pre-empts or forecloses on future options for determining the rate of return. After the 2022 RORI, AER should initiate a full review of its approach to estimating the rate of return (with a particular emphasis on the return on equity). (CRG p.76) • Broadly disagree; AER should use a 10-year estimation period, consider international comparators, and consider low beta bias. (ENA p.95) • After the 2022 RORI, AER should establish a substantive stakeholder consultation and review process focused on future methodology for beta estimation. (ENA p.95)	• Section 8.1: draft decision • Section 8.2.1: methodology for estimating beta
What are the pros and cons of using beta estimates of the longest period available and 10-year period? How much weight should we place on the most recent 5-year data given market volatilities in recent periods?	• Agree with AER's existing approach of using a mix of short and long estimation periods (AEC p.2) • AER should use the longest, reliable estimation period, not mix of short and long estimation periods. (CRG p.76) • A short estimation period provides more recency and relevance but may be unstable and volatile. A longer estimation period provides more statistical reliability but may be less reflective of current level of systematic risk. A 10-year estimation period is recommended. (ENA p.96-97) • Long estimation periods do not reflect recent asset stranding risk. A 5-year estimation period is recommended. (APA p.38-40)	• Section 8.2.4: estimation period
Are there any transparent, robust, and practical approaches which would enable us to adjust data from international energy firms and domestic infrastructure firms to account for any differences between those firms and the benchmark efficient firm in Australia?	• AER should not consider international energy firms. (CRG p.76; AEC p.2) • AER should not consider domestic infrastructure firms. (CRG p.76; APA p.38) • AER should consider international comparators (but not necessarily in a formulaic way). (ENA p.95; APGA p.12; NSG p.10; AGIG/SAPN/VPN p.5; APA p.38; Ausgrid p.3; Endeavour p.1; Jemena p.3; TransGrid p.7-8) • AER should adopt a beta that is within the overlapping confidence intervals of beta estimates for the domestic sample and international sample. (APGA p.15, CEG p.20) • AER should consider domestic infrastructure firms. (ENA p.99; NSG p.10)	• Section 8.2.5: comparator set

Is there any empirical evidence on the extent to which the regulated electricity and gas networks may have materially different systematic risks? Is there any robust evidence on the magnitude of stranding risks for the regulated gas networks, and in particular, the scope that part of stranding risk is systematic?	• AER should not adjust the equity beta to reflect stranding risk. (CRG p.81) • It is unclear whether electricity and gas firms have the same beta, and further analysis is needed. (ENA p.105; APGA pp.13, 14, 15; Jemena p.4) • There is empirical evidence on materially different systematic risks for regulated electricity and gas firms, and further examination is warranted. (APA p.47) • The regulatory framework should have strong asset standing protections. (AusNet p.2)	• Section 8.2.6: setting a single beta for regulated electricity and gas businesses
Low beta bias	• There is a large body of evidence demonstrating low beta bias, AER should consider this evidence when exercising its judgment to set the allowed return on equity. (ENA p.95; AGIG/SAPN/VPN pp.4-5) • Low beta bias is a 'second order issue' and should not be adjusted for in the 2022 RORI. (APA p.39)	• Section 8.2.7: low beta bias
Other regulators' decisions	• Other domestic and international regulators generally adopt a higher value of beta than 0.6, and AER should have proper regard for this (but not necessarily in a formulaic way). (ENA p.102-104; Endeavour p.4; TransGrid pp.7-8) • Some other regulators have either adopted or are considering adopting international energy firms as comparators. (ENA, pp.100-102; APGA, p.14; Endeavour p.4; AGIG/SAPN/VPN, p.5) • There's little to be learned from decisions of other regulators. (APA p.38)	• Section 8.2.8: other regulators' decisions

Use of the industry debt Index

Summary of submissions to EICSI issues

Question posed in information paper or additional issues	Summary of submissions	AER consideration
Do you agree with our preliminary position to further consider whether to make an adjustment for the residual outperformance of the EICSI compared to our benchmarks?	• No adjustment required (AGIG/SAPN/VPN, p. 6; APA, p. 16; Ausgrid, p. 3; ENA, p. 116; Endeavour Energy, pp. 4–5; NSG, p. 13; TransGrid, pp. 8–9). • Results are not robust enough to show a sustained, statistically significant under or over performance (AEC, p. 1; APGA, p. 24; AusNet, pp. 2–3; NSG, p.13). • Comfortable with the principle of direct adjustment but accept that adjustment to the benchmark is unlikely (CRG, p. 95). • Continue to monitor outperformance and refine index (AEC, p. 1; CRG, p. 91; ENA, p. 116, Endeavour Energy, p. 5).	• Section 9.2.2.2: Other impacts • Section 9.2.2.3: Reasons for decision

Do the results of our analysis justify an adjustment to remove any residual outperformance that is material and persistent? And how do we define 'material and persistent'?	• Agree that material and persistent outperformance should be removed, but analysis confirms no material outperformance. 'Persistent' requires more than a single episode, but most outperformance occurred only in 2016 (AusNet, p. 3–4; ENA, p. 118). • Materiality is a matter of judgement but should be applied consistently across parameters (CRG, p. 91). • Observed outperformance is not material enough to make adjustment (AEC, p. 1, AGIG/SAPN/VPN, p. 6; APGA, p. 24; AusNet, pp. 3–4; Ausgrid, p. 3; ENA, p. 114; NSG, p. 13; TransGrid, pp. 8–9). • Current sample for EISCI is too diverse and too small to make adjustments (APA, pp. 16–17).	• Section 9.2.2.2: Analysis of data
If we were to make an adjustment, how would we do this? For example, is a cap or other constraint applied on the debt risk premium or credit spread an appropriate way to remove the residual outperformance identified?	• EICSI and WATMI should not be used to inform the return on debt (APA, p. 16; TransGrid, pp. 8–9). • No adjustment required (AEC, p. 1; AGIG/SAPN/VPN, p. 6; APA, pp. 15–17; APGA, p. 24; AusNet, pp. 2–3; Ausgrid, p. 3; ENA, pp. 116; Endeavour Energy, p. 5; NSG, p. 13). • Cap mechanism is likely to be complex and may create unanticipated consequences. Comfortable with direct adjustment to the benchmark allowance for residual outperformance (CRG, p. 92). • Removing average outperformance is negligible. Applying a cap embeds a bias in the regulatory allowance. AER should rule out ever applying cap (ENA, pp. 119–121).	• Section 9.2.2.2: Analysis of data
Should we further consider making an adjustment for the residual outperformance of the EICSI compared to our benchmarks. Or should we adjust the benchmark term directly? If we were to make an adjustment for term how would this best be done?	• The sample size in EICSI (and WATMI) are too small to inform a change to return on debt or benchmark term (APA, p. 16; APGA, p. 24). • No basis for adjusting benchmark term from 10 years (AusNet, p. 3; Ausgrid, p. 3; Endeavour Energy, p. 5; TransGrid, pp. 8–9). • Current evidence provides limited support for a change to term (CRG, p. 91). • If change is proposed, implement immediately (CRG, p. 91).	• Section 9.2.2.2: Analysis of data
Inclusion of subordinated debt/hybrids	• Support the inclusion of subordinated debt in the EISCI (ENA, pp. 32–33; AusNet, pp. 3). • AER misquotes Lally on hybrids. AER should clarify treatment in draft RORI (AusNet, p. 3). • Hybrid securities do not form part of the portfolio of financing instruments used by a benchmark provider (APA, p. 73). • At present, hybrids appear to only be used by a few of the businesses, and so the AER is correct to disregard them. If the use of hybrid instruments became more prevalent, it may need to change approach (CRG, p. 93).	• Section 9.2.2.1: How the EICSI is constructed
Future collection of data	• Continue to monitor outperformance and refine index (AEC, p. 1; CRG, p. 91; ENA, p. 116, Endeavour Energy, pp. 4–5). • There may be a case for data collection and analysis of state-owned networks' cost of debt (CRG, pp. 95–96).	• Section 9.2.2.1: How the data is collected

Weighted trailing average return on debt

Summary of submissions to weighted trailing average issues

Question posed in information paper or additional issues	Summary of submissions	AER consideration
What are the relative merits of Options 1–4 from the information paper? *Option 1*: Maintain the current (simple trailing average) approach. *Option 2*: Weighted trailing average that applies to all distribution and transmission network service providers. Weights are based on the debt issuance assumptions in the Post Tax Revenue Model (PTRM) *Option 3:* Weighted trailing average only starts to apply when a large increase in the RAB (and therefore debt issuances) is forecast. We would need to set a threshold for the shift to a weighted trailing average. Once the weighted trailing average is triggered, weights are based on the debt issuance assumptions in the PTRM. *Option 4*: Weighted trailing average that applies to all	• Only Option 1 has merit. Do not advocate implementing weighted trailing average. The case for a weighted trailing average has not been sufficiently made to trigger such a change (Jemena, p. 4; NSG, p. 13; AEC, p. 2; APGA p. 24). • Option 1 is preferred. There may be some merit to implementing the weighted trailing average, but it is insufficient, in and of itself, to address this commercial viability problem. If the AER wishes to progress approach, detailed consultation is required on the specifics to avoid exacerbating the problem (AusNet, p. 3; ENA, p. 13; AGIG/SAPN/VPN, pp. 6–7). • Option 1 is best, as the merits of weighted average are yet to be proven. If a change is made, option 3 is next best option as it should be targeted at the relevant NSPs (CRG, p. 98; Ausgrid, pp. 3-4). Option 4 is a fallback if option 3 proves incapable of implementation (CRG, p. 98). • Option 2 is the best option, it appears to lead to a better estimate of the return on debt allowance - in draft RORI a more specific mechanism should be proposed. Option 3 and 4 should not be considered, as Option 3 raises new issues and be arbitrary, and may be unworkable under the Law (APA, pp. 57-58). • Option 3 or 4 have merit. A weighted approach may introduce complexity that may not result in a better estimate, thus don't consider this level of specificity necessary. May only be necessary if a threshold is met or for transmission only (Endeavour, p. 5). • Not clear that any proposed options better match the allowed return on debt with that required for financing major project capex. Separate RAB for major project capex during construction applying specific beta, gearing and RoD commensurate with construction activities is preferred. (TransGrid, p. 3). • Weighted average approach based on the capital expenditure profile should be adopted for new businesses during initial expenditure phase, transitioning to simple trailing average. For new businesses like MLPL the benefit of applying weighted trailing average likely outweigh the costs of developing and implementing. For existing businesses judgment needs to be made whether the benefit of introducing change outweighs the costs. (MLPL, pp. 2–3).	• Section 9.2.7.4: Trailing average approach options and our decision

TNSPs. Weights are based on the debt issuance assumptions in the PTRM.		
Is there a better option to address our concerns?	• Should consider a 'construction' allowance during the construction phase of major new projects. Identify capex and place in separate RAB during construction phase with separate beta, gearing and RoD commensurate with construction activities. Once commissioned, roll into standard RAB (TransGrid, p. 5). • It is too late to consider a new option that requires detailed development, however, the option suggested during CES to create a separate RAB for new investment shows potential (CRG, p. 100). • AER should consider how best to address the cost of debt for new TNSPs, particularly during the construction phase (MLPL, p. 3). • There may be other ways to assure the financeability of major projects that may be explored in the AEMC's Review of Transmission Investment Frameworks (Ausgrid, pp. 3-4).	• Section 9.2.7.2: Treatment of new entrants • Section 9.2.7.4: Options 4 and 5 are inconsistent with NEL/NGL
Is there a case for taking a more tailored approach to determining the return on debt for regulated firms with temporarily large capex (for example, such as in Options 3 and 4)?	• Case for change not yet proven, but if AER applies weighting it should only be applied to NSPs for whom it will make a material difference/threshold is met. (CRG, p. 99; Ausgrid, pp. 3-4). • Complexity may not be necessary for all. If applied may only be necessary if threshold met or to TNSPs only (Endeavour, p. 5). • Weighted average approach based on the capital expenditure profile should be adopted for new businesses during initial expenditure phase (MLPL, pp. 2–3). • If the use of weights better aligned with the required level of capital investment reduces any mismatch between the return on debt allowance and benchmark efficient financing cost, should be applied to all, not targeted. (APA, pp. 57-58).	• Section 9.2.7.2: Treatment of new entrants • Section 9.2.7.4: Other considerations
How would such an approach work under the current law and given the mechanistic nature of the Rate of return instrument?	• To implement option 3, the RoRI needs to specify a set of ex ante conditions under which the capex-weighting applies which then needs to apply to forecast capex (CRG, p. 103). • A "tailored" approach appears against s. 18J(2) of the National Electricity Law and s. 30E(2) of the National Gas Law (APA, pp. 57-58). • If the AER adopts a weighted trailing average, we consider the weights should be based on the percentage change in the post-tax revenue model (PTRM) debt balance - example provided. (QTC, p.32).	• Section 9.2.7.3: Scenario analysis and observations • Section 9.2.7.4: Options 4 and 5 are inconsistent with NEL/NGL and Other considerations
In particular, if we were to set up a threshold of capex 'lumpiness', what would such a threshold look like? Would setting up a threshold present some gaming opportunities for businesses with capex programs that	• Threshold options include a high annual percentage change, a high change for two or more consecutive years, or a high annual average over the period. There may be some gaming opportunities which can be minimised by using a threshold applied across multiple years or as an annual average, as well as applying extra scrutiny to NSPs whose capex forecasts just fall either side of threshold. (CRG, p. 103). • No specifics presented, but if the AER wishes to progress approach, detailed consultation is required on the specific application to avoid exacerbating the problem (AusNet, p. 3; ENA, p. 13; AGIG/SAPN/VPN, pp. 6–7). A more specific mechanism should be proposed in the draft RORI (APA, pp. 57-58).	• Section 9.2.7.4: Other considerations

take them close to this trigger?		

Crosschecks of the rate of return

Summary of submissions to crosscheck issues

Question posed in information paper or additional issues	Summary of submissions	AER consideration

Do you agree with our preliminary positions in the final working paper?	• General agreement that crosschecks should have no formulaic/deterministic/mechanical role (Partington & Satchell, p5; Endeavour Energy p6, CRG p104, ENA p136).
	• On scenario testing, there was general agreement with AER that scenario analysis could be useful, although stakeholders also noted reservations.
	    ○ In support of scenario analysis as a crosscheck reiterates their September 2021 submission, that scenario testing is important to test whether the RoRI is robust (ENA p. 140); agree with AER that scenario testing can be a useful crosscheck (CRG p. 104); are supportive in principle while noting potential issues (asymmetry and scenario specification) (Partington & Satchell p. 29)
	    ○ Reservations were noted as follows: it should be robust to different scenarios because of its binding nature for four years (AGIG (p.7 and Endeavour Energy p.6); notes that it should be 'responsive to a wider set of scenarios … to be truly reflective of the market' (GIIA p.3); little value given the inflexible scheme for the RoRI in the national energy laws (APA p. 63); care must be taken in the process of selecting the relevant forecasts to ensure scenario testing is applied symmetrically and the AER should clarify how it seeks to interpret the output of scenario testing (CRG p.104)
	• On RAB multiples, there are mixed views, as follows:
	    ○ RAB multiples may provide some useful information and recommend further analysis by AER, while suggesting that '… using RAB multiples as a crosscheck meets all eight of the AER criteria…' (Partington & Satchell p. 5 and p. 9); RAB multiples are important and can provide additional, relevant information, which cannot be ignored or assigned to simply a role as a 'sense check' (CRG pp.116 -117).
	    ○ Very limited useful role, should have no regard to any RAB multiple unless it can be accurately disaggregated, do not see how RAB multiples can be used to assess the adequacy of the allowed regulatory return, impossible to disaggregate and understand the various drivers of RAB multiples based on publicly available information, can provide contextual information, but they cannot be used to reliably determine the degree of outperformance on the rate of return (APGA p. 25, ENA p.
		• Section 11.1: Our draft decision
		• Section 11.2.1.1: RAB multiples
		• Section 11.2.1.2: Financeability tests
		• Section 11.2.1.3: Historical profitability
		• Section 11.2.1.5: Other regulators' rate of return decisions
		• Section 11.2.1.6: Analysts' discount rates

129, Ausgrid p. 4, Ausnet p. 3, Grant Thornton p. 5, AGIG p. 2, Transgrid p.8 Endeavour Energy p.6, NSG p. 4)

- There are mixed views on whether financeability would be a good crosscheck, as follows:
    - In support of financeability as a crosscheck: agreed that it should be part of the suite of crosschecks, a key role of financeability tests 'to determine whether the regulatory allowance supports the credit rating' (Ausgrid p. 4, GIIA p.4, APGA p. 25, ENA p.139)
    - Unsupportive of financeability as a crosscheck: suggest there is limited usefulness in the context of the RoRI (CRG p. 105)
- There are mixed views on whether other regulators' rates of return would be a good crosscheck:
    - In support of regulators' rates of return as a crosscheck: this is a key crosscheck which may, or may not, lead AER to amend its approach, could reveal any AER error, extreme outcome or red flags, provides contextual information and inform potential areas of inquiry and research, insight into types of data and methods used to estimate parameters and the ways in which regulatory judgment is exercised (ENA p.135), GIIA p. 2, APGA p. 25, APA p. 65, Endeavour Energy p.5)
    - Unsupportive views or reservations: other regulators' returns should not be used as a crosscheck (CRG (p104). There is merit in looking at what other regulators do, but there is judgement required given: different fundamentals; impact of taxation; impact of regulation; and regulatory capture (Partington & Satchell p. 5).
- There are mixed views on historical profitability, as follows:
    - Supportive views: it has a role and can be used as a qualitative 'conditioning variable' given its importance to consumers in evaluating the overall framework (CRG p. 109, pp119 -120)
    - Unsupportive views: of less value and can be excluded, do not provide information on the expected rate of return, fundamental problems using accounting profitability as a crosscheck including cost allocation and accounting profit measures, which differ from economic profit; and gaming problems (APA p.66, ENA p.140, Partington & Satchell p. 36-40)
- Some stakeholders agree that there is little value in crosschecks that consider:
    - discount rates from other practitioners (APA, p66; CRG, p109)
    - investment trends (APA, p66; CRG, p109)
- Regarding, other practitioners' discount rates, two stakeholders (NSG and ENA) are supportive and provide the following information:
    - NSG (p.19-21) present the following information:

Source	Date	MRP	RFR
Deloitte	13/08/2021	7%	1.65%
KPMG	07/03/2017	6%	4%

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<tr><td>Leadenhall</td><td>31/21/2020</td><td>7% to 7.5%</td><td>0.97%</td></tr>
<tr><td>Korda Mentha</td><td>28/04/2015</td><td>6% to 6.5%</td><td>5%</td></tr>
<tr><td>Grant Thornton</td><td>30/09/2019</td><td>6%</td><td>3.5%</td></tr>
<tr><td>EY</td><td>19/10/2020</td><td>6%</td><td>3.25%</td></tr>
<tr><td>KPMG</td><td>30/06/2018</td><td>6%</td><td>2.9%</td></tr>
<tr><td>Grant Samuel</td><td>April 2019</td><td>8.7%</td><td>2.2%</td></tr>
<tr><td>Grant Samuel</td><td>August 2020</td><td>6%</td><td>3%</td></tr>
<tr><td>FTI Consulting</td><td>June 2020</td><td>7.5%</td><td>Adjusted every year</td></tr>
<tr><td>Calibre Partners</td><td>June 2020</td><td>6%</td><td>2.98%</td></tr>
<tr><td>Lonegran Edwards and Associates</td><td>June 2020</td><td>6.5%</td><td>3%</td></tr>
<tr><td>Valuation Expert A</td><td>2021</td><td>6%</td><td>2.3%</td></tr>
<tr><td>Valuation Expert B</td><td>2021</td><td>6%</td><td>3%</td></tr>
<tr><td>Valuation Expert C</td><td>2021</td><td>6.5%</td><td>2.9%</td></tr>
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ENA (p. 19-21) presents the following information:
<table>
<tr><th>Source</th><th>MRP</th><th>RFR</th></tr>
<tr><td>KPMG</td><td>6%</td><td>2.8%</td></tr>
<tr><td>Grant Samuel</td><td>6% to 8%</td><td>1.8% to 3.1%</td></tr>
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<td>Do the crosschecks that we have selected provide a balanced assessment that promote the NEO and NGO?</td>
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Stakeholders noted that the selected crosschecks:

do not need to promote the NEO and NGO given their purpose as a sense check on determination of allowed rate of return (APA, p. 67)
need to include detail on how they will be applied to determine whether they provide a balanced assessment (CRG, p. 105)

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<td>Section 11.2: Issues and considerations</td>
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Which financeability tests should be undertaken to inform our decision on the rate of return?	• Suggestions for financeability tests include: ○ the ENA approach, which proposes tests based on a benchmark efficient entity, to ensure a minimum for required returns and to confirm the allowed return supports the credit rating assumed in deriving it per the NPV=0 principle (APGA p. 25, Endeavour Energy p.6). ○ a version of PTRM that contains relevant metrics, which could be built into the standard PTRM (Ausgrid, p. 4) ○ suggest examination of the ratio of funds from operations to net debt (FFO/net debt) using cashflows from the Post-tax Revenue Model (APA p. 68) ○ Some stakeholders note that financeability tests should not focus on the actual financing operations of individual service providers (APA, p. 68), ex ante testing (CRG, p. 109), a single narrowly applied model or models which arbitrarily exclude relevant data in the process (GIIA, p. 4)	• Section 11.2.1.2: Financeability tests
How can RAB multiples be appropriately adjusted to identify and disaggregate the impact of the rate of return from other contributing factors?	• Stakeholders suggest the following issues should be accounted for: ○ Control premium (ENA, p. 127) (Partington & Satchell, p. 24), potential overpayment (ENA, p. 127), future revenues, regulatory allowances, and incentives/outperformance (ENA, p. 127 and Partington & Satchell, p. 24 & p28) unregulated assets (ENA, p. 127 and Partington & Satchell, p. 27, Ausgrid, p. 4), tax depreciation benefits, economic conditions, potential for expenditure reductions, potential for unregulated growth and network specific factors. (AusNet, p. 4), future investments and the 'real option' value. (Transgrid, p. 8, ENA p. 128, Partington & Satchell, p. 29), trailing average debt (ENA, p. 128) • the problem of non-regulated revenues is largely irrelevant because revenues are 'very largely' from regulated networks and that adjustments depend on the intended role of RAB multiples (CRG p. 105 & 117) • RAB multiples are unsuitable for use as crosschecks on the rate of return, given doubts on '… whether RAB multiples can be adjusted to identify and disaggregate the impact of rate of return from other factors which contribute to the values of the multiples' (APA p. 69) • a disaggregation of the RAB multiple is unnecessary because there already exist direct estimates of the market cost of equity capital via the recent takeovers independent reports (AGIG p.3)	• Section 11.2.1.1: RAB multiples
Should we prioritise information from transaction RAB multiples or trading multiples?	• It is unclear whether transaction or trading RAB multiples should be prioritized (APGA p. 26) • This question is moot given their view that RAB multiples are unsuitable for use as crosschecks (APA p.72) • Both represent potentially useful sources of information (CRG p. 105) • Most stakeholders do not provide an explicit view, including ENA; Grant Thornton; and Partington & Satchell.	• Section 11.2.1.1: RAB multiples
Which scenarios should we consider to provide a balanced assessment of possible outcomes from our rate of return decision?	• The ENA suggest (pp.143-144): ○ plausible pathways for the risk-free rate ○ indicative pricing impacts (eg $per household impacts) ○ that AER publish scenario outputs for the cost of equity, debt, and rate of return to provide a reasonable sense of potential outcomes	• Section 11.2.1.7: Sensitivity testing • Section 11.2.1.8: Scenario testing

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The CRG suggest AER consider scenarios that model potential outcomes from different options for each parameter. CRG suggest that two key types of inputs be considered (p.105 & 109):

options that reflect open options for parameter estimates
forecasts that reflect a range of potential future states with respect to relevant macroeconomic variables

The APGA (p26) suggest AER shows how customer prices should change, given some notional benchmark PRTM model
The APA (p73) suggest that there is little value in testing different scenarios given the difficulty in formulating fixed rules to apply, and the explicit preclusion of discretionary intervention by the AER in the national energy laws.
Endeavour Energy (p6) suggest a range of financial market conditions should be considered for scenario analysis
GIIA (p3) suggest the unprecedented capital market conditions (both pre-COVID, and in light of COVID) be accounted.
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<td>The ENA has provided some additional detail on how scenario testing can be used to inform the rate of return such as prioritising certain scenario(s) and not needing to assign probabilities to scenarios. We appreciate your comments on the ENA’s proposal.</td>
<td>
Stakeholders are in agreement that scenario testing can be potentially informative:

suggest that the ENA model is excellent guidance for the AER to develop their own scenarios (APGA p. 25, APA p. 74)
Essential that the AER takes control of any scenario analysis for the purposes of crosschecking its decisions (CRG p.106)

On assigning probabilities: the CRG agree that assigning probabilities is unnecessary (p. 106).
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Section 11.2.1.7: Sensitivity testing
Section 11.2.1.8: Scenario testing
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<td>What are the views/comments/evidence on how our 2018 Instrument has performed?</td>
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Two clearly different views between the CRG and networks and shareholders group

There is no evidence to suggest the 2018 RoRI is having a detrimental impact on the ability of NSPs to raise finance (CRG p. 9)
The 2018 RORI is producing historically low equity returns below that of international comparators, which is out-of-step with academic literature and market practices, not producing a reasonable WACC estimate in prevailing market conditions (Endeavour Energy p. 2, AusNet p. 3, NSG p.1). Some of the reasons are:

the current 1:1 relationship between the risk-free rate (Rfr) and MRP in a low interest rate environment
the approach to estimating beta using a set of domestic comparators only
outlier compared to returns allowed by other Australian and international regulators
lower than returns expected by investors
Brattle report, and through Independent Expert Reports that suggest AER's estimate is more than 150 basis points lower than that required by investors.

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Section 11.2.3: Our findings on our overall rate of return
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If the 2018 Instrument needs improvement/change what enhancements are proposed?	• The stakeholders that suggest there is a problem with the 2018 RoRI substantiate their claims by referring to international comparators and the Brattle Report as evidence that the returns are too low.
	• The methods and estimates adopted by investors for the cost of capital are the most relevant information to the AER's task. If there is a divergence between market practice and regulatory estimates, this will result in over or underinvestment compared to efficient levels. (NSG p.1)
	• The ENA lists the following as the contextual information for this 2022 review (exec summary and p.145):
	  ○ return on equity is currently lower than at the time of any previous review
	  ○ the Brattle report
	  ○ recent independent valuation reports indicate that the cost of equity capital (with gearing at 60%) is 7.5 – 8% while the AER's current allowance is 5.5%.
	  ○ networks are being asked to invest very material amounts of new capital to support and enable the decarbonisation of the Australian economy.
		• Section 11.2.1.5: Other regulators' rate of return decisions
		• Section 11.2.3: Our findings on our overall rate of return

Other issues

Summary of submissions to other issues

Question posed in information paper or additional issues	Summary of submissions	AER consideration
Should hybrid securities be included in our analysis of benchmark gearing?	• Hybrid securities should not be included in analysis of benchmark gearing (APGA p. 26; APA p. 73). • They should not be included for this instrument but should be revisited if the use becomes more prevalent (CRG p. 123–124). • Hybrid securities should continue to be included in gearing analysis and should also be used to inform cost of debt (ENA, 2022, p. 32; ENA, 2021, pp. 24-27). • *Hybrids should be considered to be debt until they are converted to equity, thus should be included in gearing (MEU, 2021, pp. 3–5).* •	• Section 4.2.2.4: Hybrid securities
Should we adjust benchmark gearing to more closely align with market data?	• Gearing should be assessed by reference to market values. There is no useful role for book values. (APGA p. 27). • Gearing should remain at 60% as argument for change is thin: Market values (which have limitations) suggest changing gearing to 55% but only from 3 recent comparator firms, book values should be considered and show much higher and stable gearing, 5% change is unlikely to be material. (CRG p. 124). • Gearing should be maintained at 60% due to smaller sample of comparator firms (APA p. 74).	• Section 4.2.2: Estimation approach

	• Gearing commensurate with construction activities should be applied to major new projects (TransGrid, p. 5). • *Gearing should remain at 60% as there are materiality issues switching to 55% but use market data to estimate gearing with 10-year averages forming basis of calculation (ENA p. 36).* • *Use market value data with 10-year averages forming the basis of the calculation for gearing (AusGrid, 2021, pp. 3–4).* • *Rely on market-based measures to estimate gearing (Energy QLD, 2021, p. 1).* • *Rely on market-based measures to estimate gearing and maintain 60% gearing (Endeavour Energy, 2021, p. 4).* • *Maintain current approach for estimating gearing (AEC, 2021, p. 1).* • *Gearing should only be adjusted in response to change in the efficient benchmark to maintain stability, predictability and sustainability. Maintain 60% gearing. (NSG, 2021, p. 5).* • *The importance of the formal 'written down' value of the assets cannot be overstated. Book value is the prime source of information used by debt providers. (MEU, 2021, pp. 3–5).*	
Should we continue to assume that non-resident investors assign no value to imputation credits?	• Yes, this assumption should be retained (CRG p.125; APA p.76; APGA p.27)	• Section 10.2.7: non-resident investors' valuation of imputation credits
Are there additional debt data providers that we should consider in setting the return on debt estimate?	• No stakeholders appear to have made any submissions on this point.	• N/A
Are there any improvements or changes that can be made to the application of the return on equity crosschecks at the point of making our 2022 Instrument?	• Crosschecks have a limited role in determining the allowed rate of return. The AER's approach to rate of return on equity estimation limits the scope for subsequent crosschecks. (APA, page 78) • Considers that comparable regulatory allowances provide a key return on equity crosscheck. The 2022 RoRI should have regard to the data, methods, and regulatory judgment exercised by comparable regulators engaged in a comparable task. (ENA, page 138,139) • Recommends maintaining the same crosschecks the AER applied in the 2018 Instrument. In making the 2022 Instrument, the AER should explain how it has considered these crosschecks in influencing or not influencing its estimates and the reasons. The CRG further notes that for other regulators return on equity reference points to be meaningful, the AER should be confident that these reference points are comparable in that they have been produced under similar assumptions the AER has applied in its return on equity estimates. (CRG, page 126) • Crosschecks can and should play an important role when determining the assumptions and approach to setting the return on equity. The foundation model would still have primacy as the crosschecks are only capable of choosing a point within the confidence interval associated	• Section 11.2.1.5: Other regulators' rate of return decisions • Section 11.2.1.6: Analysts' discount rates

	with the application of that model. In this way, crosschecks are only a check on the judgement that the AER has used to choose a point within the range that its data and application of its foundation model suggest is reasonable. (APGA, page 19-20,27) • Crosschecks on return on equity should include comparisons with other regulators, including international regulators, market analyst and valuation expert estimates. (NSG, page 11) • Crosschecks to inform forward-looking A key finding of the Brattle report in 2020 was that other internationally comparable regulators employ a wider range of return on equity estimates than that employed by the AER. (GIIA, page 4)	

Note: Italicised text reflects relevant content from submissions received as part of the *Overall rate of return draft working paper* related to gearing, as gearing was not one of the key issues discussed in the *Final omnibus paper*, or *Information paper*.

Appendix C HER return series data

In this attachment we provide additional detail on the historical excess return series data used by Brailsford, Handley and Maheswaran (BHM).

Figure C.1 HER returns series data used by BHM

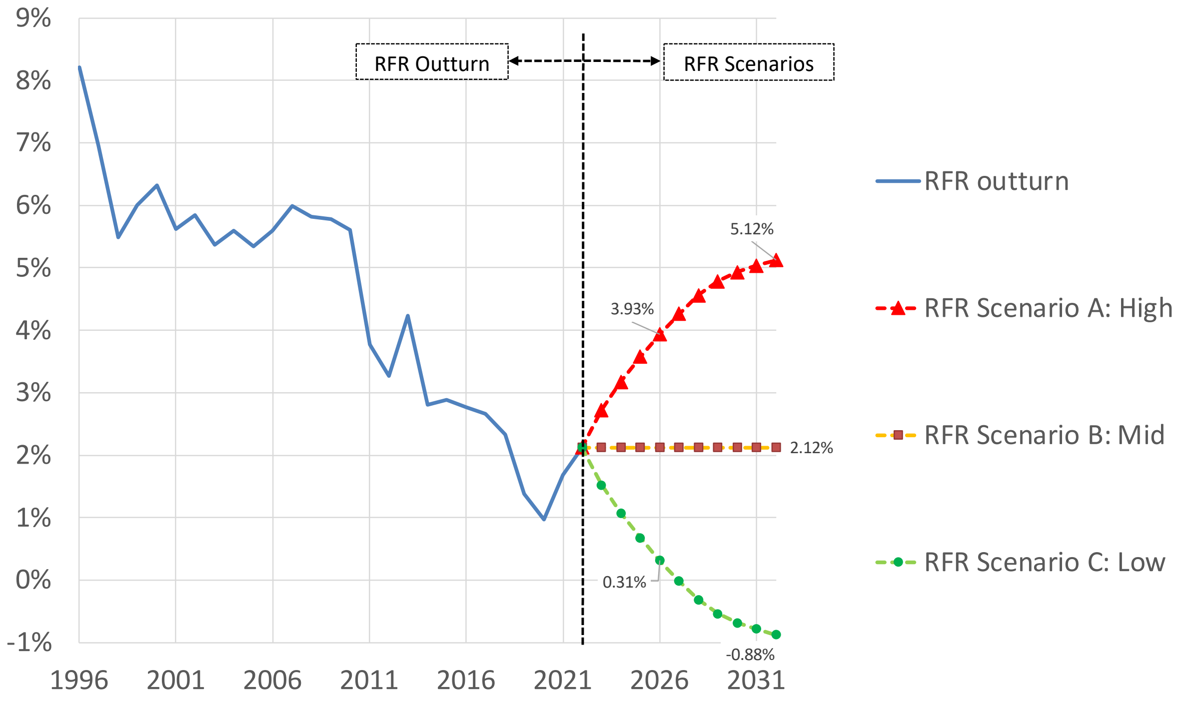
Year	Stock accumulation index	Stock price index	Bonds	Inflation
2011	(0.09)	(0.12)	0.04	0.03
2012	0.14	0.09	0.03	0.02
2013	0.18	0.13	0.04	0.03
2014	0.06	0.02	0.03	0.02
2015	0.03	(0.02)	0.03	0.02
2016	0.13	0.08	0.03	0.02
2017	0.14	0.09	0.03	0.02
2018	(0.03)	(0.07)	0.02	0.02
2019	0.26	0.21	0.01	0.02
2020	0.03	0.00	0.01	0.01
2021	0.15	0.11	0.02	0.04

The data from 1883 to 2010 is available on our website and can be downloaded from the Rate of Return Instrument 2022 project page – draft decision supporting information.

Appendix D MRP Sensitivity testing

In chapter 7, we considered different approaches to setting Market risk premium(MRP), namely Option 1 and Option 3b. Subsequently, in chapter 11, we conducted Sensitivity testing and Scenario testing to understand the impact these MRP options might have on return on equity (ROE) outcomes. We created three symmetrical risk-free rate (RFR) sensitivities, as shown in Figure D.1, as a basis for resulting ROE scenarios.

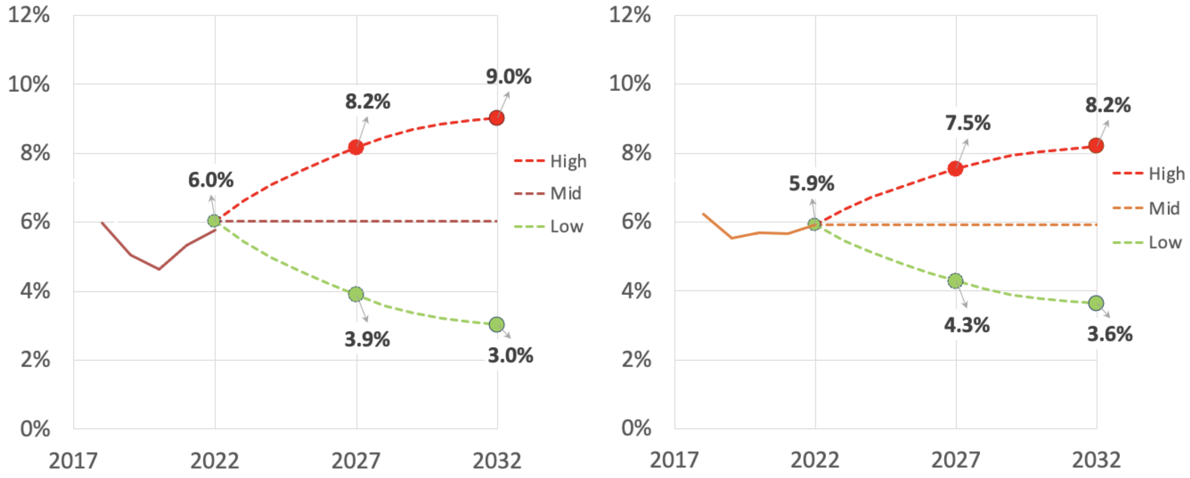
Figure D.1 RFR Scenarios



Note: Uses RFR from end of February 2022 data, based on 10-year Commonwealth Bond yields.

Using these RFR scenarios, we estimated the following ROE outcomes for both MRP options considered. As seen in Figure D.2, Option 3b, which implies a negative relationship (of -0.8) between the MRP and the RFR from the 3-Stage DGM, results in greater stability in the cost of equity.

Figure D.2 Estimated ROE using MRP Option 1 (left) compared to MRP Option 3b (right)



Note: Option 1 ROE is derived using the RFR from February 2022 data, based on 10-year Commonwealth Bond yields, beta of 0.6, and uses the HER value of 6.51 from February 2022 as a starting point. Option 3b ROE is derived using the RFR from February 2022 data, based on 10-year Commonwealth Bond yields, beta of 0.6, and uses an average of the HER value from February 2022 and corresponding estimate from the three-stage dividend growth model as a starting point.

Shortened forms

Term	Definition
2013 Guidelines	Refers to AER, *Rate of Return Guidelines*, December 2013; AER, *Rate of Return Guidelines - Explanatory Statement*, December 2013; and/or AER, *Rate of Return Guidelines - Explanatory Statement - Appendices*, December 2013
2018 Instrument	Refers to AER, *Rate of return instrument*, December 2018; and/or AER, *Rate of return instrument - Explanatory Statement*, December 2018
2022 Instrument	Refers to the Rate of Return Instrument to be published in December 2022
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
ACM	Authority for Consumers and Markets (a Dutch regulator)
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARERA	Italian Regulatory Authority for Energy, Networks & the Environment
ASX	Australian Securities Exchange
ATO	Australian Taxation Office
Brattle	The Brattle Group
Capex	Capital expenditures
CAPM or SL CAPM	Sharpe-Lintner Capital Asset Pricing Model
CEPA	Cambridge Economic Policy Associates
CGS	Commonwealth Government Securities
CPI	Consumer Price Index
CRG	AER’s Consumer Reference Group
Determination or regulatory determination	Refers to an electricity distribution regulatory determination, electricity transmission revenue determination, and/or a gas access arrangement determination
DGM	Dividend growth model
Draft decision or draft Instrument	This document and/or AER, Draft Rate of Return Instrument, June 2022
EICSI	Energy Industry Credit Spreads Index
FERC	Federal Energy Regulatory Commission (a US regulator)
FFO/net debt	Funds from operations to net debt
HER	Historical Excess Returns
Information paper	Refers to AER, *Rate of return Information paper and call for submissions*, December 2021
ISP	Integrated System Plan
Legislative objectives	Collectively the NEO, NGO and RPPs
MRP	Market Risk Premium
NEL	National Electricity Law
NEO	National Electricity Objective
NER	National Electricity Rules
NGL	National Gas Law
NGO	National Gas Objectives

Term	Definition
NGR	National Gas Rules
NPAT	Net profit after tax
NPV	Net present value
NSPs	Network Services Providers
NZCC	New Zealand Commerce Commission
Ofgem	Office of Gas and Electricity Markets (a UK regulator)
Ofwat	Office of Water Services (a UK regulator)
Opex	Operating expenses
PTRM	Post-tax revenue model
RAB	Regulatory Asset Base
RBA	Reserve Bank of Australia
Regulatory period	Refers to a regulatory control period and/or an access arrangement period
Regulatory proposal	Refers to a regulatory proposal, revenue proposal, or gas access arrangement proposal
Regulatory year	Refers to a year within a regulatory period
REU	ACCC's Regulatory Economic Unit
RFM	Roll forward model
RFR	Risk-free rate
RIN	Regulatory Information Notice
ROE	Return on Equity
ROR	Rate of Return
RORI	Rate of return instrument
RPPs	Revenue and Pricing Principles
STB	Surface Transportation Board (a US regulator)
WACC	Weighted Average Cost of Capital
WATMI	Weighted average term to maturity at issuance
Working papers or work paper series or draft working paper or final working paper	Refers to AER, *Energy Network Debt Data – Final working paper*, 18 November 2021; AER, *International regulatory approaches to rate of return – Final working paper*, 16 December 2020; AER, *CAPM and alternative return on equity models – Final working paper*, 16 December 2020; AER, *Term of the rate of return & Rate of return and cashflows in a low interest rate environment - Final working paper*, September 2021; AER, *Rate of return - Overall rate of return draft working paper*, July 2021; AER, *Rate of return - Equity draft working paper*, July 2021; AER, *Rate of return - Debt draft working paper*, July 2021; and/or AER, *Rate of return - Final omnibus paper*, December 2021