



Rate of return instrument

Explanatory Statement

December 2018

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Director, Corporate Communications
Australian Competition and Consumer Commission
GPO Box 4141, Canberra ACT 2601

or publishing.unit@acc.gov.au.

Inquiries about this publication should be addressed to:

Australian Energy Regulator
GPO Box 520
Melbourne Vic 3001

Tel: (03) 9290 1444

Fax: (03) 9290 1457

Email: AERInquiry@aer.gov.au

Note

This explanatory statement forms part of the AER's final decision on the rate of return instrument. It should be read in conjunction with our final rate of return instrument.

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Shortened forms

Shortened form	Extended form
2013 Guidelines	refers to AER, <i>Rate of Return Guidelines</i> , December 2013; AER, <i>Rate of Return Guidelines - Explanatory Statement</i> , December 2013; and/or AER, <i>Rate of Return Guidelines - Explanatory Statement - Appendices</i> , December 2013
AER	Australian Energy Regulator
ASX	Australian Securities Exchange
ATO	Australian Taxation Office
CAPM	capital asset pricing model
CCP	Consumer Challenge Panel
CCP16	Sub-panel 16 of the CCP. This sub-panel was established to provide advice on our review of the rate of return.
CGS	Commonwealth Government securities
CoAG	council of Australian governments
CRG	consumer reference group
DGM	dividend growth model
DRP	debt risk premium
Draft decision	refers to AER, <i>Draft rate of return guidelines</i> , July 2018 and/or AER, <i>Draft rate of return guidelines explanatory statement</i> , July 2018.
EICSI	energy infrastructure credit spreads index This is the index developed in: Chairmont, <i>Aggregation of return on debt data report</i> , 28 April 2018.
ERP	equity risk premium
FAB	ATO franking account balance
GDP	gross domestic product
HER	historical excess returns
IRG	investor reference group
LAD	least absolute deviation
legislative objectives	collectively the NEO, NGO, and RPPs
MRP	market risk premium
MSE	mean squared error
NEL	national electricity law
NEO	national electricity objective

Shortened form	Extended form
NER	national electricity rules
NGL	national gas law
NGO	national gas objective
NGR	national gas rules
OLS	ordinary least squares
RAB	regulatory asset base
Rate of Return Instrument	Means either: <p>(a) If the review of the 2013 non-binding guidelines is not completed before the commencement of clause 30(1)(a) of the <i>Statutes Amendment (National Energy Laws) (Binding Rate of Return Instrument) Act 2018 (SA)</i> – the first Rate of Return Instrument made under s.18l of the NEL; or</p> <p>(b) If clause 31(1)(a) of the <i>Statutes Amendment (National Energy Laws) (Binding Rate of Return Instrument) Act 2018 (SA)</i> applies – the Rate of Return Guidelines made under NER 6.5.2 and 6A.6.2 and NGR 87.</p>
Regulated services	refers to an electricity prescribed transmission service, an electricity distribution direct control service, and/or a gas reference service
Regulatory determination	Refers to an electricity distribution regulatory determination, electricity transmission revenue determination, and/or a gas access arrangement determination
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
RPPs	revenue and pricing principles
RRG	retailer reference group
Service provider	refers to an electricity transmission network service provider, an electricity distribution network service provider, and/or a gas service provider
SLCAPM	Sharpe-Lintner CAPM
WACC	weighted average cost of capital

About this review

The Australian Energy Regulator (AER) is responsible for the economic regulation of electricity and gas transmission and distribution services in eastern and southern Australia under the National Electricity Rules (NER) and the National Gas Rules (NGR) (collectively, the rules). We monitor the wholesale electricity and gas markets, and are responsible for compliance with and enforcement of the rules. We also regulate retail energy markets in the ACT, South Australia, Tasmania (electricity only) and New South Wales.

In the economic regulation of electricity and gas transmission and distribution services the allowed return on capital represents the largest component of the revenue determinations. Our rate of return instrument sets out how we will determine the allowed rate of return on capital. The rate of return is a forecast of the cost of funds a network business requires to fund investment in its network. The rate of return instrument also sets out the value we propose to assign to imputation credits.

We developed the current non-binding rate of return guidelines (the 2013 Guidelines) in December 2013. Those Guidelines can be found at <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/rate-of-return-guideline-2013>.

Starting in mid-2017, the AER initiated a review of the 2013 Guidelines.

In November 2018 the national electricity and gas laws were amended to replace the non-binding rate of return guidelines with a binding rate of return instrument. The legislative amendments include provisions to allow for our review of the 2013 Guidelines to also satisfy the process for developing the first binding rate of return instrument.

In conducting this review, we have engaged in the most extensive consultation process yet undertaken by the AER when formulating an approach to calculating the rate of return and determining the value of imputation credits.

We are grateful for numerous submissions from consumers, service providers, investors and representative groups received throughout this review process. These submissions have assisted our understanding of the issues and informed the exercise of our judgement.

In addition, we have undertaken new initiatives to better engage with both consumers and industry stakeholders to assist us in reaching our decision.

We have had the benefit of assistance from reference groups that we have established to help facilitate greater engagement with consumers, investors and retailers in the review process. Our Consumer Challenge Panel has also assisted us in taking into account consumer concerns.

An important new initiative for this review has been the establishment of a 'hot-tub' of experts in concurrent evidence sessions. In these sessions, experts that have been

nominated by different consumer and industry stakeholders openly and frankly discussed with us and each other some of the key issues that apply to the calculation of the rate of return. We conducted two concurrent evidence sessions prior to making our draft decision and the concurrent evidence sessions have proved a valuable tool in helping us to arrive at our decision.

A further significant new initiative we undertook for this review was to appoint an Independent Panel of five highly-qualified members to review the draft rate of return instrument and provide us with a report. The Independent Panel members were Natalia Southern, Scott Hempling, Stewart Myers, Geoff Frankish, and Pat Duignan.

The Panel members have diverse backgrounds and areas of expertise including regulatory, legal, economic, finance, consumer perspectives and institutional investment.

The Independent Panel conducted a thorough review of the draft instrument and the associated material. It has been of immense value. We have addressed the Panel's comments and suggestions throughout our final decision.

Following the release of our draft decision we also sought further submissions from the public and extended the period for making submissions to appropriate time for stakeholders to also address the report of the Independent Panel.

This enhanced process provides for greater transparency and stakeholder engagement. It has assisted us significantly in making a final decision that best achieves the long term interests of consumers.

We wish to place on record our thanks to all those who have participated in this new process.

Summary of our decision

Our decision is to make the rate of return instrument that is published with this explanatory statement.

We have made a rate of return instrument that we consider will promote—to the greatest degree—efficient investment in, and efficient operation and use of, the electricity or gas network services for the long term interests of consumers.

In November 2018 the national electricity and gas laws were amended to require us to make a binding rate of return instrument. This instrument will be binding on all of our regulatory determinations made after the instrument is published. As a binding instrument, it must set out the precise value for the rate of return, or set out a method for calculating the rate of return that can be applied automatically without exercise of discretion.

Our 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, and calculated in accordance with the method set out in the instrument. The method and the input data to be used is summarised in Table 1 below.

Table 1 Summary of our decision

Parameter	Previous approach	2018 Instrument
Overall rate of return		
<i>Indicative rate of return</i>	5.76%	5.36%
<i>Estimation approach</i>	Weighted average of the <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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		
<i>Value of gearing ratio</i>	0.6	0.6

Return on debt		
<i>Indicative return on debt</i>	4.77%	4.70%
<i>Estimation approach</i>	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: <ul style="list-style-type: none"> • for a given credit rating and term, and • for each annual update, averaged over periods nominated by regulated business 	benchmark to observed market rate curves: <ul style="list-style-type: none"> • for a given credit rating and term, and • for each annual update, averaged over periods nominated by regulated business
<i>Benchmark term of debt</i>	10 years	10 years
<i>Benchmark credit rating</i>	BBB+	BBB+
<i>Source of market rate curves</i>	RBA & Bloomberg	RBA, Bloomberg & Thomson Reuters
<i>Weighting of sources of market rate curves</i>	equal weight	equal weight
<i>Market rate curves to proxy the benchmark credit rating</i>	Broad BBB curves	Weighted average of Broad BBB and Broad A curves
<i>Weighting of curves</i>	Simple average (equal weight)	2/3 weight on BBB curves, 1/3 weight on A curves
<i>Averaging period conditions</i>	Nominated prior to the start of the period	Nominated prior to 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

	End no later than 25 business days prior to regulated business submitting an annual pricing proposal or notifying customers of prices. Starts no earlier than 12 months before maximum end date.	Starts no earlier than 16 months before, and ends no later than 4 months prior to, 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		
<i>Indicative return on equity</i>	7.25%	6.36%
<i>Estimation approach</i>	<p>The Sharpe-Lintner Capital Asset Pricing Model formula, where return on equity is the product of:</p> <ul style="list-style-type: none"> the risk free rate, and the sum of the market risk premium and the equity beta <p>Set for the entirety of each regulatory period and not updated annually</p>	<p>The Sharpe-Lintner Capital Asset Pricing Model formula, where return on equity is the product of:</p> <ul style="list-style-type: none"> the risk free rate, and the sum of the market risk premium and the equity beta <p>Set for the entirety of each regulatory period and not updated annually</p>
<i>Value of market risk premium</i>	6.50%	6.10%
<i>Value of equity beta</i>	0.70	0.60
<i>Indicative risk free rate</i>	2.70%	2.70%
<i>Risk free rate estimation approach</i>	Yield to maturity on 10yr Cth Gov bonds, averaged over period nominated by regulated business	Yield to maturity on 10yr Cth Gov bonds, averaged over period nominated by regulated business
<i>Risk free rate averaging period conditions</i>	Nominated in advance	Nominated in advance

	20 consecutive business days long	Regulated business to nominate length between 20 to 60 consecutive business days
	as close as practicable to start of regulatory period	start no earlier than 7 months prior to the start of the regulatory period finish no later than 3 months prior to the start of the regulatory period
<i>Imputation credits</i>		
<i>Value of imputation credits</i>	0.40	0.585
<i>Estimation approach</i>	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
<i>Value of imputation credit distribution rate</i>	0.70	0.90
<i>Value of imputation credit utilisation rate</i>	0.60	0.65

- Notes:
1. Indicative rates are based on market rates for the risk free rate and return on debt over November 2018. 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 'previous approach' described above reflects the typical approach applied in determinations made following our 2013 rate of return guidelines. These guidelines were not binding. Some of the details of the approach, such as the return on debt averaging period conditions, varied between determinations.
 3. The 2018 Instrument approach and previous approach both set out the 'first-best' or most-likely approach. There are a number of contingencies that 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.

1 Our review process

We have implemented a new enhanced consultation process for this review that is designed to help us better understand consumer and industry views, and to ensure that we are able to take these views into full consideration when deciding how best to contribute to achieving the legislative objectives through this decision.

A summary of our consultation process is set out in section 1.1.

In response to our draft decision some stakeholders made the following submissions about our review process:

- That we did not undertake an incremental review as we had initially indicated – this is discussed in section 1.2.
- That an incremental review is acceptable on the condition that a subsequent review into alternative methods for setting an allowed rate of return is initiated immediately following this review – this is discussed in section 1.3.
- That the outcome of this review is not consistent with the rate of return decisions in regulatory determinations made while this review was underway – this discussed in section 1.4.

1.1 Key stages of our review process

The key steps in our consultation process have included:

- In July 2017 we issued a consultation paper which sought views on how best to run the review process.
- On 18 September 2017 we held a pre-issues paper public forum.
- On 31 October 2017 we released an issues paper requesting views on whether our current approach to setting the allowed rate of return remains appropriate. We sought submissions on our issues paper by 12 December 2017.
- On 28 November 2017 we released a positions paper setting out our positions on the process for reviewing the 2013 Guidelines.
- On 15 March 2018 we held a concurrent evidence session to discuss gearing, financial performance measures and risk and judgement. Discussion papers on the topics were made available prior to the session on 28 February 2018. Following the first evidence session we published a transcript of the session.
- On 5 April we held a second concurrent evidence session to discuss gamma, equity beta, market risk premium, the risk free rate averaging period and the automatic application of the rate of return instrument. Discussion papers on the topics were made available prior to the session on 15 March 2018. Following the second evidence session we published a transcript.

- On 21 April 2018 we published a joint expert statement that covered the views of experts in relation to many topics discussed at each of the concurrent evidence sessions.
- We invited written submissions on discussion papers, concurrent expert evidence sessions, and joint expert statement by 4 May 2018.
- On 10 May 2018 we published a discussion paper addressing return on debt issues and inviting written submissions by 30 May 2018.
- On 10 July 2018 we published our draft guidelines, explanatory statement to the draft guidelines, and fact sheet on our draft decision.
- On 2 August 2018 we held a public forum and heard stakeholder views on our draft decision
- On 7 September 2018 we received a report from the Independent Panel detailing its review of our draft decision. The Panel reported on whether our draft decision is supported by sound reasoning based on the available information such that it is capable of promoting achievement of the national gas and electricity objectives.
- We invited written submissions on our draft decision and the Independent Panel report by 25 September 2018. We extended the period for submissions from stakeholders in order to allow stakeholders an appropriate time in which to comment upon our draft decision with the benefit of the Independent Panel's report.

In this process we also formed a number of reference groups to input into the review process. These groups have actively and openly engaged with us throughout the process. This has helped us to take their members views into account in this decision. These groups were:

- A consumer reference group (CRG)
- A consumer challenge panel (CCP16)
- An investor reference Group (IRG)
- A retailer reference group (RRG)

Energy Networks Australia (ENA) and the Australian Pipeline Gas Association (APGA) both have also actively and openly engaged in this process. Both sponsored experts to participate in the evidence sessions. A number of consumer groups have also actively participated in the process including Energy Consumers Australia (ECA), Energy Users Association of Australia, Major Energy Users Inc, and the Public Interest Advocacy Centre (PIAC). ECA also sponsored an expert to attend the expert evidence sessions.

We also encouraged our CRG and ENA to engage directly to exchange views, share perspectives and explore potential areas of common ground. The CRG and ENA held a series of meetings which both have indicated were useful.

Throughout the review process we have received public submissions on our various papers, including submissions from the groups listed above.

We have had full regard to the submissions and other information before us (such as the joint statement of experts and transcripts of the concurrent evidence sessions) in making this decision. The extensive engagement from all stakeholders and stakeholder groups has greatly assisted the AER in determining the rate of return instrument that it considers will best contribute to the achievement of the legislative objectives.

1.2 Incremental approach to this review

We first publically proposed a ‘targeted’ approach to our review in our 18 September 2017 workshop and in an October 2017 issues paper, asking the question: should the AER build on the knowledge base gained from development and application of the 2013 Guidelines or start from a blank slate?¹ Although we sought views on building on the knowledge base from the 2013 Guidelines, we also sought views from stakeholders on the high, medium and low priority issues for the review.

While most participants agreed that we would be unwise to start from a blank slate, several groups noted that the knowledge gained to date on the approach in the 2013 Guidelines should be open to question.² We then explored these aspects of our approach that should be open to question in subsequent issues papers, discussion papers, concurrent expert evidence sessions, and submissions on these papers.

In light of stakeholder comments, our draft decision used our 2013 Guidelines as a starting reference point for our analysis. However, we were also mindful of our obligation to reach a decision that we were satisfied would contribute to the achievement of the legislative objectives. From that starting point we then considered the relative merits of the evidence before us in the areas of concern identified in stakeholder submissions.

In response to our draft decision some stakeholders submitted that the scope of the review did not align with that set out in earlier consultation papers.³ In contrast, other stakeholders submitted that the scope of the review should be broader than the incremental review canvassed in earlier consultation.

We provided an extensive period following publishing our draft decision for stakeholders to make submissions, including on why the final decision should be narrower or more broad in order to meet the legislative objectives. We also held a public forum on 2 August 2018 at which we heard views from stakeholders on our draft decision.⁴ Stakeholders were given a further opportunity to set out their views when invited to give a presentation on their submissions to the AER Board.⁵

¹ AER, *Issues paper – Review of the rate of return guidelines*, October 2017, p7.

² AER, *AER Rate of Return Public Workshop: Discussion summary*, September 2017, p3.

³ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 32.

⁴ Materials presented at the public forum are available at the AER website.

⁵ Stakeholder presentations are available on the AER website.

We consider that all stakeholders have had significant opportunity to address any aspect of the review that they may wish to. Ultimately, it is the legislative objectives that we must seek to achieve when making a decision on the review.

We note that stakeholder submissions seeking a broader review scope are focussed on concerns about the CAPM, use of RAB multiples and historical profitability, debt benchmark – these issues are addressed in sections 1.3 (CAPM and debt benchmark), 5 (CAPM), and 12 (RAB multiples and historical profitability).

Submissions that our draft decision went beyond an incremental review are focussed on:

- Changes in our approach to estimating the rate of return – particularly changes to weight afforded to the DGM, low beta bias, tax stats are not justified – are greater than incremental and are not justified. These issues are addressed in sections 9.4 (DGM), 8 (low beta bias), and 11.4 (tax statistics) respectively.
- Stability is highly valued and outweighs other concerns.

The Australian Energy Council, Network Shareholder Group, Infrastructure Partnerships Australia, and Consumer Reference Group all submitted that stability is an important consideration. The Network Shareholder Group stated that:⁶

stability and predictability of process and outcomes required for efficient investment...

...the viability of the regulatory compact depends critically on investors having confidence in the future consistency of the AER's decisions. In simple terms, a reliance on the AER doing what it says it will do (and what it said in the past that it would do).

Network Shareholder Group submitted that we should apply sufficiently high evidentiary and process standards before changing our rate of return or approach to estimating the rate of return.⁷

The Network Shareholder Group and Infrastructure Partnerships Australia also submitted that it is important to promote stability in outcomes, not just process. The Infrastructure Partnerships Australia submitted that the parameters from the 2013 Guidelines remain within a plausible range.⁸ The Network Shareholder Group submitted that if weight is put on stability then we would expect to see no change in the equity risk premium.⁹

⁶ NSG, *Submission in response to draft decision*, 25 September 2018, p. 9.

⁷ NSG, *Submission in response to draft decision - cover letter*, 25 September 2018, p. 4.

⁸ IPA, *Submission to the AER on the review of the draft rate of return guideline*, 26 September 2018, p. 3.

⁹ NSG, *Submission in response to draft decision*, 25 September 2018, p. 16.

The Australian Energy Council submitted that while stability is an important consideration, our objective should be to arrive at the best estimate of the cost of capital, stating:¹⁰

The AER should evidently put greater weight on making their best estimate of the overall cost of capital than on similarity to previous decisions. However, there is also value in being able to demonstrate some predictability/stability. This extends to the process itself.

Similarly, the Consumer Reference Group submitted that it acknowledges the need to maintain investor confidence but that “investor expectations need to be re-set”.¹¹

Our rate of return instrument must promote the legislative objectives to the greatest degree. We do consider stability to be an important consideration for achieving the legislative objectives. However, stability is not our outright objective and there are other considerations for achieving the legislative objectives.

We consider it is important for the achievement of the legislative objectives that we periodically review our rate of return and value of imputation credits. This process of review, combined with the use of incentive regulation, is a key driver of efficiency and the continued achievement of the legislative objectives over time. Each review comes with the possibility of change.

We consider that stability can be promoted in furtherance of the legislative objectives through a decision that is well-reasoned, clearly explained, and sets out an approach to determining the allowed rate of return that is transparent and predictable. The following chapters of this decision set out how we have estimated the rate of return and its component parameters.

In general, our decision on each parameter and the overall rate of return is based on the relative merits of the evidence available to us in terms of achieving the legislative objectives. While much of the evidence available to us has also been considered in previous reviews, inertia from parameter values set in previous reviews or determinations has not been a driving factor.

However, we have considered whether the magnitude of any change may affect the achievement of the legislative objectives. Where our approach to determining the rate of return is transparent, predictable, and well-reasoned; a material change in the rate of return is most likely to affect stakeholder confidence and the achievement of the legislative objectives through affecting a service provider's cash flow and its ability to meet its financing requirements. We have considered these financeability concerns in section 12.3.

1.3 Future reviews

¹⁰ AEC, *Submission in response to draft decision*, 25 September 2018, p. 3.

¹¹ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. iii.

Some stakeholders submitted that at the conclusion of this review we should commence a subsequent review into alternative methods and data sources for determining the allowed rate of return.

1.3.1 Draft decision

The draft decision set out our views on the rate of return instrument that would achieve the legislative objectives based on the evidence before us. It did not comment on the timing or content of future reviews.

1.3.2 Independent panel review

While the Independent Panel made recommendations to be considered at this review, including to consider dividend drop-off studies and evidence of market risk premiums in other developed countries, the Panel did not comment on the timing or content of future reviews.

1.3.3 Stakeholder submissions

In response to our draft decision the CRG submitted:¹²

The Draft Decision is a modest (incremental) step in the right direction and is acceptable as long as it is part of a downward process which corrects the overly generous (to networks) 2013 settings. A more comprehensive review of the ROR Guideline is required with the resulting process informed by actual earnings returns as evidenced via a rigorous reporting regime, with greater consumer input.

...this review has raised further concerns about the use of market estimates and associated finance theory and strongly urges the AER to undertake a more fundamental review of the approach to determining the allowed ROR as soon as the first binding instrument is made

The CRG also submitted that the review is required to address the 'looming loss of current input data' resulting from the reduction in the number of listed Australian energy network firms.

The CRG submitted that the review should include:¹³

- A review of the use of the Sharpe-Lintner capital asset pricing model (SLCAPM);

¹² Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, pp. iii, 48.

¹³ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. 49

- Establishment of information disclosure and public reporting obligations for regulated energy networks to provide empirical evidence as to actual returns; and
- Establishment of a performance monitoring and evaluation framework, using the above information, incorporating an error correction mechanism, to provide an ex post assessment of whether or not a prior decision was correct, to ensure that:
 - the allowed Rate of Return (ROR) meets the National Electricity Objective (NEO), the National gas Objective (NGO) and Revenue and Pricing Principles (RPP);
 - consumers pay no more than they should for the efficient delivery of services; and
 - networks do not earn excessive profits.

Similarly, the ECA submitted:¹⁴

we repeat our request that the AER review the whole approach to the return on capital. The data available to us suggests that it is feasible to set a return on capital that is simply specified as a number of basis points (probably 250) above the risk-free rate

1.3.4 AER consideration

We consider it is important for the achievement of the legislative objectives that we periodically review our rate of return and value of imputation credits. This process of review, combined with the use of incentive regulation, is a key driver of efficiency and the continued achievement of the legislative objectives over time.

Legislative amendments proposed by the Council of Australian Governments (CoAG) to replace the non-binding Rate of Return Guidelines with a binding legislative instrument were passed by the South Australian Parliament in December 2018. Under this framework the instrument is to be reviewed every four years.¹⁵

At each review we are open to considering any issue that stakeholders consider relevant. However, at this stage we have no preconceived views on matters that may be considered at a subsequent review or the direction in which the rate of return may move (if at all). As set out in section 2.2, we have sought in this review to estimate a central estimate of the rate of return and avoid decisions that are influenced by any material bias towards a higher or lower rate of return (that is, in either promoting or discouraging investment). We have come to a decision in this review that we consider achieves this end without the need for a transition path through a subsequent review.

¹⁴ Energy Consumers Australia, Response to the AER Draft Guideline, September 2018, p. 18.

¹⁵ *Statutes Amendment (National Energy Laws) (Binding Rate of Return Instrument) Act 2018 (SA)*

While we have no preconceived views on matters for subsequent reviews, we will continue to collect and monitor data and other evidence that may be relevant at the next review.

We indicated in our draft decision and again in section 12.1 of this final decision that we intend to monitor RAB multiples and service provider profitability. We intend to collect information on RAB multiples and profitability that may assist in identifying the drivers of trends in this evidence.

The Independent Panel recommended that we consider taking a proactive approach to improving the quality and relevance of dividend drop-off studies of the value of imputation credits. We will investigate approaches to improving the quality of these studies and consider the results at the next review.

Stakeholders have also identified the Capital Asset Pricing Model (CAPM) and empirical estimation of equity beta as issues for further consideration at the next review. We are open to consider these, and other issues, at the next review, and will continue to monitor the market data, academic literature, and other evidence relevant to these issues. Based on the evidence currently before us we consider that:

- The Sharpe-Lintner CAPM is the most appropriate asset pricing model to use in our foundation model approach to estimating the return on equity.
- The data currently available from listed and delisted Australian energy networks is sufficiently robust to provide a reliable empirical estimate of equity beta.

Finally, on the timing of a subsequent review, we note that statutory timeframes for conducting future reviews are set out in the amendments to the legislative framework to replace the non-binding rate of return guidelines with a binding rate of return instrument. One important aspect of the next review will be to monitor how stakeholders adjust to the new instrument, and for us to examine these effects and the extent to which the allowed rate of return may have achieved the legislative objectives.

1.3.5 Conclusion

We have been open to considering in this review any issue that stakeholders consider relevant but have no preconceived views on matters that may be considered at a subsequent review or the direction in which the rate of return may move (if at all).

We will continue to collect and monitor evidence that may be relevant at the next review.

1.4 Regulatory determinations made while this review was underway

We published our final determinations for Murraylink and ElectraNet on 30 April 2018 and for TransGrid on 18 May 2018. We published our draft decision for this rate of return review on 10 July 2018. Due to this timing the draft decision for this review was not reflected in our Murraylink, ElectraNet, or TransGrid determinations.

1.4.1 Draft decision

In the draft decision we discussed the continuation of the transition to a trailing average portfolio approach to Transgrid's return on debt for its 2018-23 determination. We also noted the differences between our rate of return review draft decision and our final decision on Transgrid's 2018-23 determination on the value of imputation credits.¹⁶ The interaction between our rate of return instrument and regulatory determinations to be made while the rate of return review was underway was not otherwise discussed.

1.4.2 Independent panel review

The Independent Panel did not comment on the interaction between our review of the rate of return and regulatory determinations made while the review was underway.

1.4.3 Stakeholder submissions

The Network Shareholder Group submitted that the draft decision represented a significant reduction in the rate of return compared to our final decisions for ElectraNet and Transgrid. It stated:¹⁷

The AER also adopted the current rate of return in the final determinations for ElectraNet and TransGrid in April and May 2018, respectively, despite available additional materials from a well-progressed RORG review. Since those determinations, there has been no change in prevailing market conditions that warrants, or indeed explains any reduction in allowed returns, let alone:

- A 95-basis point reduction in Equity Risk Premium (ERP) which is the premium above the risk-free rate (RFR);
- The consequent 45-basis point reduction in weighted average cost of capital (WACC); or
- A 25% increase in the value of imputation credits.

1.4.4 AER consideration

In making the Murraylink, ElectraNet, and TransGrid determinations we had regard to all the information submitted to us as part of those processes. However, we did not pre-empt our consideration of the evidence before us in this review as the review had not been completed. The draft instrument was still to be subject to the scrutiny of an Independent Panel and further consultation with stakeholders. We had not finalised our decision about the evidence at that time.

The difference between the rates determined under the Murraylink, ElectraNet, and TransGrid determinations and a rate determined under our draft decision for this review needs to be understood in that context. Our draft decision on this review

¹⁶ Draft decision, pp. 375, 388-389.

¹⁷ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 2.

reflected our consideration of the evidence before us in the review up to that point of time but was not a final decision. It was a step in an ongoing process that would be subject to further consultation, stakeholder input and review by an Independent Panel before reaching any conclusive positions. The methodology proposed in the draft decision was different to that which we were satisfied should be applied in the earlier decisions for Murraylink, ElectraNet, and TransGrid. Differences in rates that flow from the different decisions do not reflect movement in market data or new evidence received between April/May 2018 and July 2018.

1.4.5 Conclusion

Our final decisions for TransGrid, ElectraNet, and Murraylink were made under separate processes to this review. The difference between the rates determined in those three determinations and under the approach we proposed in our draft decision for this review must be understood in that context. It would not be appropriate to interpret this as reflecting a movement in market data or new evidence received between April/May 2018 and July 2018.

2 Framework for setting the allowed rate of return

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, and the guidelines are to contribute to the achievement of the legislative objectives.

In section 2.1 we discuss the legislative objectives that guide our decision making on the allowed rate of return and the common repeated concepts found in these objectives.

In section 2.2 we set out our framework for considering the risks and costs of not achieving the objectives (we undertake this consideration in accordance with this framework in section 13).

In section 2.3 we address the Independent Panel's recommendation that achieving the legislative objectives requires consideration of both investment and consumption efficiency.

In section 2.4 we set out our considerations of the risks involved in the provision of regulated energy network services. The legislative objectives require us to consider a rate of return that is commensurate with the degree of risk involved in providing regulated energy network services, and this concept is applied across all aspects of our estimation of the allowed rate of return.

Amendments to the legislative framework

This rate of return review process has been run in tandem with a proposal to amend the national electricity and gas legislation to replace the Rate of Return Guidelines with a binding legislative instrument.

Those legislative amendments have now been passed into law and were proclaimed on 13 December 2018.¹⁸

As the two processes have been run in tandem, there has always been a degree of uncertainty around whether the review process, or the amendment process, would be completed first. That has consequences for whether the current review process would result in a non-binding instrument made under one set of laws or a binding instrument made under different provisions.

¹⁸ See: [https://www.legislation.sa.gov.au/LZ/V/P/2018/STATUTES%20AMENDMENT%20\(NATIONAL%20ENERGY%20LAWS\)%20\(BINDING%20RATE%20OF%20RETURN%20INSTRUMENT\)%20ACT%20\(COMMENCEMENT\)%20PROCLAMATION%202018_13.12.2018%20P%204272.aspx](https://www.legislation.sa.gov.au/LZ/V/P/2018/STATUTES%20AMENDMENT%20(NATIONAL%20ENERGY%20LAWS)%20(BINDING%20RATE%20OF%20RETURN%20INSTRUMENT)%20ACT%20(COMMENCEMENT)%20PROCLAMATION%202018_13.12.2018%20P%204272.aspx)

The amendments seek to address this uncertainty by providing that the guidelines review process that has been undertaken by the AER will satisfy the consultation requirements for the first binding rate of return instrument under the new amendments, regardless of whether the review is completed before or after the amendments commence.

The new amendments achieve this by providing that if:

- (a) the review of the non-binding 2013 Guidelines is not completed before the commencement of the relevant amendments; and
- (b) the AER has sought advice or comment from stakeholders in relation to the review; and
- (c) at least 3 months before making the first rate of return instrument, the AER has published on its website a draft of the proposed first rate of return instrument or proposed new non-binding Guidelines under the Rules; and
- (d) the draft instrument or Guidelines has been reviewed by an independent panel consisting of at least 3 members with qualifications or experience the AER considers appropriate to conduct the review,

then that will satisfy the consultation requirements for making the first binding instrument made under the new amendments.

Alternatively, if:

- (a) the review of the non-binding 2013 Guidelines is completed and new non-binding guidelines are in force under the Rules; and
- (b) the AER sought advice or comment from stakeholders in relation to the review; and
- (c) at least 3 months before making the new non-binding guidelines, the AER published on its website a draft of the proposed new non-binding guidelines; and
- (d) the draft was reviewed by an independent panel consisting of at least 3 members with qualifications or experience the AER considered appropriate to conduct the review; and
- (e) the independent panel gave the AER a report on the panel's review,

then the new non-binding guidelines will be taken to be the first rate of return instrument made under the new amendments when the new amendments commence.

The new amendments require the binding rate of return instrument to set out how the estimation of the rate of return will be automatically applied in each regulatory determination without any additional exercise of discretion.

This is unlike the legislative framework under which the review was initiated, which allowed both the service providers and ourselves the opportunity to depart from the Guidelines when applying those guidelines in revenue determinations or access

arrangements if the evidence justified that doing so would result in an outcome that better achieves the legislative objectives.

In light of CoAG's commitment to implementing a binding rate of return instrument, we have therefore proceeded on the basis throughout the review process of developing an instrument that would be capable of both:

- operating as non-binding guidelines; or
- being automatically applied as a binding rate of return instrument.

2.1 Our legislative 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:¹⁹

- National gas and electricity objectives, and
- 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.

The national gas and electricity objectives

The National Electricity Objective (NEO) and the National Gas Objective (NGO) establish the ultimate objective of our decision-making.²⁰ 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.²¹

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.

¹⁹ In addition to meeting the legislative obligations to achieve the national gas and electricity objectives, and having regard to the revenue and pricing principles, the National Gas Rules and National Electricity Rules contain an allowed rate of return objective. That objective provides that the allowed rate of return is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of its regulated services. This objective needs to be interpreted consistently with the overall national gas and electricity objectives, and the revenue and pricing principles. We note that the November 2018 amendments to the National Electricity Law and National Gas Law require the binding rate of return instrument to be applied automatically and without discretion in all subsequent regulatory determinations. The allowed rate of return objective in the National Gas Rules and National Electricity Rules is not an objective of the rate of return instrument. Nonetheless, we consider that our final decision also meets this allowed rate of return objective.

²⁰ NEL, s. 7; NGL, s. 23.

²¹ The NEO contains an additional objective of the reliability, safety and security of network system: see NEL s.7.

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.²² These principles underlie the achievement of the national gas and electricity objectives and we have had particular regard to these principles in making our decision.

The revenue and pricing principles are expressed in essentially similar terms for both electricity and gas. In summary, those principles are:

- A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in—
 - providing regulated services; and
 - complying with a regulatory obligation or requirement or making a regulatory payment.
- A service provider should be provided with effective incentives in order to promote economic efficiency with respect to the regulated services they provide. The economic efficiency that should be promoted includes—
 - efficient investment the network with which the service provider provides regulated services; and
 - the efficient provision of regulated services; and
 - the efficient use of the system with which the service provider provides regulated services.
- Regard should be had to the regulatory asset base adopted
 - in any previous determination or arrangement, or
 - in the Rules
- 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.
- Regard should be had to the economic costs and risks of the potential for under and over investment 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.

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 in order to achieve the national gas and electricity objectives. For example, if the rate of return is set at a rate that is too low to

²² NEL, s. 7A; NGL, s. 24.

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, or 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 under-investment 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 over-invest 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 underutilised 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 over nor under investment in assets, and achieve an appropriate balance of sustainable long term consumer outcomes in respect of 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.

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.²³

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
- a reasonable opportunity to recover at least the efficient costs
- effective incentives in order to promote economic efficiency

Economists typically think of efficiency in three dimensions: productive, allocative and dynamic. Table 2 sets out how this applies in the context of the rate of return.

Table 2 Application of efficiency concepts to rate of return

Dimension of efficiency	Economic meaning	Application to rate of return estimation
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²³ See AER, *Risk and judgement Discussion paper*, February 2018 and section 2.4 of this decision.

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 in the sections below.

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 have regard to 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-off²⁴ 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 below.

Market data

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 investment with a similar degree of risk as that which applies to a service provider in respect of the provision of regulated services.²⁵ 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'.²⁶

We consider employing a rate of return that is commensurate with the prevailing market cost of capital (or WACC) is consistent with the zero NPV investment condition (see above). 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.²⁷

Energy Consumers Australia submitted that market data may be imperfect, submitting that markets may not price risk effectively in situations where potential outcomes cannot be quantified.²⁸ We acknowledge that market imperfections may affect the data available to us and we have regard to these factors when considering the evidence before us. Nonetheless, we consider that having regard to market data is important for achieving the legislative objectives by considering the prices in the market for funds from which service providers must source capital.

The Consumer Reference Group submitted that the use of market data introduces risk of error reinforcement. Market prices will reflect the value to investors of outperformance of regulatory benchmarks, while regulatory benchmarks are based on market data.²⁹

²⁴ Handley, Advice on the Return on Equity, Report prepared for the Australian Energy Regulator, 16 October 2014, p. 4.

²⁵ 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).

²⁶ Kahn, A.E., 'The economics of regulation: Principles and institutions', The MIT Press, Massachusetts, 1988, p. 45.

²⁷ Partington, G., Satchell, S., *Report to the AER: Discussion of the allowed cost of debt*, 5 May 2016, p. 15.

²⁸ Energy Consumers Australia, Response to the AER Draft Guideline, September 2018, pp. 8-9.

²⁹ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. ii.

We agree that this is a factor that we should consider when examining market data. In September 2018 we published information on service providers' realised returns compared to the allowed returns and the impact of incentive payments. While incentive payments may not reflect all outperformance, the results indicated that there is a range of outperformance across service providers and over time. Based on the evidence available, the extent of any correlation between outperformance and the market data used in rate of return estimation (predominately equity beta estimates, gearing ratios, credit ratings) it is not clear. We consider that it is important to continue to monitor service providers' actual returns and expect that over time this can help inform us on the effectiveness of our regulatory framework and identify areas that require further investigation.

Benchmarking

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.³⁰

The service providers' actual returns could 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.³¹

On the use of incentive regulation, the ECA submitted:³²

The objective is not to set the rate of return based on a benchmark so that the provider can outperform the rate of return by the way it is financed – the intention is that the rate of return is a constraint so that the provider has maximum incentive to generate higher returns by efficiency in its investments and its operations.

We agree 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 (set out below).

We note that we have updated our empirical analysis in a number of areas consistent with incentive regulation. We have reviewed our benchmark gearing, credit rating, debt

³⁰ See AER, *Better regulation: Explanatory statement rate of return guideline*, December 2013, ch. 3.

³¹ NEL, s. 7A(3); NGL s. 24(2)(b).

³² ECA, Review of the rate of return guideline: Response to the AER Issues Paper, December 2017, p. 11.

term, and overall debt costs by examining the recent, actual costs and financial management practices of service providers.

NPV=0 condition

As the regulatory regime is ex-ante³³, 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:³⁴

The zero NPV investment criterion has two important properties. First, a zero NPV investment means that the ex-ante expectation is that over the life of the investment the expected cash flow from the investment meets all the operating expenditure and corporate taxes, repays the capital invested and there is just enough cash flow left over to cover investors' required return on the capital invested. Second, by definition a zero NPV 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.

During the first concurrent evidence session, the experts agreed that setting an allowed return to achieve a zero NPV outcome achieves efficient investment incentives, and is in the long term interest of consumers.³⁵

2.2 Balancing the risks and costs of not achieving the objectives

In section 2.1 we outlined that the legislative objectives that guide our decision making and exercise of judgment. We set out our view that an allowed rate of return that reflects the efficient market cost of capital³⁶ will contribute to the achievement of the legislative objectives.

However, the market cost of capital for providers of regulated energy network services cannot be directly observed and must instead be estimated. We agree with the Independent Panel that estimating the allowed rate of return is not a science and involves uncertainty and judgment.

Due to inevitable uncertainty, there is a risk that the estimated rate of return will be higher or lower than the actual market cost of capital. If the allowed rate of return deviates from the market cost of capital then the rate of return, while intended to promote efficient investment in and use of the service provider's energy network in the long term interests of consumers, may not end up doing so. That is, there may be

³³ 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*.

³⁴ Partington, G., Satchell, S., *Report to the AER: Discussion of the allowed cost of debt*, 5 May 2016, p. 14.

³⁵ AER Concurrent Evidence Session 1 – Proofed Transcript, p.15

³⁶ Given the risks involved in the provision of regulated energy network services.

costs associated with the allowed rate of return being higher or lower than the market cost of capital. This is, of course, an inherent problem in estimation and economic prediction.

The uncertainty in the estimation of the rate of return therefore introduces two concepts that need to be considered:

- the risk that our rate of return is above or below the market cost of capital, and
- the costs that may result from a rate of return above or below the market cost of capital.

In reviewing our draft decision the Independent Panel recommended that we provide fuller explanation of how to address this uncertainty, the risks involved and the resulting costs.

We agree with the Independent Panel that we should be more explicit about how we have exercised our judgement in the context of uncertainty in economic predictions and our degree of confidence that the final result is neither too high nor too low, based on the evidence before us.

This theme arose in a number of submissions and there were very divergent views on where our draft decision was positioned on the spectrum. In general, service providers and investors considered our rate of return instrument would produce returns that were too low,³⁷ while consumer representatives considered that returns would be too high and that past regulatory decisions had already resulted in returns that were too high.³⁸

We note that the key consideration of these risks and costs is centred on their symmetry, that is:

- whether the risk that our rate of return is above the market cost of capital is greater than the risk that it is below the market cost of capital (or vice versa); and
- whether the costs resulting from a rate of return above the market cost of capital are greater than the costs of a rate of return below the market cost of capital (or vice versa).

If there is a material imbalance in the risks and costs of estimating the rate of return, then it may arguably be prudent to set an allowed rate of return above or below the market cost of capital, in order to meet the legislative objectives. For example, consider a situation in which the risks of over or under-estimating the market cost of capital were equal, but the cost of underinvestment are materially greater than all other costs of mis-estimating the rate of return. In this case, uncertainty in estimating the market cost of capital may mean that the legislative objectives are best achieved by setting a rate

³⁷ ENA, AER Review of the Rate of Return Guideline, 25 September 2018, pp.2-5; NSG, Submission to the draft Rate of Return Guideline, September 2018, pp1-2;

³⁸ CRG, Submission to the Australian Energy Regulator - Response to the Rate of Return Draft Decision, 25 September 2018, pp.3-4, 5-6; CCP16, Submission to the AER on its Draft Rate of Return Guideline, September 2018, pp.5-7

of return with a bias towards investment – that is, a rate of return above the market cost of capital.

In the draft decision we exercised judgement by placing our emphasis on market data and avoiding choices that are influenced by any material bias in either promoting or discouraging investment.

In making submissions about either promoting or discouraging investment, some stakeholders referred to the balance achieved in our previous Guidelines and regulatory determinations. The CRG submitted that the rate of return should be lower than in previous Guidelines as these previous decisions included an upward bias.³⁹ The Network Shareholder Group submitted that it is not clear that previous decisions reflected an upward bias.⁴⁰ We note that this decision has been made on a forward-looking basis to reflect the current market evidence of the efficient rate of return. This approach is not based on quantifying changes from previous decisions.

The Independent Panel recommended that the risk-cost trade-off should be an assessment of the outcome as a whole after the component by component analysis. Accordingly we have set out our consideration of the risks and costs of our decision in section 12.

On risks, we note that evidence available to inform us of the level of the market cost of capital is also informative of the risk in estimating the market cost of capital. In our component by component assessment we have had regard to an extensive range of relevant estimation methods, financial models, market data and other evidence relevant to estimating a rate of return that reflects the efficient market cost of capital. To assess risks, we have had regard to the relative merits of all this evidence before us. Our assessment of the relevant evidence is set out in sections 3 through 11, and considered together as a whole in section 12.

In undertaking our risk-cost assessment we have carefully considered whether we need to make changes to the outcomes of our component by component analysis on the basis of our findings in the risk-cost trade-off.

2.3 Twin objectives of investment and consumption efficiency

The Independent Panel stated that our draft decision focused on the effect of the rate of return on investment efficiency, and noted that consumption efficiency is also an important part of the legislative objectives.

2.3.1 Draft decision

³⁹ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, pp. iii, 48.

⁴⁰ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018.

In the draft decision we noted the risk to consumption efficiency from under-utilisation of network services through depressed consumer demand and/or disconnection from the grid. We referred to consumer submissions that discussed financial distress experienced by some consumers, declining demand, and declining network utilisation.⁴¹

However, when considering the overall risks of an allowed rate of return that is too high or too low, we referred only to efficient investment, stating:⁴²

Where we exercise judgement, we do so placing our emphasis on market data and avoiding choices that are influenced by any material bias in either promoting or discouraging investment. We consider that the promotion of efficient investment will flow from a decision that reflects well established economic approaches as supported by the available evidence, always having regard to the principles set out in the RPPs and the various elements we are seeking to achieve in the NEO and NGO.

2.3.2 Independent panel review

The Independent Panel stated that:⁴³

Submissions to the AER focused on a specific risk – the effect on investment incentives of over or underestimating the rate of return.

but that:⁴⁴

the national objectives also include consumption efficiency, which needs to be addressed as well. In achieving the national objectives, attracting capital is necessary but not sufficient.

2.3.3 Stakeholder submissions

None of the stakeholder submissions directly addressed the Independent Panel's statement on the importance of considering consumption efficiency as well as investment efficiency. However, some submissions did discuss the consumption efficiency implications of rate of return decisions.

The CCP16 submitted that:⁴⁵

A ROE that errs on the high side of efficient equity costs, incentivises over-investment in the assets as such investment promotes a focus on growing the

⁴¹ Draft decision, pp. 26, 28.

⁴² Draft decision, p. 29.

⁴³ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, p. 64.

⁴⁴ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, p. 67.

⁴⁵ Consumer Challenge Panel (CCP), *Submission to the AER on its Draft Rate of Return Guideline*, September 2018, p. 57

RAB – particularly where the regulatory rules include revenue caps and indexation of the RAB that protect investors and leave consumers funding imprudent investment over many years. It also leads to a cycle of reducing demand and inefficient allocation of resources in the economy as a whole.

The CRG submitted that for some consumers energy is already unaffordable, citing an ACOSS report suggesting that the number of Australian experiencing energy poverty is likely to be much higher than the 3 million living below the poverty line.⁴⁶ Further, energy self-sufficiency may not be a viable alternative for vulnerable consumers and an increase in self-sufficiency, driven by unnecessarily high electricity prices, will translate to even higher prices for vulnerable consumers.⁴⁷

The Consumer Reference Group submitted that if the AER's exercise of judgement gave greater consideration to consumer outcomes and less consideration to investment incentives the bill reduction delivered by the rate of return instrument could be substantially larger.⁴⁸

Energy Consumers Australia submitted that the trend toward network returns becoming more certain and consumer prices becoming less certain encourages consumers to move to self-generation, which would result in a vicious cycle of increasing prices as service providers attempt to attract their allowed revenue.⁴⁹

Sapere Research Group submitted that where service providers are able to earn economic profits, this may lead consumers to invest in substitute assets and services at higher levels than otherwise, reducing utilisation of network assets and as a result dynamic or economic efficiency over the long run.⁵⁰

2.3.4 AER consideration

We agree with the Independent Panel that achieving the legislative objectives requires more than just efficient investment in energy networks, but also requires efficient use of energy network services. An allowed rate of return that is too high (low) will, all else equal, contribute to prices that are too high (low). This effect on prices may discourage (encourage too much) use of network services. It may also encourage consumers to overinvest (underinvest) in downstream investments, such as upgrading to more energy efficient appliances. It may also encourage (discourage) disconnection from the grid and investment in stand-alone power systems. For business consumers, the effect

⁴⁶ Consumer Reference Group (CRG), *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. 11

⁴⁷ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. 12

⁴⁸ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p.12

⁴⁹ Energy Consumers Australia, *Response to the AER Draft Guideline*, September 2018, p. 9

⁵⁰ Sapere Research Group, *Regulated Australian Networks – Analysis of rate of return data published by the Australian Energy Regulator*, October 2018, p. 6

on energy network prices may be passed through to the prices of other goods and services, creating further distortions to efficiency in downstream markets.

To assess the efficiency of prices, and consequently the efficient use of network services, there are three aspects of economic efficiency to consider: allocative efficiency, productive efficiency, and dynamic efficiency.

In economic theory⁵¹ allocative efficiency is achieved when prices are set to reflect costs.⁵² Productive efficiency is achieved if those costs are the lowest possible costs. Dynamic efficiency is achieved if productive and allocative efficiency are maximised over time.⁵³

The rate return, or cost of capital, is one cost of operating an energy network and therefore a component that contributes to a network's overall cost. The rate of return instrument address the level of this component of a network's overall cost. The setting, through the instrument⁵⁴ of an allowed rate of return is the regulatory mechanism to ensure that a certain cost of capital is recovered through prices. If this cost of capital level is too high or too low then efficiency may suffer. However, the instrument does not address how a particular cost level is recovered from consumers through the structure of prices. The structuring of prices to reflect costs is instead addressed through other parts of our regulatory framework.

In this context, for the allowed rate of return to contribute to the achievement of the legislative objectives it should reflect the efficient cost of capital. If it does, then it will (all else equal) promote both efficient investment in, and efficient use of, energy network services.

2.3.5 Conclusion

An allowed rate of return that reflects the efficient market cost of capital will promote both investment and consumption efficiency.

2.4 Risk and return

In section 2.1 we set out the legislative objectives that guide our decision making. These objectives provide that we consider how to efficiently compensate for the risk exposure of service providers in supplying regulated energy network services.⁵⁵

⁵¹ Referring to Kaldor-Hicks efficiency as distinct from Pareto efficiency.

⁵² Under a single-price model allocative efficiency is achieved when price is set to marginal cost. For energy network services that involve large fixed costs, the recovery of these fixed costs from consumers may cause prices to differ from marginal cost. This may mean that prices need to be set above marginal cost (in a single price model), that multi-part prices are used (for example, a fixed access charge and a variable usage charge), or that price discrimination is used to set higher prices for consumers with a higher reservation price.

⁵³ Including resource allocations designed to improve economic efficiency and to generate more resources.

⁵⁴ Or through regulatory determinations that apply the instrument.

⁵⁵ As set out in NER cl.6; NGR cl. 6A

Risk is the degree of uncertainty about an event—such as the uncertainty around the expectation of the return on an investment.⁵⁶ It is strictly a forward-looking concept, as 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.⁵⁷

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 two distinct types of risk - systematic risk (market risk or non-diversifiable risk) and non-systematic risk (firm-specific risk or diversifiable risk).⁵⁸ 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, under the assumption that investors hold fully diversified 'efficient' market portfolios, 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.⁵⁹ 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.⁶⁰

We are required to have regard to the desirability of consistent application of financial parameters that are relevant or common to the return on equity and debt.⁶¹ In determining the allowed rate of return we must also have regard to any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.⁶² Components or relevant parameters adopted for estimating the rate of return should not be assessed in isolation.⁶³

⁵⁶ Bishop, S., Faff, R., Oliver, B., Twite, G., *Corporate Finance*, Ed. 5 Pearson Prentice Hall, 2004, p. 577.

⁵⁷ Handley, J., *Advice on the return on equity: report prepared for the AER*, 16 October 2014, p. 4.

⁵⁸ Refer to AER, *Draft Rate of return guideline – explanatory statement*, July 2018, page 87 for a detailed discussion on systematic and unsystematic risk.

⁵⁹ For example, AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 20.

⁶⁰ We observe the promised returns of debt issued by a sample of firms we consider comparable to an efficient firm in the supply of regulated energy services based on the benchmark credit rating and term. Since we provide a return on debt based on the promised yield, our allowed rate of return will be slightly above the expected return. This is because the promised returns will exceed expected returns, as the expected return is the promised return less the default risk.

⁶¹ NER, cl. 6.5.2(e), NER cl. 6A.6.2 (e); NGR, r. 87(5).

⁶² NER, cl. 6.5.2(e); NER, cl. 6A.6.2 (e); NGR r. 87(9).

⁶³ For example, see: AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 40.

Importantly, the principles set out in this paper regarding 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 draft decision we set out further details of our consideration of risk and its role in our estimation of the allowed rate of return. This analysis remains relevant.

In this section, we consider stakeholder submissions on the major risk 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 conceptualise the risk exposure of a regulated energy network provider relative to a market average firm. In Section 2.4.3, we discuss whether gas and electricity businesses face different risk environments and whether different benchmarks are warranted.

2.4.1 Compensable 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. In this section we consider submissions about whether systematic risk has changed over time, including the role and impact of technological, regulatory, and catastrophic risks.

2.4.1.1 Draft decision

An efficient rate of return compensates for only the systematic risk of investing in a firm supplying energy network services, since non-systematic risk can be mitigated by holding a diversified portfolio. While non-systematic risks are considered in the overall return in the regulatory framework, they are compensated through means outside the allowed rate of return.

Our draft decision concluded that technological, regulatory and catastrophic risks such as those highlighted in stakeholder submissions should not be compensated through the rate of return.

In reaching this decision, we considered that:

- Technological, regulatory and catastrophic risks in stakeholder submissions cannot be reasonably classified as systematic risks, as it is unlikely that sectors outside the energy sector will experience significant impacts. Investors would be able to diversify away such risks by investing in other industries.⁶⁴

⁶⁴ This was an area of agreement between experts: Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, May 2018, P.11; AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p.47; Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, May 2018, P.11

- Experts were split on whether technological risk was factored into the equity beta and through the market.⁶⁵
- The effects of technological change can be uncertain and may lead to positive impacts for businesses. For example, an increase in electric cars will likely increase demand for electricity charging points.⁶⁶
- The CCP and EUAA highlighted that consumers bear the risk of underutilised assets, as the full costs of assets continue to be reflected in the regulated revenues and prices.⁶⁷
- Catastrophic risks can be mitigated by purchasing insurance, with insurance costs passed to customers through the opex allowance.⁶⁸ Further, catastrophic risks can be mitigated via the potential to pass the costs to relevant users and shipwreck clauses.

2.4.1.2 Independent panel review

The independent panel did not comment on this topic.

2.4.1.3 Stakeholder submissions

We have received submissions from stakeholders regarding technological and regulatory risks in response to our draft decision:

- NSG submitted that⁶⁹:
 - Technological risks are not fully diversifiable as many industries currently face technological risk.
 - Changes in technological risk have not been captured in the equity beta estimate.
 - Regulatory risk must be compensated under the regulatory pricing proposals.
 - Regulatory and sovereign risk has increased as a result of interventions by government, a deterioration in governance of decisions and removal of appeal rights.

⁶⁵ Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, May 2018, p.10; AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p.52. Evoenergy, Review of rate of return guideline – evidence sessions – May 2018, p.2

⁶⁶ Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, May 2018, p.4

⁶⁷ Consumer Challenger Panel 16, Submission to the AER on its Rate of Return Guideline Review Concurrent Evidence Sessions, 4 May 2018, p. 44-46; Energy Users Association of Australia, EUAA submission – AER Rate of Return Review Issues Paper, October 2017, p.8.

⁶⁸ This was supported by a range of stakeholders: AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p.46, p.50, p.59, Network Shareholder Group, Submission on the Rate of Return Guideline review, May 2018, p.8, Ian McAuley, Submission to AER on rate of return guidelines, December 2017, p.3

⁶⁹ NSG, Letter on the Australian Energy Regulator’s draft rate of return guideline, 25 September 2018, p. 10-13

- Most experts agreed that risk has not reduced since the 2013 RORG.
- Investors Mutual Limited and Infrastructure Partnerships Australia submitted that the proposed reduction in ERP is inconsistent with increased technological and regulatory risk.⁷⁰
- Australian Energy Council submitted that regulatory and technological risks are non-systematic and therefore not relevant to the rate of return.⁷¹
- Energy Consumers Australia submitted that regulatory risk has not changed as there was always the risk of government intervention, and that consumers should not have to pay for a change in a policy outcome.⁷²

2.4.1.4 AER considerations

In determining whether a risk is to be accounted for in the rate of return we have to determine whether it is systematic.⁷³

We recognise that technologies such as solar panels, smart technology and power storage are beginning to change how consumers produce and consume electricity. This could affect how consumers use network infrastructure and may impact some risks faced by network service providers.

The NSG stated that technological risks are impacting many industries and cannot be diversified completely. While technological change does impact many industries, we emphasise that the type of technology and how industries are impacted may vary. We consider that the sort of technological changes mentioned by businesses are sector-specific and are unlikely to have significant effects outside the energy sector. Investors would therefore be able to diversify these technological risks by investing in other industries. This was highlighted in our concurrent evidence session, the Australian Energy Council and by the NZCC.⁷⁴

The NSG submitted that market data may not have captured technological and regulatory risks. We note that the NSG did not provide evidence in support of its claim.

To the extent that technology risk is systematic and priced by investors, we consider that it would be reflected in the equity beta.⁷⁵ Analysis of broker and independent

⁷⁰ Investors Mutual Ltd, Submission to rate of return guideline review draft decision, 21 September 2018, p.2, Infrastructure Partnership Australia, Submission to Rate of Return, September 2018, p. 3

⁷¹ AEC, Draft rate of return guideline response, September 2018, p. 12

⁷² Energy Consumers Australia, Response to the AER Draft Guideline, September 2018, P. 16

⁷³ Refer to section 2.4.1.1 above or section 2.4 of our draft guideline for a detailed discussion on why we only compensate for systematic risk.

⁷⁴ New Zealand Commerce Commission, Input methodologies review decisions, December 2016, p.109; AER *Concurrent Evidence Session 1 – Proofed Transcript*, April 2018, p. 47.

⁷⁵ In our April/June 2015 final and preliminary decisions, we considered that, 'Even if the risk arising from disruptive technologies has increased the systematic risk of an efficient firm in the supply of regulated energy services, we consider this will be captured in our empirical equity beta estimates to the extent that investors are aware of the risk' (see, for example, AER, *Jemena Gas Networks final decision 2015-20: Attachment 3—Rate of return*, June

valuation reports indicates that there has been no explicit adjustments to rate of return parameters for the technological risks.⁷⁶ Further, to the extent that technological risk is not reflected in the market data, this may indicate a non-systematic nature, and would not warrant compensation through the rate of return on an ex-ante basis.

We note that the NSG submitted we - as regulators - should deviate from the market to compensate for technological risk. It would be inappropriate for a regulator to offer an additional arbitrary amount of compensation outside of the financial market and financial theory framework.

The NSG is correct in highlighting that regulatory risk must be compensated under the Revenue Pricing Principles.⁷⁷ However, the Principles do not specify that compensation must arise through the allowed rate of return. Similar to technological risks, the regulatory risks noted in submissions are unlikely to have significant effects outside the energy sector. Investors in the market would be able to diversify away such risks by holding a market portfolio. We note that submissions did not provide evidence that regulatory risk is systematic.

The NSG submitted that sovereign risk has increased due to increased changes in the regulatory framework and governance process. We note that the NSG has not provided evidence that sovereign risk has increased or that the risk is systematic. We highlight that changes to the regulatory framework may be a natural result of useful data, theory, models and information that were previously unavailable. Further, regulatory changes may also benefit businesses and networks. For example the CRG has previously noted that there has been recent network tariff reform under the AEMC's Demand Side Participation review to increase revenue smoothing.⁷⁸

The NSG submitted that most experts agreed with the view that risks have not reduced since the 2013 Guidelines. This appears to refer to Stephen Gray's view in the evidence sessions that overall risks have not reduced since the 2013 Guidelines, and that risks should be addressed within the discussion of compensation.⁷⁹ We highlight that this does not imply that compensable risk has not decreased since the 2013 Guidelines. We note that during the discussion on risk, experts discussed technological, regulatory and catastrophic risks, but did not express the view that compensable risks have not reduced since 2013.

2015, p. 406).; Partington and Satchell, *Report to the AER: Allowed rate of return 2018 guideline review*, May 2018, p.10.

⁷⁶ This is consistent with Partington and Satchell's October 2015 report, 'Since we do not consider the impact of disruptive technology to be a systematic risk we do not consider that it would be captured by estimates of beta, however recent they are' (see Partington and Satchell, *Report to the AER: Analysis of criticism of 2015 determinations*, October 2015, p. 39).

⁷⁷ NEL. 7A (5).

⁷⁸ Consumer Reference Group, *Submission to the Australian Energy Regulator Rate of Return Guideline Review*, May 2018, p.28.

⁷⁹ AER, *Transcript proof proceedings: Review of rate of return guidelines concurrent expert evidence session 1*, April 2018, p.10.

We disagree with the view that a reduction in ERP is inconsistent with increased technological and regulatory risk. As mentioned above, the technological and regulatory risks submitted are non-systematic, and do not warrant compensation in the return on equity. Additionally, we emphasise that a multitude of factors may affect ERP and each factor could impact ERP differently. Therefore, a reduction in ERP is not necessarily inconsistent with an increase of any specific risk, especially non-systematic risks.

2.4.1.5 Conclusion

After reviewing all available evidence presented, we view that an efficient rate of return compensates only for systematic risk. Additionally, we view that technological, regulatory, catastrophic risks cannot be reasonably classified as systematic risks and therefore should not be accounted for in the rate of return.

2.4.2 Conceptual Analysis

In this section we conceptually analyse whether we can form an overview of the systematic risks faced by an efficient firm that provides regulated energy network services, relative to the market average firm. This can provide insight into where the firm's equity beta is likely to sit relative to the average equity beta across all firms in the market - which is 1.0 by definition. Our conceptual analysis is necessarily qualitative in nature and is therefore used as a cross-check against the empirically derived range.

2.4.2.1 Draft decision

Two key types of systematic risk are relevant for this conceptual analysis: business risk and financial risk.

Business risk

Business risk in this context refers to the systematic risk exposure of the underlying business assets.⁸⁰ It is generally accepted that an efficient firm providing regulated energy network services has lower business risk than the market average firm.⁸¹ We note that business risks for such a firm will be low for the following reasons:⁸²

⁸⁰ We note business risk in this context is only systematic/market risk and does not include firm specific risk that can be diversified away.

⁸¹ McKenzie and Partington, *Estimation of equity beta*, April 2012, pp. 6, 10; SFG, *Equity beta: Report for Jemena Gas Networks, ActewAGL and Networks NSW*, May 2014, pp. 17–18. (SFG, *Equity beta*, May 2014); SFG, *Estimating the required return on equity: Report for Energex*, 28 August 2014, p. 60; SFG, *Beta and the Black capital asset pricing model: Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausgrid, Ausnet Services, Australian Gas Networks, CitiPower, Endeavour Energy, Energex, Ergon, Essential Energy, Powercor, SA Power Networks and United Energy*, 13 February 2015, p. 42 (SFG, *Beta and the Black capital asset pricing model*, 13 February 2015); SFG, *Equity beta report prepared for APT Petroleum Pipelines Ltd*, October 2011, p. 11; McKenzie and Partington, *Report to the AER: Risk, asset pricing models and WACC*, June 2013, p. 11; Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 64. McKenzie and

- There are a number of inherent characteristics of an energy transportation network that lead to low systematic risk exposure. For example, operation of a natural monopoly and provision of an essential service with low price elasticity of demand.
- Incentive regulation allows service providers to earn more stable cash flows, with periodic reset of revenues reflecting changes in actual expenditure.⁸³ As most unregulated businesses do not have the same protections or restrictions, they are likely to face different risk environments.⁸⁴
- The structure of the regulatory regime insulates service providers from systematic risk.⁸⁵ For example, the regulatory framework may provide revenue cap regulation, tariff variation mechanisms and cost pass through mechanisms. Additionally, tariff structures may include fixed charges and protection of sunk investment through rolling forward the regulatory asset base (RAB).
- Frontier has previously noted that the regulation framework of Australian energy networks mitigates most of the business risks compared to business risks faced by other types of firms in the economy.⁸⁶
- Analysis indicating a general trend of increasing beta estimates as the proportion of regulated revenue decreases.⁸⁷
- McKenzie and Partington previously disaggregated business risk into intrinsic (economic) risk and operational risk.⁸⁸ Intrinsic risk relates to how the business cycle impacts a firm's sales and operational risk relates to a firm's operating leverage. McKenzie and Partington considered operational risk for an efficient firm providing regulated energy network services would be above the market average, but overall business risk would be low since the effect of this cost structure could be mitigated through fixed charges.⁸⁹ Intrinsic risk for an efficient firm providing regulated energy network services would be very low because it is insulated from the business cycle for reasons described above. A key conclusion from their 2012

Partington, *Report to the AER, Part A: Return on equity*, October 2014, p. 11. Origin Energy, *Submission to NSW distribution network service providers regulatory proposals for 2014–19*, August 2014, p. 7.

⁸² AER, *Draft Rate of Return Guideline – explanatory statement*, July 2018, p. 104.

⁸³ 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.

⁸⁴ 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.

⁸⁵ We summarised a selection of provisions in the NER and GNR that we consider likely to mitigate various risks in our draft decision: AER, *Draft Rate of Return Guideline – explanatory statement*, July 2018, p. 108

⁸⁶ Frontier Economics, *Assessing risk when determining the appropriate rate of return for regulated energy networks in Australia*, July 2013, p. 4.

⁸⁷ AER draft Guideline,

⁸⁸ McKenzie and Partington, *Estimation of equity beta*, April 2012, pp. 5–6; McKenzie and Partington, *Report to the AER: Risk, asset pricing models and WACC*, June 2013, p. 11

⁸⁹ McKenzie and Partington, *Estimation of equity beta*, April 2012, pp. 6, 15.

report was that the intrinsic risk of a firm is the 'primary, if not sole, driver of its systematic risk'.

Financial risks

Financial risk relates to the additional systematic risk that arises from the debt holdings of a firm. The underlying principle is that, since payments to debt holders take precedence over payments to equity holders, the systematic risk exposure for equity holders increases as the firm issues more debt. It is generally accepted that an efficient firm providing regulated energy network services has higher financial risk than the market average firm. The key cause of the higher financial risk is the relatively higher leverage such a firm has relative to the market average firm.

However, the exact relationship between financial risk and financial leverage is not straight forward. In their 2012 report, McKenzie and Partington discussed the limitations of various linear and nonlinear leverage formulae. They considered that overall, increased financial leverage increases the financial risk, and therefore the systematic risk facing equity holders. However, they cautioned against any claim that the exact nature of this relationship might be known. This suggests that high financial leverage relative to the market average does not necessarily result in an equivalently high exposure to financial risk. For example, McKenzie and Partington noted that, for energy network businesses, the likelihood of bankruptcy as leverage increases is low.⁹⁰ In their 2013 report, McKenzie and Partington also noted that, given the low default risk in regulated energy network businesses, the financial risk effects are 'unlikely to be substantive in normal market conditions'.⁹¹

Frontier previously assessed the level of risk (under the sub category financial risks) for regulated Australian energy network businesses relative to other businesses in the economy as:⁹²

- Low risk - default risk, financial counter party risk, liquidity risk (for large networks)
- Medium risk - refinancing risk
- Medium to high risk - interest rate reset risk⁹³, and illiquidity risk (for small networks)

⁹⁰ To the extent that the business is able to pass on borrowing costs to consumers. McKenzie and Partington, *Report to the AER, Part A: Return on equity*, October 2014, p. 11; Partington, *Report to the AER: Return on equity (Updated)*, April 2015, pp. 31–32.

⁹¹ McKenzie and Partington, *Report to the AER: Risk, asset pricing models and WACC*, June 2013, pp. 11–12

⁹² Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 65.

⁹³ When the Frontier report assessed interest rate reset risk as 'medium to high', it did so on the basis that the regulated return on debt would continue to be set using an 'on the day' approach (see Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 64). Later in that report, Frontier acknowledges that our implementation of a trailing average approach would reduce interest rate reset risk (see Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 74).

On the basis of the information above, we consider that although an efficient firm providing regulated energy network services has high financial leverage -relative to the market average - this does not necessarily imply it has an equivalently high overall exposure to financial risk.

Overall risks

The above assessment indicates that the intrinsic risk of a firm is the main driver of its systematic risk. We expect an efficient firm providing regulated energy network services to have low intrinsic risk exposure relative to the market average. We also consider the high financial leverage of an efficient firm providing regulated energy network services -relative to the market average - does not necessarily correspond to an equivalently high exposure to financial risk. Based on this information, we consider there are reasonable conceptual grounds to expect the overall systematic risk for an efficient firm providing regulated energy network services to be below that of the market average firm, and hence an equity beta below 1.0, a conclusion was supported by multiple reports report to the AER.⁹⁴

2.4.2.2 Independent panel review

Recommendation 16 of the Independent Panel Report was to clarify the discussions of financial risk and our conceptual analysis.⁹⁵ The Panel noted that financial risk depends on the fixed cost of servicing debt and that financial risk can be large even when the risk of default is zero.

2.4.2.3 Stakeholder submissions

Since our draft decision, we have received additional submissions on the conceptual analysis of risk:

- CCP requested explanation on AER's view on business and financial risk, including clarification of the relationship between financial risks, gearing and systematic risk.⁹⁶
- ENA submitted that the AER should recognise that a conceptual analysis has no proper basis.⁹⁷
- AGL submitted that the regulatory framework heavily insulates energy network businesses from risks faced in competitive markets, a view supported by the CRG and AEC.⁹⁸

⁹⁴ Partington and Satchell, *Report to the AER: Allowed rate of return 2018 guideline review*, May 2018, P.3. Partington, *Report to the AER: Return on equity (Updated)*, April 2015, Partington and Satchell, *Report to the AER: Return on equity and comment on submissions in relation to JGN*, May 2015, p. 6.

⁹⁵ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, p. 39

⁹⁶ CCP, *AER submission to rate of return*, September 2018, p.10.

⁹⁷ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 85-86

- AGL submitted that investment in network assets could be classed with Government bonds, which theoretically can have an equity beta of 0.⁹⁹
- AEC submitted that there is no reason that the AER should take the high end of the numerical range derived from its quantitative analysis.¹⁰⁰

2.4.2.4 AER Consideration

We acknowledge the Panel's recommendation and agree with the Panel's comment that, all else equal, a higher leverage leads to higher financial risk. We have previously noted this, stating:¹⁰¹

Frontier, in its 2015 report, also submitted that financial leverage increases the financial risk of a firm, regardless of the likelihood of bankruptcy. It submitted that this is because financial leverage, of itself, increases the volatility of cash flows to equity. We agree with this submission, as do Partington and Satchell.

As the independent panel observed, low default risk does not necessarily guarantee low financial risk. However, we consider that the overall financial risk of a regulated energy network business may not necessarily be higher than the market average despite its higher-than-average gearing level. In arriving at this conclusion, we considered Partington and McKenzie's comments on the exact relationship between financial leverage and financial risk is unclear.¹⁰² We also considered Frontier's previous analysis that various risks that form the overall financial risk are of low to medium magnitude.¹⁰³

This suggests that the high financial leverage of an efficient firm in the supply of regulated energy services (relative to the market average) does not necessarily result in the firm experiencing an equivalently high exposure to financial risk.

The ENA submitted that a conceptual analysis has no proper basis after highlighting the Panel's conclusion on leverage and financial risk. We note that the Independent Panel's recommendation was to clarify our view which does not support the idea that our conceptual analysis is flawed. As noted above, our conceptual analysis is qualitative in nature and is therefore used as a cross-check against the empirically derived range. Our analysis of the impact of regulation on equity beta indicates that beta estimates decrease as the proportion of a firm's revenue from regulated operations increase. Additionally, we note that Professor David Johnstone agrees with

⁹⁸ AGL, *Re: Draft rate of return guidelines*, 25 September 2018 p.2 ; CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 19; AEC, *Draft rate of return guideline response*, September 2018, p. 12–14

⁹⁹ AGL, *Re: Draft rate of return guidelines*, 25 September 2018 p.2

¹⁰⁰ AEC, *Draft rate of return guideline response*, September 2018, p. 13–14

¹⁰¹ Preliminary Decision, *Jemena Electricity Networks determination 2016 – 2020*, Attachment 3 – Rate of Return, October 2015 p. 443.

¹⁰² McKenzie and Partington, *Estimation of equity beta*, April 2012, p.10.

¹⁰³ Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 65.

the concept of a regulated business having a lower beta than an unregulated business.¹⁰⁴

AGL submitted that investment in network assets could be classed with government bonds. We note that systematic risks are considerably mitigated for energy network businesses, since the firm provides an essential service and is protected by the regulatory framework. However, we highlight that risk differences exist between an investment in regulated network assets and government bonds. For example:

- Under the regulatory framework, a firm's revenue is determined every regulatory period based on assessing their efficient costs on an ex ante basis. A government bond in comparison, does not have regular assessments that impact return.
- The risk of investing in the government is lower than investing in a network, as highlighted by their different credit ratings.

2.4.2.5 Conclusion

After reviewing the material available to us, we consider that there are reasonable conceptual grounds to expect the overall systematic risk for an efficient firm in the supply of regulated energy services to be below that of the market average firm. Although an efficient firm in the supply of regulated energy services has high financial leverage (relative to the market average firm), this does not necessarily imply it has an equivalently high exposure to financial risk. This leads to our expectation that the equity beta of an efficient firm in the supply of regulated energy services will be below 1.0.

2.4.3 Gas and Electricity

Since our draft decision we have received submissions from stakeholders regarding whether gas and electricity businesses face different risks.

2.4.3.1 Draft decision

Our draft decision concluded that a single beta for gas and electricity businesses:

- Gas and electricity service providers face similar regulatory frameworks and limited business risk as regulated natural monopolies.
- To the extent there are genuine risks of extreme changes in demand which present the potential of asset stranding, the regulatory regime can mitigate this risk by providing prudent discounts and accelerated depreciation.
- There was no consensus within our expert panel on whether different betas were warranted.¹⁰⁵

¹⁰⁴ The AER, *Concurrent evidence session 2- Transcript*, 5 April 2018, p. 30.

¹⁰⁵ AER, *Draft Rate of Return Guideline – explanatory statement*, July 2018, p. 104.

- International comparators did not provide clear guidance on whether gas and electricity network service providers should be subject to different betas.
- The New Zealand Commerce Commission’s 2016 decision to include a 0.05 beta uplift for gas firms was not sufficiently persuasive to warrant different betas in Australia¹⁰⁶
 - Its beta analysis was based on a comparator sample of NZ, Australian, UK and US utility firms, which included vertically integrated utilities. This approach conflicts with our decision to use a domestic pure-play comparator set due to differences in risk and regulatory environments.¹⁰⁷
 - The Australian market's gas penetration of 56 per cent is substantially higher than the 21 per cent for North Island.¹⁰⁸
 - It is not clear whether gas has a higher price elasticity than electricity. The ACCC’s east coast gas inquiry concluded that suppliers had market power over gas users.¹⁰⁹
 - The NZCC acknowledged that “neither of these factors are sufficient in supporting an uplift in isolation”.¹¹⁰
- Our empirical analysis is based on a comparator set which includes gas service providers. Therefore, if there are differences in the systematic risks of electricity and gas service providers, this may be captured in our Australian empirical estimates of equity beta.

2.4.3.2 Independent panel review

The independent panel did not comment on this topic

2.4.3.3 Stakeholder submissions

APA submitted that gas businesses possess higher risk (and warrant a higher equity beta) than electricity businesses:

- Quantitative analysis from HoustonKemp, supports gas pipelines having a higher beta than electricity networks.¹¹¹
- The AER’s conclusion of similarity was based on a qualitative assessment and lacks the precision required to assess whether there is a difference between the betas for those service providers.¹¹²

¹⁰⁶ AER, *Draft Rate of Return Guideline – explanatory statement*, July 2018, p. 104.

¹⁰⁷ See AER, *Final decision AusNet distribution determination – attachment 3 – rate of return*, May 2016, pp 38

¹⁰⁸ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016*, Paragraph 418.

¹⁰⁹ ACCC, *Inquiry into the east coast gas market*, April 2016, P.18-19.

¹¹⁰ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016*, Paragraph 344.

¹¹¹ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 15.

- The New Zealand Commerce Commission’s decision to set different betas for gas and electricity businesses indicates a possible difference.¹¹³ APGA also suggested there was overseas precedent for differing betas.¹¹⁴
- The experts noted differences between gas and electricity providers do not necessarily translate into the rate of return and the difficulty in measuring the differences, but nothing about the differences between gas and electricity.¹¹⁵
- The experts did not say whether there are differences in systematic risk and whether the betas might be different as between electricity network and gas pipeline service providers.¹¹⁶ APGA submitted that experts agreed there are differences in risk and that there is no reason as to why they should be treated the same¹¹⁷
- Operating in the electricity sector is different from operating in the gas pipeline sector:¹¹⁸
 - Gas transmission pipeline service providers are not revenue capped; they are subject to price caps
 - There is competition among gas supply chains of which transmission pipelines are an integral part, for gas delivered to end-users.
 - Pipeline service providers are also exposed, through their contracts with users, to volatility in downstream markets. These risks are not reduced by regulation which, in the event of prolonged downturn or plant closure, allows pipeline costs to be recovered through higher tariffs for remaining users.

2.4.3.4 AER consideration

If the systematic risk of providing different network services by gas and electricity networks is different then we may need to recognise different benchmarks. In assessing whether more than one benchmark is required, the key issue is whether a material difference in risks exists between gas and electricity regulated network services. We have reviewed the available evidence available to us, including the HoustonKemp report on gas betas.¹¹⁹

¹¹² APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 15.

¹¹³ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 23-24.

¹¹⁴ APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, p. 4-5.

¹¹⁵ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 23-24.

¹¹⁶ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, pp. 23-24.

¹¹⁷ APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, pp. 4-5, 8.

¹¹⁸ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, pp. 23-24.

¹¹⁹ HoustonKemp, *Australian estimates of the equity beta of a gas business*, September 2018.

We consider our conceptual analysis (in section 7.2) suggests that the equity beta for regulated gas and electricity firms are likely to be similar. The regulatory framework for gas and electricity service providers are similar, and both face limited systematic risk by virtue of being regulated natural monopolies.

In its independent expert valuation report for DUET (which operated both electricity and gas networks), KPMG considered that gas and electricity businesses are sufficiently similar to not warrant separate betas and that any difference would be reflected in the cashflows¹²⁰:

Each of DUET's energy infrastructure businesses (DBP, DDG, Multinet Gas and United Energy) fundamentally share similar characteristics which support the application of a consistent base WACC being adopted across the entities... Whilst there are differences between the businesses such as (but not limited to) the tariff structure and exposure to volume risk (Price Cap vs Revenue Cap vs Contracted), which would typically warrant a specific adjustment for each business, these risks have been accounted for in the cash flows for each of the operating companies...

We disagree with the view that HoustonKemp's results indicate a higher beta for gas firms. HoustonKemp disaggregated firms¹²¹ in our comparator set in the following sectors: gas or mixed. It estimated beta for these firms and a gas-only portfolio but did not account for the proportion of revenue a firm generates from regulated operations. It is difficult to tell if the results are driven by difference between gas and electricity or the proportion of regulated revenues.

Applying HoustonKemp's classification to our empirical updates, we observe gas firms¹²² range from 0.32–1.06 and mixed/electricity dominant¹²³ firms range from 0.33–0.79. However, the estimates' wide-range and the (relatively) small number of comparators do not provide robust information on a different beta for regulated gas firms. A point estimate of 0.6 falls into both ranges and the substantial overlap between the two suggests a value of 0.6 is not unreasonable.

¹²⁰ KPMG, *DUET Independent Expert's Report and Financial Services Guide*, March 2017, p. 165.

¹²¹ HoustonKemp stated that this is based on segment information from financial statements in annual reports (HoustonKemp, Australian estimates of the equity beta of a gas business, September 2018, p. 11). It appears that EBITDA was used when available for APA, AST, DUET, and HDF. Where EBITDA information was not available, notes and comments from annual reports were used.

¹²² Alinta, APA, Envestra, GasNet, Hastings. Based on HoustonKemp's analysis that all or most of their operations or revenue were from gas businesses. HoustonKemp, Australian estimates of the equity beta of a gas business, September 2018, p. 17

¹²³ SKI, AST, AGL, Duet. HoustonKemp classified AGL as mixed as there was insufficient information to allow disaggregation. (HoustonKemp, Australian estimates of the equity beta of a gas business, September 2018, p. 12) AST and SKI are classified as mixed but they derive bulk of their EBITDA from electricity businesses. (HoustonKemp, Australian estimates of the equity beta of a gas business, September 2018, p. 13, 17) Duet has a 42:58 mix for electricity vs gas EBITDA. (HoustonKemp, Australian estimates of the equity beta of a gas business, September 2018, p. 17)

It is not clear that HoustonKemp's derivation of equity beta estimates for a gas-only portfolio is entirely appropriate. Its derivation appears to be based on accounting data or book value from annual reports (where available). However, Partington & Satchell note that when 'decomposing the beta of a firm into its constituent parts the market value weights of the constituent parts are required'.¹²⁴ Partington and Satchell noted that 'there is no tight link between book values and market values' and the relationship changes over time.

Further, HoustonKemp estimates gas beta both greater and less than 0.7, but only the evidence for a beta below 0.7 is statistically significant.

We have revisited use of international regulatory decisions following APA's submission of the NZCC's decision to set a higher beta for gas firms. However, APA itself has expressed concern with relying on data from different institutional contexts and potentially different risk characteristics.¹²⁵

We consider that international regulatory decisions do not provide persuasive evidence to provide a beta uplift for gas businesses because:

- The NZCC applied an uplift (of 0.05) and acknowledged that "neither of the factors [higher income elasticity than electricity and low household connection to gas] are sufficient in supporting an uplift in isolation".¹²⁶ Given the small size of the uplift and the multitude of reasons that are not relevant to the Australian market, this does not provide persuasive evidence of an uplift to beta for regulated gas firms.¹²⁷
- The NZCC noted that given differences in context, regulatory frameworks and environments, decisions by international regulatory entities provide limited benefit.¹²⁸
- Ofgem uses the same equity beta for electricity and gas distribution, and similar betas for electricity and gas transmission¹²⁹
- European evidence also provides mixed direction, with half of the regulators in the NZCC sample use the same asset beta or a lower asset beta for gas.¹³⁰

¹²⁴ Partington and Satchell, Report to the AER: Discussion of submissions on the Draft 2018 Guideline, November 2018, p. 17

¹²⁵ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p.24.

¹²⁶ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016*, Paragraph 344.

¹²⁷ AER, *Draft Rate of Return Guideline – explanatory statement*, July 2018, p. 104.

¹²⁸ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016*, Paragraph 442.

¹²⁹ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016*, Paragraph 437.

¹³⁰ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016*, Paragraph 434.

It is also not clear that experts supported different betas for gas and electricity businesses:

- Our review of the expert joint report indicate that there was no agreement on whether systematic risks were different and whether different benchmarks were warranted.¹³¹
- Ilan Sadeh and Stephen Gray expressed the view that differences between electricity and gas network service providers may translate to OPEX rather than rate of return.¹³²

On the topic of revenue versus price cap, we have not received evidence to suggest that there is material difference in risk between the two. In the 2009 WACC review, we considered that there was no compelling evidence to suggest that the equity beta should differ based on the form of control (revenue cap vs. price cap).¹³³ The MEU submitted that there was only marginal difference between price and revenue caps on exposure to systematic risk and did not set propose to set a different equity beta based on the form on control.¹³⁴ We also observe that KPMG accounted for any difference in price vs revenue cap in the cash flows.¹³⁵

Further, we consider that regulated gas firms would not face significantly different competition (if any) to regulated electricity firms to warrant a separate beta.

2.4.3.5 Conclusion

After reviewing the information available to us, we are of the view that the systematic risk differences between gas pipeline and electricity network businesses are not material enough to reasonably justify different benchmarks.

¹³¹ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence Expert Joint Report, April 2018, p.49.

¹³² AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, pp.58, 63.

¹³³ AER, Final decision: WACC review, May 2009, pp. 251–252, 341.

¹³⁴ Major Energy Users Inc., *AER Review of Parameters for Weighted Average Cost of Capital*, September 2008, p. 51.

¹³⁵ KPMG, *DUET Independent Expert's Report and Financial Services Guide*, March 2017, p. 252.

3 Form of the allowed rate of return

In this section we set out the 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 Nominal, vanilla WACC

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 the achievement of 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 cash flows.
- This has been our long-standing 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 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 either sets a value for the rate of return on capital and value for imputation credits, or sets a formula for the calculation of the rate of return and the value of imputation credits. If we set a formula rather than a value then the formula 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 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 (SLCAPM) 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 part debt data.
 - A fixed value for the benchmark gearing ratio.
- A fixed value of imputation credits (gamma).

Our discussion paper on this topic noted that this was the first time we are applying this automatic approach for the life of the instrument. That paper did not set out how we might assess whether we should set a value or a formula. We asked whether it is appropriate to include self-executing formulas (mechanistic/automatic) where only the data is entered at the time of application. We set out our initial views on whether our current approach to return on debt, return on equity, gamma, and gearing ratio is amenable to mechanistic application over the life of the rate of return instrument. Our initial view in the discussion paper was, other than the approach to estimating the

return on equity (particularly the equity risk premium), all other aspects were amenable to mechanistic application.¹³⁶

Experts agreed in the concurrent expert evidence sessions and joint expert report that:¹³⁷

- Parameters that are relatively stable over a long period (regulatory period or more) should be fixed.
- Parameters for which data taken at a single given point in time is not suited for estimating the parameter value, and rather data over a longer period needs to be examined, should also be fixed.

Hence, equity beta and gearing should be fixed. That is, equity beta is relatively stable over a long period of time and gearing information at a single specific point in time is not suitable for estimating the value of gearing.

Where market variables influence the appropriate value at a given time then such parameters should be set via a prescriptive methodology. Hence, the risk free rate and cost of debt should be a prescriptive methodology based on market evidence.¹³⁸

We also considered other stakeholder submissions in arriving at our decision. We agree with the consensus in the expert joint report that parameters that are relatively stable over a long period (such as a regulatory period or more) should be fixed. We also agree that where market variables influence the appropriate value at a given time then such parameters should be set via a prescriptive methodology. Other stakeholder submissions also support the experts' consensus opinion.

The Independent Panel agreed that setting criteria for choosing between a fixed parameter or fixed methodology will maximise predictability and stability. The Panel inferred from our explanatory statement that in addition to the two criteria that we stated in our draft decision, we had also used another criteria.¹³⁹ The Independent Panel's inferred that, when we chose between a fixed parameter value and a fixed formula that uses current market data to derive that parameter value, the additional criterion we applied was whether any feasible formula will produce results that will track market movements accurately between rate of return reviews.

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

¹³⁶ AER, Discussion paper, MRP, risk free rate averaging period and the automatic application of the rate of return, March 2018, section 7.

¹³⁷ Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, section 2.10, p.17.

¹³⁸ Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, section 2.10, p.17.

¹³⁹ Independent Panel, Review of the AER's Rate of Return Draft Guidelines, September 7 2018, p.11

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 applied the above assessment approach agreed to by the experts in exercising our judgement on what should be fixed as a value or as a prescriptive methodology. In deciding whether to apply a methodology we also assessed whether there is an acceptable robust methodology. This assessment is set out in Table 3 below. Applying this assessment approach will provide for the rate of return instrument to be commensurate with efficient finance cost and most likely contribute to the achievement of the legislative objectives.

Table 3 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 change in target gearing ratios are likely to be infrequent and we see no reason to expect movement up or down. We agree with the experts 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 as short term gearing data can be distorted by market fluctuations in share prices. ¹⁴⁰ Therefore, it is appropriate to fix a value for the life of the rate of return instrument.
Return on equity	Formula	Our decision is set in the rate of return instrument a formula - based on the SLCAPM - to calculate the return on equity. Within the SLCAPM formula, our decision is to set fixed values for market risk premium and equity beta, and set a formula for calculating the risk free rate. In our 2013 guidelines our approach to estimating the return on equity was based on our foundation model approach. ¹⁴¹ Our draft decision continues this approach through use of the SLCAPM formula to calculate the return on equity and through our approach to determining the inputs into the SLCAPM formula (see section 5 for further detail on our return on equity approach).
Risk free rate	Formula	It is widely agreed among stakeholders and experts that the risk free rate should be set as a formula as 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

¹⁴⁰ 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.

¹⁴¹ AER, Rate of return guideline, December 2013, section 5.

also consider empirical equity beta data is relatively stable over long periods, consistent with the experts' views.¹⁴²

Market risk premium	Fixed value	<p>The experts at our concurrent expert evidence sessions considered whether it was appropriate to set a formula for calculating the market risk premium that would be applied over the life of the rate of return instrument. One expert's view was that a formula for calculating the market risk premium that is dependent on the risk free rate should be developed. This expert was concerned that a fixed value of the market risk premium may result in the allowed return on equity being too high when the risk free rate is high and too low when the risk free rate is low.¹⁴³ Some stakeholders submitted similar concerns.¹⁴⁴</p> <p>All experts agreed that the market risk premium is neither constant nor directly inversely related to the risk-free rate. However, given the lack of an accepted model of the correlation between the market risk premium and the risk free rate, most experts considered it more appropriate to fix the market risk premium.¹⁴⁵</p> <p>We consider that the market risk premium may vary over time, but its movement is not clearly linked to the risk free rate. There is no persuasive evidence of a relationship between the risk free rate and the market risk premium that can be reliably estimated. The lack of an acceptable robust method to calculate a market risk premium that varies with the risk free rate also moves us to set a fixed value for the market risk premium rather than a fixed formula. We consider that the market risk premium is an economy-wide parameter and our estimate of it is likely to be relatively stable. As such, a fixed value is appropriate. This issue is discussed in more detail in section 9.2.4.</p>
Return on debt	Formula	<p>The return on debt fluctuates over time with changes 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.</p>
Credit rating	Fixed value	<p>Observed values may change over time, but we consider that change is infrequent as 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.</p>
Term to maturity	Fixed value	<p>Observed values may change over time, but we consider that change is infrequent as 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.</p>
Value of imputation credits	Fixed value	<p>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). As both the distribution and utilisation rates are</p>

¹⁴² Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, section 2.10, p.17.

¹⁴³ Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, section 6.13, p.64.

¹⁴⁴ ENA, Response to Draft Guideline, 25 September 2018, p.118;

¹⁴⁵ Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, section 6.13, p.64.

		estimated as fixed values, so is the value of imputation credits.
Imputation credit distribution rate	Fixed value	We consider the distribution rate does not change quickly and also see no reasons to expect movement up or down. Therefore, it is appropriate to fix a value for the life of the rate of return instrument.
Imputation credit utilisation rate	Fixed value	We consider the utilisation rate does not change quickly and also see no reasons to expect movement up or down. Therefore, it is appropriate to fix a value for the life of the rate of return instrument.

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 have regard to 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”. A similar clause was included in our draft decision.

However, in our draft decision we also stated that the value of imputation credits:¹⁴⁶

- is the product of the utilisation rate and distribution rate, and
- will be rounded to the nearest one decimal place.

In the draft decision we estimated a utilisation rate of 0.6 and an initial estimate of the distribution rate of 0.88, the product of which is 0.528. From this we estimated a rounded value of imputation credits of 0.5, based on a utilisation rate of 0.6 and an adjusted distribution rate of 0.83 (adjusted for internal consistency with the value of imputation credits of 0.5).

In reviewing our draft decision the Independent Panel recommended that we review our rounding policy in relation to the value of imputation credits, including considering whether to round to the nearest five per cent or to two decimal places.¹⁴⁷

We have reconsidered our rounding policy in relation to gamma and our final decision is that we will not round the value of imputation credits, and rather estimate it as the unrounded product of our estimates of the utilisation rate and distribution rate.

Lally considered the extent to which parameter values should be rounded should be based upon the degree of precision in the estimate.¹⁴⁸ On this basis, we have estimated values for the utilisation rate and distribution rate to the nearest 0.05, and these are set as fixed values in the rate of return instrument. Once these values are

¹⁴⁶ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 388.

¹⁴⁷ Independent Panel, *Review of the AER's draft rate of return guidelines*, 7 September 2018, p. VII.

¹⁴⁸ M. Lally, *Estimation of gamma- review of recent evidence*, November 2018, p. 5.

fixed, they are precise, and as such the value of imputation credits can be calculated from them without any further need for rounding.

We consider this approach is also consistent with the rest of our rate of return instrument – fixed values for equity beta, market risk premium, and gearing are set but the return on equity and overall rate of return calculated from them are not rounded.

Further discussion of rounding in relation to imputation credits is in section 11.

4 Gearing

Gearing is the ratio of the value of debt to total capital (that is, debt and equity). The gearing ratio is used to weight the expected required return on debt and equity to derive the weighted average cost of capital (WACC). There are also interrelationships between the gearing level and equity beta and credit rating due to the effect of leverage risk on these parameters. There are also interrelationships between gearing and tax expense due to the deductibility of interest, however the estimation of benchmark tax expense is outside the scope of this review.

4.1 Final decision gearing value

Our final decision is to adopt a gearing ratio of 60 per cent. We determine a benchmark gearing ratio from observed gearing ratios of listed Australian energy networks. 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.

4.1.1 Draft decision

Our draft decision was to adopt a gearing ratio of 60 per cent based on a benchmarking approach and examining the relevant empirical evidence. Section 4 of our draft decision set out in detail the considerations and data adjustments made to the observed gearing data in our benchmarking analysis.

4.1.2 Independent panel review

The Panel found that we accessed the relevant data and interpreted the data accurately.¹⁴⁹

4.1.3 Stakeholder submissions

Stakeholder concerns with our estimation method are set out in sections 4.2 to 4.4. The AEC submitted that a gearing of 65% is justifiable on the evidence presented given that APA is not as good a proxy for a pure-play regulated energy network business¹⁵⁰ (we address the effect of regulation in section 4.2). No other submissions proposed alternative gearing estimates, though the CRG submitted that gearing should be considered in conjunction with credit rating and that our draft decision credit rating of BBB+ is too low¹⁵¹ (we discuss the benchmark credit rating in section 10).

¹⁴⁹ Independent Panel, Review of the AER's rate of return guideline, Sep 2018, p.20

¹⁵⁰ AEC, Draft rate of return guideline response, Sep 2018, pp 6-7

¹⁵¹ CRG, Submission to AER - Response to the rate of return draft decision, Sep 2018, p.30

4.1.4 AER consideration

Our draft decision set out in detail our method for estimating a benchmark gearing level. We have updated our empirical analysis to consider new data available since the draft decision. This updated analysis is set out in Table 4 and Table 5 below.

After considering the Independent Panel report, submissions on our draft decision (see sections 4.2 to 4.4), and advice from Capital Financial Consultants, we consider that the estimation approach set out in our draft decision achieves the legislative objectives.

Estimation based on market values

Table 4 presents gearing estimates for five comparator businesses over the past ten years using market values of equity and debt (with book value of debt used as a proxy for the market value of debt). The average gearing level of our comparator set over the 10 years to 2018 is 60 per cent, and 54 per cent in the last 5 years to 2018.

Table 4 Gearing based on market values

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

Source: Annual reports, AER analysis; Ausnet services, *Annual report 2018, March 2018*, p.44, p.65; APA, *Annual report 2018, June 2018*, p.55, p.72. All other data is the same as published with the draft decision.

Estimation based on book values

Table 5 presents gearing estimates for five comparator businesses over the past ten years using book values of equity and debt. The average gearing level of our comparator set over the 10 years to 2018 is 70 per cent, and 69 per cent in the last 5 years to 2018.

Table 5 Gearing based on book values

	ENV	APA	DUE	AST	SKI	AVE
2006	91%	67%	82%	57%	81%	76%
2007	90%	69%	75%	57%	80%	74%
2008	82%	71%	76%	58%	89%	75%
2009	80%	70%	79%	67%	85%	76%
2010	79%	68%	79%	62%	66%	71%
2011	78%	63%	77%	60%	69%	70%
2012	78%	64%	77%	61%	68%	70%
2013	71%	63%	79%	61%	68%	68%
2014	71%	65%	76%	64%	67%	69%
2015		68%	74%	69%	69%	70%
2016		71%	65%	66%	68%	67%
2017		71%		64%	68%	68%
2018		70%		68%		69%
5 Year average	71%	69%	72%	66%	68%	69%
10 year average	76%	67%	76%	64%	70%	70%

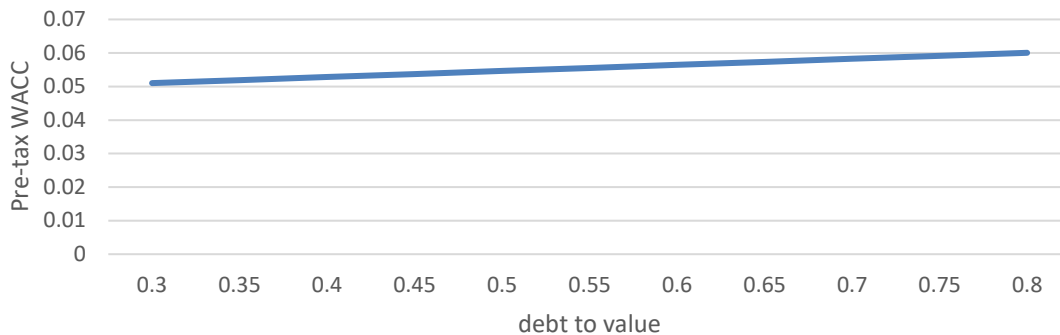
Source: Annual reports, AER analysis; Ausnet services, *Annual report 2018, March 2018*, p. 65; APA, *Annual report 2018, June 2018*, p. 72; All other data is the same as published with the draft decision

Materiality

We note that, consistent with advice from Lally and the findings of the views of the expert panel,¹⁵² the rate of return is relatively invariant to changes in gearing, as shown in Figure 1 below.

¹⁵² Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, pp. 11-13; CEPA, *Joint Expert Report*, 21 April 2018, p. 28.

Figure 1 Impact of gearing on pre-tax WACC



This implies that our regulated return on capital allowance, based on a 60% benchmark gearing ratio, should be sufficient for all service providers to finance their operations. To the extent that some service providers need to reduce their gearing, our analysis indicates that our allowed cash flows are likely to be sufficient.

Finally, we note that currently it appears that service providers have decreased gearing in recent years and the most recent year we had access to (2017) indicated an average gearing ratio of 51. While we note the gearing and the average for all service providers appears relatively volatile, this appears to show service providers are able to adjust their gearing to meet their financial needs despite our benchmark being 60%. Gearing levels for the firms we examine based on market values are shown below for the period from 2006 through 2017.

4.1.5 Conclusion

Our final decision is to adopt a gearing ratio of 60 per cent.

4.2 Sample firms and unregulated services

As discussed in our draft decision, it is important that our regulatory gearing estimate contributes to an overall rate of return that reflects efficient financing costs given the risks involved in providing regulated energy network services. We also note that regulation is likely to affect the systematic risks involved in providing regulated energy network services.

4.2.1 Draft decision

In the draft decision we acknowledged that the firms in our comparator set have varying degrees of unregulated activities and took this into account when exercising our regulatory judgment in determining a benchmark gearing ratio. However, we did

not calculate any specific adjustments to the data and considered that the comparator set is the best available.¹⁵³

4.2.2 Independent panel review

The Panel did not specifically comment on the effect of unregulated services on gearing.

4.2.3 Stakeholder submissions

The AEC submitted that a gearing of 65% is justifiable on the evidence presented given that APA is not as good a proxy for a pure-play regulated energy network business.¹⁵⁴ The ECA submitted that they have a residual concern about the choice of gearing ratio as the business that provide regulated and unregulated services to do so through financially separate entities and the expectation is the gearing of the regulated services businesses would be higher than the unregulated services businesses.¹⁵⁵

The CRG submitted that the market value of the regulated firm is driven by the previous decisions of the regulator causing a circulatory effect.¹⁵⁶ The Australian Institute submitted that:¹⁵⁷

A gearing ratio based on market values in surveys is going to be biased downward as market valuations of companies include the capitalised value of their monopoly profits. For example top 20 companies tend to have a market to net tangible assets of a bit over five

4.2.4 AER consideration

In section 2.4 we consider the relationship between risk and return, and the impact of regulation on the risk of providing regulated energy network services. In that section we note that some listed energy network firms have a material degree of unregulated revenue and others do not. For the currently listed firms in our benchmark gearing analysis in Table 4 and Table 5, APA has significant revenue from unregulated activities but that Spark Infrastructure and AusNet Services have relatively little unregulated revenue.¹⁵⁸ The ten-year average gearing for Spark Infrastructure and AusNet Services is 59 per cent and 60 per cent respectively (based on market values).

We note that the submissions by the CRG and the Australian Institute make similar points – that the market values for listed energy networks in our benchmarking analysis may reflect cash flow outside or, in addition to, regulatory allowances. This cash flow

¹⁵³ AER, Draft rate of return guidelines – explanatory statement, 10 July 2018, p.168

¹⁵⁴ AEC, Draft rate of return guidelines response, September 2018, p.7

¹⁵⁵ ECA, Review of the rate of return guideline, September 2018, p.13

¹⁵⁶ CRG, Submission to AER - Response to the rate of return draft decision, Sep 2018, p.29

¹⁵⁷ The Australian institute, Review of the rate of return guideline for energy, Sep 2018, p.6

¹⁵⁸ Spark Infrastructure, 2017 Annual Report, p. 90; AusNet Services, 2018 Annual Report, p. 71; APA, 2018 Annual Report, p. 22.

could derive from unregulated activities or, as submitted by the CRG and Australian Institute, from outperformance of the regulatory benchmarks.

As with unregulated revenue, we acknowledge that the data in our benchmark gearing analysis may reflect varying degrees of outperformance of regulatory benchmarks. It is likely that outperformance will vary across service providers and across time,¹⁵⁹ and these variations could be significant.

In section 12 we discuss the information available from RAB multiples and historical profitability measures on the market's value of expected cash flow from outperformance of regulatory benchmarks. In that section we note the limitations in decomposing the information in these measures to isolate the effects of outperformance. While we do not consider that this decomposition can be reliably undertaken based on current information, we consider it is important to collect information on the actual profitability of the network businesses that we regulate. This can help inform us on the effectiveness of our regulatory framework and identify areas that require further investigation. For example, careful consideration of profitability measures may be helpful in identifying whether the business' actual cost of debt has been systematically lower or higher than the cost of debt applied in the rate of return.

Overall, based on the information currently available, we consider that our current comparator set provides sufficient data for a reliable gearing estimate.

4.2.5 Conclusion

Our final decision is to continue to place primary weight on market values, and in doing so have regard to the effects of regulation on market data and our benchmarking analysis.

4.3 Market and book values of gearing

A gearing ratio requires estimates of the value of a business' debt and equity. These values can be obtained from a business' books (financial statements) or from market prices of traded debt and equity securities.

4.3.1 Draft decision

In our draft decision we placed primary weight on gearing estimates from market values. We noted that 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 considered this is important given the relationship between leverage risk and equity beta, and the estimation of equity beta from returns data of listed equity.¹⁶⁰

¹⁵⁹ AER, *Supporting information - Electricity network businesses - Return on assets ratios*, 10 September 2018.

¹⁶⁰ AER, *Draft rate of return guidelines – explanatory statement*, 10 July 2018, p.167

4.3.2 Independent panel review

The Panel found that we had accessed the relevant data and interpreted the data accurately. The Panel did not specifically comment on the use of market or book values of gearing.¹⁶¹

4.3.3 Stakeholder submissions

The CRG submitted that:¹⁶²

with such a small cohort of firms to assess gearing using market data, a greater weight should be applied to gearing measured on a book value basis as this increases the cohort of regulated firms from which to assess the level of gearing that would be applied to the BEE.

In submissions prior to our draft decision the Network Shareholder Group, APA, APGA, and ENA all supported using market values to estimate gearing.¹⁶³ The Network Shareholder Group noted book values are "simply a historical value and will almost never have an impact on the cost of financing debt or equity".¹⁶⁴ Similarly, ENA submitted that the rate of return reflects the market-clearing cost of capital and other rate of return parameters are based on market values, so gearing should also be derived from market values.¹⁶⁵

4.3.4 AER consideration

We agree that a larger sample of firms are available when examining book values compared to the sample available for market values. However, we remain of the view that in estimating a benchmark gearing ratio we should give primary weight to market values, with some regard to book values for the same comparator set.

Book values may not be representative of a firm's forward looking target gearing or the markets assessment of the risk involved in providing regulated energy network services. Using market values also promotes consistency between our benchmark gearing ratio and other rate of return parameters that are typically informed by market data. We consider this is important given the relationship between leverage risk and equity beta, and the estimation of equity beta from returns data of listed equity. Experts also agreed that market-based estimates are the most appropriate measure of gearing.¹⁶⁶

¹⁶¹ Independent Panel, Review of the AER's rate of return guideline, Sep 2018, p.20

¹⁶² CRG, Submission to the AER - Response to ROR draft decision, Sep 2018, p.29

¹⁶³ NSG, Submission on the Rate of Return Guideline (RORG) review, May 2018, p.14; ENA, AER review of Rate of Return Guideline (RORG), Response to discussion papers and concurrent expert evidence sessions, May 2018, p.32; APA, Review of the Rate of Return Guideline (RORG), p.20.

¹⁶⁴ NSG, Submission on the Rate of Return Guideline (RORG) review, May 2018, p.14

¹⁶⁵ ENA, AER review of Rate of Return Guideline (RORG), Response to discussion papers and concurrent expert evidence sessions, May 2018, p.32

¹⁶⁶ AER – Evidence Session 1 & 2 – Expert Joint Report – 21 April 2018, p.27

We note that if we were to expand the sample of firms in our book value analysis we would still need to consider differences between market and book values. Information on this difference can only be obtained from our current sample of listed firms. In this regard, expanding the sample of firms in our book value analysis may be of limited value. Overall, we consider that our current comparator set provides sufficient data for a reliable gearing estimate.

4.3.5 Conclusion

Our final decision is to place primary weight on gearing estimates from market values and secondary weight on book values of the same listed firms.

4.4 Treatment of hybrid securities

Hybrid securities are securities that have characteristics of both debt and equity. AusNet Services has two hybrid security issues in the form of non-convertible subordinated notes.¹⁶⁷ Envestra and Spark Infrastructure had shareholder loan notes that are included as debt for accounting purposes but have characteristics similar to equity.¹⁶⁸

4.4.1 Draft decision

We removed loan notes from our measures of debt when estimating gearing ratios on the basis that they have the following characteristics of equity:

- they were stapled to each share, with no separate existence without the share (that is, they cannot be traded independently),
- they were subordinate to all other creditors; and
- returns on the notes were not guaranteed and only payable to the extent to which there is available cash.

We did not remove AusNet Services' hybrid securities from measures of AusNet Services debt. We noted that adjusting for these hybrid securities is unlikely to have a material impact on the overall gearing estimates.

4.4.2 Independent panel review

The Panel regarded the reasoning in the draft decision on hybrids as clear and sound and that such clarity is an important consideration for replicability. The Panel recommended that we should:¹⁶⁹

¹⁶⁷ AusNet Services, AusNet Services Successfully Prices SGD200M Hybrid Offer, ASX and SGX-ST release, 1 March 2016, p.1; AusNet Services, AusNet Services successfully prices USD 375M hybrid offer, ASX and SGX-ST release, 10 March 2016, p.1

¹⁶⁸ ACG, *Review of gearing issues raised in AER Issues Paper*, 21 September 2008, p. 32.; Spark Infrastructure, *Prospectus and product disclosure statement*, 18 November 2005, pp. 4, 31, 86, 140.

¹⁶⁹ Independent Panel, Review of the AER's rate of return guideline, Sep 2018, p.21

address whether consistency is necessary in the treatment of hybrid and subsidiary debt for gearing, as compared to their treatment for estimating beta.

4.4.3 Stakeholder submissions

Stakeholders did not raise any concerns about the treatment of hybrid securities and loan notes.

4.4.4 AER consideration

We agree with Independent Panel that it is important to consider consistency in the treatment of hybrid securities in both our estimation of a benchmark gearing ratio and equity beta. We confirm that our final decision reflects consistency in the treatment of hybrid securities in the estimation of a benchmark gearing ratio and equity beta. The gearing estimates used in our benchmark gearing ratio analysis and equity beta analysis are identical.¹⁷⁰

4.4.5 Conclusion

Our treatment of hybrid securities has been consistent in both our gearing and equity beta estimation.

¹⁷⁰ The beta analysis covers a longer time series and larger sample of comparator firms than our benchmark gearing ratio analysis. The gearing estimates are identical for firms and time periods that are in both sets of analysis.

5 Overall return on equity

This chapter explains our decision under each step for estimating the final equity risk premium (ERP). The ERP is applied with the risk free rate to determine the expected return on equity.¹⁷¹

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 SLCAPM, this equals the MRP multiplied by the equity beta. Hence, we have compared equity risk premium estimates where appropriate.¹⁷²

Our final decision is to calculate the return on equity using the Sharpe-Lintner CAPM with a market risk premium of 6.1 per cent and an equity beta of 0.6 resulting in an ERP of 3.66 per cent. We combine this ERP with a risk free rate observed at the time the Rate of Return Instrument (the Instrument) is applied. We consider this approach will, or is most likely to, contribute to the achievement of our legislative objectives.

We consider our six step process:

- 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 the inherent uncertainties in the data.

When capital is priced via a competitive market, the opportunity to beat the benchmark creates incentives to seek efficiencies. Similarly, a benchmark return on equity for regulated businesses, reflecting a market rate of return for the risk of providing Australian regulated network services, furthers the revenue and pricing principles and is in the long-term interests of energy users.

In this chapter:

- First, we outline our foundation model approach. We use this framework to consider systematically all relevant estimation methods, financial models, market data and other evidence.

¹⁷¹ The equity risk premium is the product of the MRP and equity beta.

¹⁷² For example see: AER, Final decision SA Power Networks determination 2015–16 to 2019–20 Attachment 3–Rate of return, October 2015, p. 40.

- Then, we apply each step of the foundation model approach.

We discuss any changes from our draft decision, the conclusions of the Independent Panel and the submissions we received before setting out our considerations and reasons for this final decision. Our 'AER consideration' sections, respond to all of the points that have been raised in submissions and where relevant, identify other sections of this final decision that consider material relevant to the return on equity.

5.1 Foundation model approach

5.1.1 Final decision

Our final decision is to maintain our current approach to estimate the expected return on equity by using the foundation model approach which is a six step process. This approach was developed in our 2013 Guidelines after extensive stakeholder consultation. We implemented this approach in all our regulatory determinations since 2013. It has also been subject review by the Australian Competition Tribunal which found no fault with it.¹⁷³

Most experts at the concurrent evidence sessions agreed we should maintain the foundation model approach and focus on its application in light of the evidence that has evolved.¹⁷⁴

The foundation model approach provides a framework for systematically considering relevant information and then exercising our judgement on the appropriate choice of the regulated return on equity. The approach recognises our task requires us to exercise judgement because we are estimating a forward looking return on equity that will satisfy the national electricity and gas objectives. Further, the information available to inform our decision is imprecise, incomplete and, to some extent, conflicting.

This foundation model approach consists of a six step process as set out below:

Step 1 – Identify relevant material

Step 2 – Determine role/ how best to employ relevant material including determining the foundation model (SLCAPM)

Step 3 – Implement foundation model. Determine SLCAPM input parameter ranges and point estimates.

Step 4 – Other information. Estimate other information used to inform overall return on equity

Step 5 – Evaluate information from steps 3 and 4.

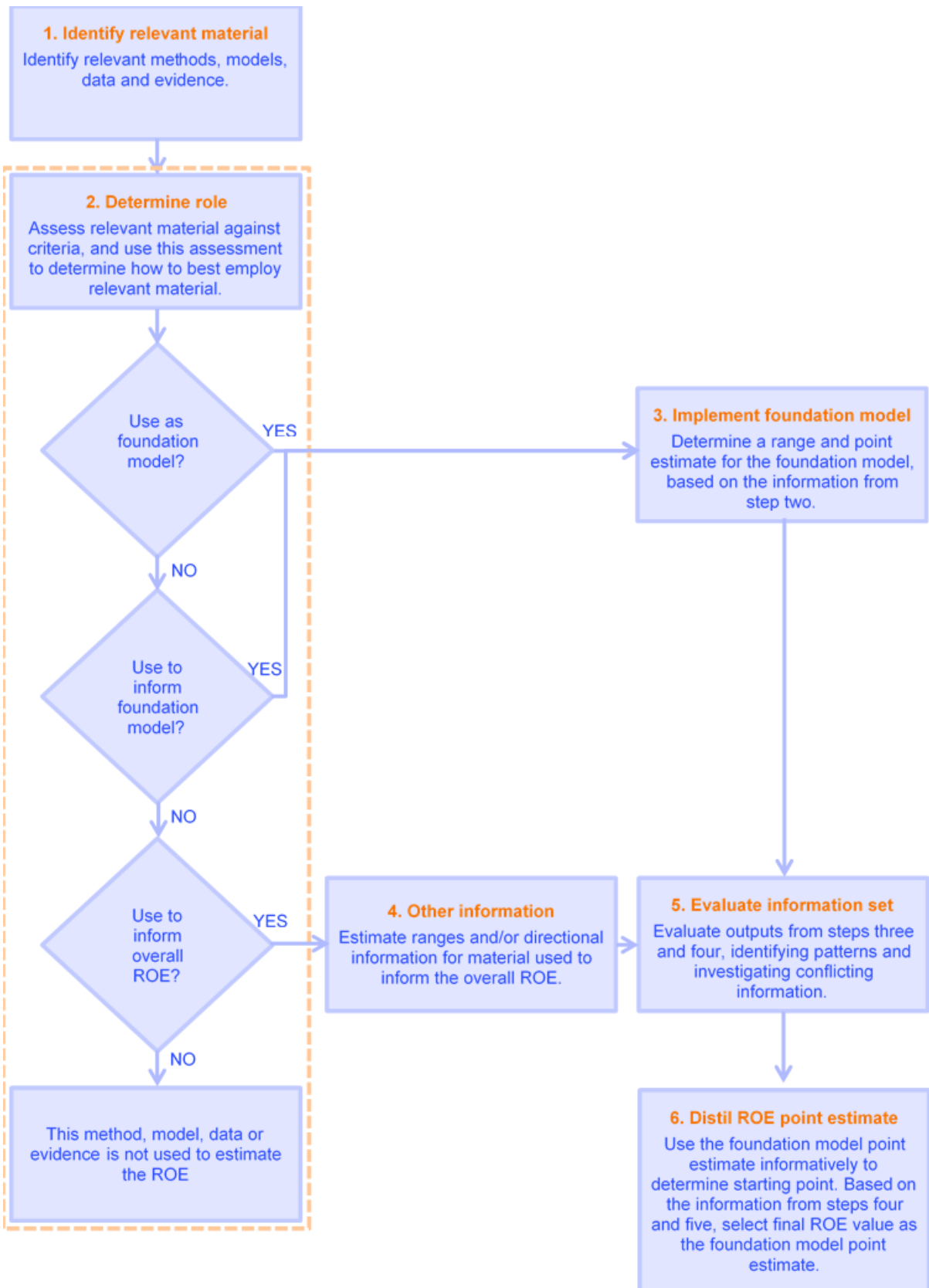
¹⁷³ AER, *Draft rate of return guidelines, Explanatory Statement*, July 2018, chapter 5.

¹⁷⁴ Cambridge Economic Policy Associates, *Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions*, 21 April 2018, section 2.1.3, p.19.

Step 6 – Distil return on equity point estimate. Use SLCAPM point estimate as starting point and select final return on equity value having regard to information from steps 4 and 5.

Figure 2 presents the six steps graphically:

Figure 2 Foundation model approach flowchart



5.1.2 Draft decision

Our draft decision applied the foundation model approach comprising of six steps.

We have assessed submissions and new evidence since our draft decision at each of the six steps and any changes at the level of a step is discussed under that step.

5.1.3 Independent panel review

On the overall return equity approach, the Independent Panel recommended that:

- We explain more clearly why the AER should place any reliance on the Wright approach to determining an equity risk premium
- We should include a discussion of the Black Model and low beta bias and should consider whether any adjustment to the return on equity are justified based on that model and bias.¹⁷⁵

5.1.4 Stakeholder submissions

Submissions largely supported the foundation model approach. However we received diverse views on whether our draft decision had applied our foundation model approach.

Networks and network shareholders submitted that:^{176 177 178}

- The AER should make use of models other than the SLCAPM when applying step 3 of the Foundation Model Approach. In the 2013 Guidelines, the AER made greater use of a dividend growth model and Black CAPM when determining the return on equity, particularly in deciding how to use different classes of evidence (in step 2) and then the application of the foundation model in step 3. The approach taken in the 2013 Guidelines should be maintained in the 2018 rate of return instrument.
- The draft Decisions effectively abandoned the foundation model approach because the Black CAPM and the DGM no longer has an impact on equity beta and MRP estimates. These models had a material impact in the 2013 Guidelines, but under the 2018 draft we have mechanically applied the SLCAPM which is inconsistent with the AEMC's 2012 rule change determination that required the AER to have regard to all relevant models.

¹⁷⁵ Independent Panel Report, Review of the Australian Energy Regulator's Rate of Return Guidelines, September 2018, p. 24.

¹⁷⁶ Energy Network Australia, *Response to the draft guideline*, 25 September 2018, chapter 6, pp.60-68; Letter to AER chair, Paula Conboy, 17 August 2018, p. 2.

¹⁷⁷ Network Shareholder Group, *Response to the AER's draft RORG*, 25 September 2018, p.12; Email to AER chair, Paula Conboy, 15 August 2018.

¹⁷⁸ The Joint Businesses (SAPN, AGIG, Citipower, United Energy and Powercor), *Draft rate of return guideline*, 25 September, p. 6.

- In the context of what these stakeholders had taken to be an incremental review, the AER's application of its foundation model appears to have departed considerably from its 2013 application.
- The AER's change in the weight it attaches to models other than the SL CAPM in the foundation model approach is inconsistent with regulatory stability and predictability – particularly where these stakeholders consider there is no new evidence to support changing the current approach
- The key objective is to provide an allowed rate of return that contributes to the NEO and NGO to the greatest degree. In an incremental review, the appropriate approach to updating return on equity parameters is to start with the estimates adopted in the 2013 Guidelines.

The CRG submitted that:¹⁷⁹

- It was very concerned with an assumption that "new evidence" should be limited to just that used to derive the parameters used in setting the rate of return. Rather, "new evidence" must be interpreted more widely and include assessments of outcomes seen in the market and consumer appetite for reliability risks.
- Whilst the key parameter values for beta, MRP and gamma are a step in the right direction towards current over generous returns, the AER should have gone further but the CRG acknowledged the need to balance consumer outcomes with investor confidence.

The CCP 16 submitted that:¹⁸⁰

- The AER has followed the foundation model approach and CCP16 is not persuaded that a change in the relative reliance of different material is a 'fundamental change' to the foundation model approach.
- The AER continues to consider the DGM and Black CAPM/low beta bias in its analysis but has drawn the conclusion that the problems with determining reliable and robust estimates from this data are significant.
- The AER's foundation model approach has been affirmed by the Australian Competition Tribunal and is uncontroversial (*PIAC-AusGrid [2016] ACompT*).
- Following the steps in the foundation model approach does not mean the AER is obliged to adopt the conclusions from the 2013 Guidelines at each step. An incremental review builds on the core elements of the 2013 Guidelines but should not be bound by all the conclusions in past guidelines.
- Out of some 22 individual pieces of information when applying the foundation model approach, the AER made variations only to how 3 sources of evidence

¹⁷⁹ Consumer Reference Group, *Submission to the AER – Response to the rate of return draft decision*, September 2018, p. iv.

¹⁸⁰ Consumer Challenge Panel 16, *Submission to the AER on its draft rate of return Guidelines*, September 2018, p. 10, 23, 24, 55

should be used. Moreover, these variations relate to the AER's developing views on the relative merits of these models and increased concerns about their reliability and robustness for the purposes of ex ante regulatory determinations. These limited changes do not comprise a fundamental change to the AER's established foundation model approach.¹⁸¹

The ECA submitted that material referred to by the AER for its diminished confidence in the DGM and Black CAPM is new information and placing reliance on that material is consistent with the intent of a review, including an incremental review. ECA also submitted that central to the incremental approach is the continued use of the foundation model.¹⁸²

The Australian Energy Council submitted that¹⁸³:

- The AER should put greater weight on making their best estimate of the overall cost of capital than on similarity with previous decisions, whilst recognising the value of predictability/stability.
- The current review process has been extensive and multifaceted.
- The AER must ultimately make a series of judgements. As the decision maker it must use its own judgement, no individual stakeholder or expert point of view should be considered determinative.

5.1.5 AER consideration

An important issue that has arisen in submissions to our draft decision is whether we have effectively abandoned the foundation model approach we developed in our 2013 guidelines. In particular, some submissions suggested our proposed treatment of the DGM and theory of the Black CAPM was not consistent with the proper application of our foundation model approach. In this section, we respond to those submissions. We outline our view that the approach we have employed is consistent with the foundation model approach, but more importantly is consistent with our regulatory objectives.

In our 2013 review, we gave weight to the DGM and the theory of the Black CAPM when implementing steps 2 to 4 of our foundation model approach. These were used to inform us of the appropriate point estimate for the MRP and equity beta, respectively. In this 2018 review, we have had regard to these two models in the application of our foundation model approach but our confidence in their informative power to determine the appropriate MRP and equity beta point estimate has diminished.

¹⁸¹ Consumer Challenge Panel 16, *Submission to the AER on its draft rate of return Guidelines*, September 2018, pp.21-25 and pp.55-58.

¹⁸² Energy Consumers Australia, *Response to the AER draft rate of return guideline*, 25 September 2018, cover letter pp.1-2.

¹⁸³ Australian Energy Council, *Submission on draft rate of return determination*, 25 September 2018, pp.3-4.

Our foundation model approach does not consist of three specific models. In 2013, we placed particular reliance upon the SL CAPM when considering a reasonable range and possible point estimate for the MRP and beta. We placed less reliance upon both DGM and the theory of the Black CAPM to help inform us about the appropriate point estimate within a possible range. The approach we adopted in 2013 was not a 'multi model' approach. Input parameter point estimates for the SLCAPM were determined after having regard to all relevant material including the theory of the Black CAPM and DGM estimates. The return on equity derived from the SLCAPM was also used informatively, not deterministically. That is, our six step approach provides opportunity for us to consider other relevant information, and exercise our judgement in setting the return on equity through a systematic review of the evidence.¹⁸⁴

For the 2018 Instrument, we maintain that overall approach by continuing to have regard to relevant estimation methods, financial models, market data and other evidence.¹⁸⁵ However, we have placed less reliance upon DGM and the Black CAPM than the 2013 Guidelines because of information and analysis since 2013 and those received in this process.

In relation to the scope of this review, in our draft decision we stated that our 2013 Guidelines is the starting reference point of our analysis. We further stated that our objective is to develop a guideline that we are satisfied will, or is likely to contribute to the achievement of the NEO and NGO.¹⁸⁶ In response, we have not received submission that indicated disagreement with our stated objective. Rather, some stakeholders appear to disagree with our exercise of judgement when applying the foundation model approach.

Stakeholders have differing views on whether we should change our level of confidence on the informative value of the DGM and Black CAPM. In response, in chapter 9– MRP and 8– Low beta bias/Black CAPM, we have further clarified and explained the evidence that led us to have diminished confidence in these models. These considerations include new material on the strengths and weaknesses that we did not have before us at the time we developed the 2013 Guidelines. We are satisfied that our diminished confidence in these models' informative value is based on robust evidence, transparently explained and further clarified in this final decision. Moreover, we disagree that our decision will undermine regulatory stability and predictability. We have applied the foundation model approach to estimating the return on equity and used the relevant evidence to inform parameter estimates consistent with their strengths, weaknesses and suitability for our regulatory task.

We note that the Independent Panel stated that low beta bias or the Black CAPM are not relevant to estimating beta and should not be used as an arbitrary add-on to the

¹⁸⁴ AER, *Explanatory statement, Rate of Return Guideline, 2013*, section 5.

¹⁸⁵ NER, cls. 6.5.2(e)(1) and 6A.6.2(e)(1); NGR, r. 87(5).

¹⁸⁶ AER, *Draft Rate of return, Explanatory statement*, July 2018, pp.30-31.

beta. The Independent Panel also noted that the AER's reduced confidence in the DGM is clearly explained.¹⁸⁷

In achieving our legislative objectives in this review, it is important that we consider new information which may lead to changes in our approach. It is contrary to the intent of the legislative requirement for the review to not accept the possibility of some movement away from previous approaches. A central principle of our framework is that there be a degree of flexibility in adapting the approach in light of new evidence. This has always been accepted by stakeholders as the basis for the requirement that the instrument is renewed periodically.

Whilst we maintain the framework developed in 2013 and tested through determinations and appeals is appropriate, we must also consider the most up to date data and information in this review. To do otherwise, would be inconsistent with Rules requirement for a review to develop the rate of return instrument and that the instrument be periodically reviewed.¹⁸⁸

Our October 2017 Issues Paper indicated from the outset that we were reconsidering the weights to give to different pieces of evidence with particular reference to the Black CAPM and the DGM.¹⁸⁹ We have considered the more up to date evidence and the increased understanding of the material in the context of its use in an ex ante regulatory setting. The CCP 16 supports the approach we have taken.

Considering the theme of the ECA and CRG submissions, it is clear that consumers consider our draft overall return on equity point estimate is an incremental step towards reducing the rate of return and on that basis is capable of acceptance. On the other hand, the theme from the networks and network shareholders submissions is that, if this was an effective incremental review then we had no reason or evidence to move from our 2013 return on equity estimate and SLCAPM input parameter estimates.

Ultimately, we must exercise our regulatory judgement about the weight that should be attached to different models, data, methods and other evidence that may be available to us when making our decision. In doing so, we are committed to consistently evaluating the current material available to use in keeping with developments in our understanding of the material, and developing more up to date evidence so that we make robust decisions on the best available evidentiary material.

We disagree with ENA's characterisation of our approach as a 'package of models' that requires particular pieces of evidence to be given weight in setting the return on equity. Our approach in 2013 and now is to assess all information and employ it according to its merits. The foundation model approach is a framework that provides for the

¹⁸⁷ Independent Panel Report, Review of the Australian Energy Regulator's Rate of Return Guidelines, September 2018p. 35 & 39.

¹⁸⁸ For example, see: NER, CI 6.5.2.p.

¹⁸⁹ AER, Draft *Rate of return Guidelines*, Explanatory statement, July 2018, p.30.

systematic consideration of all relevant material. It does not require information to be used if it does not satisfy our assessment criteria.¹⁹⁰

This approach has been endorsed by the Australian Competition Tribunal.¹⁹¹ Similarly, the Independent Panel also recognised that the regulation of economic performance is not a science and the importance of a credible exercise of judgement, based on principle and clearly explained.¹⁹²

In response to the Independent Panel recommendations, we have considered the Black CAPM and low beta bias separate from equity beta (see chapter 8). We have also reviewed our reliance on the Wright approach which is discussed under steps 1 and 2 below

5.2 Identify relevant material and determine role (steps 1 and 2)

Under steps 1 and 2 of our foundation model approach we identify relevant material and the roles assigned to each piece of material.

5.2.1 Final decision

We consider the list of material we employed in 2013 remains appropriate. We have not identified any additional classes of material that we did not consider when preparing our 2013 Guidelines.

Based on new evidence about the material and current data, we are persuaded that we should adjust the relative merit of some pieces of material in exercising our judgement to determine a return on equity that will contribute to achieving our legislative objectives. In this final decision the Black CAPM does not inform our equity beta estimate and we do not place any reliance on the Wright approach to inform the overall return on equity. Table 6 sets out all of the relevant material and the role we have applied to it, if any, within our overall framework.

Table 6 Relevant material and role

Material (step one)	Role in 2013 (step two)	Role in 2018 and relative merit
Sharpe–Lintner CAPM	Foundation model	No change
Black CAPM	Theory of the model to inform selection of	Related to the overall return on equity.

¹⁹⁰ The 2013 Guidelines adopted a set of criteria to assist assessment of the relevant information. We adopt them in this explanatory statement/Instrument for assessing information in terms of their strengths, weaknesses and suitability for our regulatory task. See: AER, Better regulation explanatory statement rate of return guideline, December 2013, p. 24.

¹⁹¹ Australian Competition Tribunal, Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, 26 February 2016, 180–222.

¹⁹² Independent Panel Report, Review of the Australian Energy Regulator’s Rate of Return Guidelines, September 2018, p. 62.

	point estimate of foundation model parameter estimates (equity beta)	However, at this time, we have diminished confidence in the robustness of the Black CAPM and are therefore not persuaded to adjust the Sharp-Lintner CAPM estimate for the theory of the Black CAPM.
Dividend growth models	Inform foundation model parameter estimates (MRP) to select an MRP towards the upper end of the range from historical excess returns	Can inform the MRP. However, at this time we have diminished confidence in the robustness of DGMs and are therefore not persuaded to select an MRP towards the top of the observed empirical estimates of historical excess returns.
Fama–French three factor model	No role	No change
Commonwealth government securities	Inform foundation model parameter estimates (risk free rate)	No change
Observed equity beta estimates	Inform foundation model parameter estimates (equity beta)	No change
Historical excess returns	Inform foundation model parameter estimates (MRP)	No change
Survey evidence of the MRP	Inform foundation model parameter estimates (MRP)	No change
Implied volatility	Inform foundation model parameter estimates (MRP)	No change
Other regulators' MRP estimates	Inform foundation model parameter estimates (MRP)	No change
Debt spreads	Inform foundation model parameter estimates (MRP)	No change
Dividend yields	Inform foundation model parameter estimates (MRP)	No change
Wright approach	Inform the overall return on equity	We have diminished confidence in the robustness of the Wright approach leading us to place no reliance on it.
Takeover/valuation reports	Inform the overall return on equity	No change
Brokers' return on equity estimates	Inform the overall return on equity	No change
Other regulators' return on equity estimates	Inform the overall return on equity	No change
Comparison with return on debt	Inform the overall return on equity	No change
Trading multiples	No role	No change
Asset sales	No role	No change
Brokers' WACC estimates	No role	No change
Other regulators' WACC estimates	No role	No change
Finance metrics	No role	No change

5.2.2 Draft decision

Our draft decision on the relevant material we identified and the relative merit of the DGM, Black CAPM and the Wright approach is largely the same as our final decision.

5.2.3 Independent Panel

The Independent Panel did not directly comment on the identified relevant material. It however, made comments on the merits of the Black CAPM and sought clarification on the reason we had regard to the Wright approach.¹⁹³ We discuss the Black CAPM in section 8 and the Wright CAPM in section 9.2.4.

5.2.4 Stakeholder submissions

We have received stakeholder submissions that propose changes to the role of some of the material. We have considered this material under separate sections of this decision as noted below. Submissions relating to the evidence that persuaded us to place relatively low weight on the DGM is set out in the MRP chapter and submissions on the Black CAPM are discussed in the low beta bias and Black CAPM chapter.

In relation to the Wright approach, the ENA stated that the Wright approach produces an alternative estimate of the MRP which is materially above the proposed allowance.

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5.2.5 AER considerations

Our detailed considerations on the merits of different types of material used to inform our decision on the return on equity are set out in other sections of this decisions. In particular:

- low beta bias and the Black CAPM is considered in section 8
- the DGM is considered in section 9.4
- RAB multiples and profitability are considered in section 12.1
- Investment trends is considered in section 12.2
- Financiability assessment is considered in section 12.3
- International regulators return on equity is considered under step 5 below

5.2.5.1 Wright approach

¹⁹³ Independent Panel Report, Review of the Australian Energy Regulator's Rate of Return Guidelines, September 2018, pp. 24 and 39.

¹⁹⁴ Energy Networks Australia, Response to Draft Guideline, September 2018, p. 69.

Having reviewed the Wright approach in this process, we do not place any reliance on it as the model has no theoretical basis in Australia and is not an appropriate tool for regulatory use, nor is it used by market practitioners.

The Wright approach is in effect, a model that assumes a stable total market return and perfect negative correlation between the risk free rate and the MRP. The Independent Panel stated that the Wright model assumes that the return on equity does not move at all when the risk free rate changes.¹⁹⁵

In our draft decision, we considered information from the Wright approach. We also noted that we had diminished confidence in the robustness of the Wright approach. Our diminished confidence was largely driven by evidence we received since 2013 that the model has no theoretical basis in Australia and is not an appropriate tool for regulatory use, nor is it used by market practitioners.¹⁹⁶ However, as identified by the Independent Panel, although we accepted in 2013 that the Wright model assumes that the return on equity does not move at all when the risk free rate moves, we continued to place some limited reliance on it. We agree with the Independent Panel that Wright model assumes that the return on equity does not move at all when the risk free rate changes.

In response to our draft decisions the ENA stated that the Wright approach produces an alternative estimate of the MRP which is materially above our estimate. Underpinning this is a heavy reliance on the assumption of a perfect, or at least a near perfect negative relationship between the MRP and the risk free rate. In our draft decisions we noted and assessed differing submissions from stakeholders and experts on whether the Wright approach is valid and should be used in our MRP estimation process. In section 9.2.4 of this final decision we have again considered new stakeholder submissions on this issue. We are of the view that there is neither strong theoretical reasons, nor strong empirical evidence, to support assumption of an ongoing and consistent inverse relationship between the risk free rate and the MRP. Consequently, having had regard to all the material before us, we have determined that the Wright approach should not play a role in our MRP estimation process.

The Wright approach is unlikely to reflect market risks or changes over the period between this instrument and the next due to the stable return on equity. Whilst there are times the MRP and risk free rate may show a negative correlation, this does not prove a causal relationship. For example during the GFC there was a decrease in interest rates, and an increase in the MRP. However, these were two separate events caused by different market forces. Firstly, the GFC led monetary authorities to expand

¹⁹⁵ Independent Panel Report, Review of the Australian Energy Regulator's Rate of Return Guidelines, September 2018, p.24.

¹⁹⁶ Rankin and Idil, A century of Stock-Bond Correlations, September 2014, Partington and Satchell, Cost of Equity issues 2016 Electricity and Gas Determinations, April 2016, pp30-31; Partington and Satchell, Report to the AER, May 2018, p.34-35, AER, Draft decision - Multinet Gas access arrangement 2018-22, Attachment 3 - Rate of return, p.220. Our analysis of independent valuation reports for the 2018 rate of return draft decision review also indicated no reports appeared to use the Wright CAPM.

credit and reduce interest rates in order to ease the crisis. Secondly, due to the substantially increased risk in the market investors demanded an increased MRP. The second effect was not causally related to the first, but were both effects of the GFC. We do not consider these separate impacts would apply in the current economic climate. Work by Abel expands upon the general theory of the equity risk premium and states that the risk free rate and the MRP are both jointly determined, rather than there being a necessary causal link between them.¹⁹⁷ Our review of broker reports and valuation reports do not indicate use of the Wright CAPM in practice.

5.3 Implement the foundation model (step 3)

Implementing the foundation model is a key step in our six step approach and has stood the test of time. In our 2013 Guidelines, after extensive evaluation of other available models including the DGM, Black CAPM and Fama-French, we decided to use the Sharpe-Lintner CAPM as the principal model for determining a range and point estimate for the return on equity, with some reliance on the DGM and Black CAPM when estimating particular input parameters. The use of the Sharpe-Lintner CAPM was further tested and was accepted as appropriate by stakeholders, used by network businesses in their proposals and applied in determinations by us and reviewed by the Australian Competition Tribunal.^{198 199}

5.3.1 Final decision

We continue to use the Sharpe-Lintner CAPM to determine an initial range and point estimate for the return on equity (as per step 3 of our foundation model approach). We consider the Sharpe-Lintner CAPM is the most appropriate model to reflect the systematic risk.²⁰⁰ We also refer to other evidence when determining Sharpe-Lintner CAPM parameters.

- There is widespread agreement for continued use of the Sharpe-Lintner CAPM as part of our foundational model approach.²⁰¹ The joint expert report noted there has been no compelling evidence to change our approach.²⁰²

¹⁹⁷ Partington & Satchell, Report to the AER, November 2018

¹⁹⁸ Since the Tribunal decision in 2016, disagreements amongst stakeholders on the allowed return on equity was largely driven by differences in opinion on how best to exercise judgment given the uncertainty/imprecision of the evidence, rather than the six step foundation model approach.

¹⁹⁹ The Australian Competition Tribunal reviewed our return on equity estimate based on our foundation model approach on appeal by stakeholders and found that there was no reviewable error. See, *PIAC – AusGrid*, [2016] *ACompT* 1.

²⁰⁰ Partington, G., Satchell, S., *Report to the AER: Allowed Rate of Return 2018 Guideline review*, May 2018

²⁰¹ For example, see Energy Networks Australia, AER Review of the Rate of Return Guideline – Response to Discussion Papers and Concurrent Evidence Sessions, p44, or, Australian Pipeline and Gas Association, Submission to issues Paper: AER Review of the rate of return guideline, 12 December 2017, p.2, Network Shareholder Group, Submission on the Rate of Return Guideline review, May 2018, p.8, Jemena, Submission on concurrent expert sessions and discussion papers, 4 May 2018, p.3, Public Interest Advocacy Centre, Submission on rate of return guideline review issues paper, 18 December 2017, p.2, Network Shareholder Group, Response to issues paper on the review of the Rate of Return Guidelines, December 2017, p.9,

- Financial market practitioners, academics and other regulators consistently use the Sharpe-Lintner CAPM for estimating the expected return on equity²⁰³. This model reflects the risk-return relationship in a clear and simple relationship. It has well-accepted and unbiased methods for estimating its parameters, and these parameters can be estimated with acceptable accuracy.²⁰⁴
- We use other relevant sources of information to cross-check the SLCAPM foundation model estimate. The triangulation of estimates from relevant market participants broadly supports our foundation model estimate of the return on equity (which is discussed further in relation to steps 4 and 5)
- Analysis by Graham and Harvey found that the market factor proposed by Sharpe was the dominant factor in asset pricing models.²⁰⁵

We consider the best estimates for the Sharpe-Lintner CAPM parameters are:

- a formula for calculating the risk free rate based on yields on 10-year Commonwealth Government Securities (CGS)
- a value of 0.6 for equity beta
- a value of 6.1 per cent for market risk premium.

The Independent Panel acknowledged our steps in setting the equity return and recognised the Sharpe-Lintner CAPM as the model connecting risk and return.²⁰⁶

Stakeholder submissions, Independent Panel recommendations and our reasons regarding the Sharpe-Lintner CAPM input parameter point estimates are discussed in detail in their respective chapters (risk free rate – section 6, MRP – section 9 and equity beta –section 7). Below we set out a high level summary of our final decision for each of the three input parameters.

5.3.1.1 Risk free rate

Our final decision

Our final decision is to set a risk free rate that is based on the 10 year Commonwealth Government Securities (CGS) yield and is determined using an averaging period between 20 and 60 days in length that must occur between 3 and 7 months before the regulatory control period starts. We have arrived at this decision considering multiple factors such as averaging period confidentiality, risk free rate volatility and market

²⁰² Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence Expert Joint Report, April 2018, p.23

²⁰³ See AER, *Explanatory statement to the rate of return guideline (appendices)*, 17 December 2013, pp. 12–13.

²⁰⁴ Partington, G., Satchell, S., *Report to the AER: Allowed Rate of Return 2018 Guideline review*, May 2018, p.12

²⁰⁵ Graham, J. and Harvey C. (2001) The Theory and Practice of Corporate Finance: Evidence from the Field, *Journal of Financial Economics* 60.

²⁰⁶ Independent Panel Report, Review of the Australian Energy Regulator’s Rate of Return Guidelines, September 2018, pp.23-24.

practice. We believe a risk free rate determined in this manner will, or is most likely to, contribute to the achievement of our legislative objectives.

The term of the risk free rate

We consider the appropriate term for the risk free rate should be 10 years because this will lead to an overall return on equity that will better contribute to the achievement of the NEO and NGO. Networks and investors supported this decision. However, the CRG raised concerns that a shorter term of five years was more appropriate. We reached our decision for the following reasons:

- The 10 year term is consistent with the theory of the SLCAPM, which is a single period equilibrium model, that estimates the returns an investor requires over a long-term investment horizon.
- The 10 year term is a sufficiently long investment term to serve as a proxy for the long-lived assets under regulation.
- The 10 year term is consistent with actual investor valuation practices and academic works as shown by findings in the KPMG market practitioner surveys, indicating that 85 per cent of practitioners use a 10 year risk free term.
- This is comparable with the investor valuation practices used to value other stocks within the market, with a similar degree of systematic risk
- It is consistent with our estimation of the market risk premium and equity beta

We consider a reasonable argument could be made in support of either a five year term or a 10 year term. However, we found support for using a 10 year term in actual investor valuation practices and academic works and consider the evidence for a five year term was less persuasive than that for a 10 year term.

Averaging Period Length

We have increased the flexibility of our averaging period length: regulated businesses may nominate a 20–60 day period, up from the flat 20 days allowed in our 2013 guidelines. Consumers and networks supported our decision, and the independent panel found the reasoning was sound. However, the CRG was concerned about regulated businesses using this flexibility to choose an averaging period length that upwardly biases the risk free rate.

Our decision is a departure from the 2013 approach but we consider it is justified by the benefit it provides in reducing exposure to CGS volatility. We note there is at times material disparity between the minimum 20 day and maximum 60 day averaging period rate. However, this disparity appears directionally symmetrical and we consider that it does not introduce significant upward or downward bias to the calculated risk free rate. We also consider that concerns regarding the ability for a regulated business to accurately and consistently predict an averaging period that upwardly biases the risk free rate, are not supported by evidence.

Nomination Window

Our final decision is to use a nomination window between 3 and 7 months prior to the commencement of the regulatory control period. The CCP was concerned our draft approach because it could overlap with the revised revenue proposals. Specifically, it was concerned wording in the draft guideline that may suggest a regulated business can resubmit an averaging period after it has commenced.

We consider the requirement for averaging periods to be in the future and to be nominated in the regulated businesses' initial regulatory proposal to the AER, should address these concerns. The 4 month nomination window covers around 80 business days, which should provide additional flexibility and confidentiality for longer averaging periods up to 60 business days.

5.3.1.2 MRP

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 or the 'average firm' in the market. Systematic risk is risk that 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.

Final decision

Our final decision is to set an MRP of 6.1 per cent per annum over the yield to maturity on Australian Commonwealth Government Bonds with a term to maturity of 10 years (10 year CGS). 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 methods of estimating a forward looking MRP. We consider an MRP of 6.1 per cent per annum will, or is most likely to, contribute to the achievement of our legislative objectives. The estimate MRP adopted in this instrument has increased from the draft decision due to an increase in the utilisation rate as explained in section 9.1.

Evidence on MRP

Historical excess returns

Historical excess returns (HER) estimate the realised return that stocks have earned in excess of the 10 year government bond rate. We consider arithmetic averages of historical excess returns are the most robust source of evidence for estimating the MRP.

We evaluate several criteria when assessing materials and their relevance/suitability for determining the rate of return. Estimates from historical excess returns best meet those criteria. That is, these estimates are:²⁰⁷

²⁰⁷ These criteria were also applied in the 2013 guideline: AER, Better Regulation Explanatory Statement Rate of Return Guideline, December 2013, pp. 23–26,

- Based on available market data and derived with sound, econometric techniques and empirical analysis.
- Fit for purpose as they are based on market data that most closely, albeit imperfectly, meets our definition of a service provider in the provision of regulated energy services.
- Implemented in accordance with good practice as they are derived from robust, transparent and replicable analysis. We note that consistent results are derived from different studies using different econometric techniques and sampling periods.
- Based on quantitative modelling in that they are derived using techniques with no arbitrary adjustment to the data.
- Based on market data that is credible, verifiable, comparable, timely and clearly sourced. They are widely used by financial practitioners and regulators in Australia. They are also widely respected as one of the best ways to estimate the MRP by market practitioners.²⁰⁸

We observe both arithmetic and geometric averages to inform our historical excess returns. This is because there are strengths and limitations to both estimates:

- The arithmetic average is a mathematically unbiased estimator of future returns if yearly returns are independently and identically distributed and future returns are expected to have the same distribution. However there is debate as to the independence of returns from year to year or the uniformity of the distribution over time, as shown by trends in the long term data and raised in recent advice.²⁰⁹ It is therefore not clear that using solely the arithmetic average of historic results will provide an unbiased estimation of future excess returns
- The geometric average is downwardly biased, but is most useful when considering returns over a longer period or highlighting periods of differing volatility. Academic results have shown that as the investment horizon increases, results from the geometric average become closer to the unbiased estimator than the arithmetic average.²¹⁰ Recent advice also highlights that with shorter sample periods we should be placing increasing weight on the geometric results in order to reach an unbiased estimate.²¹¹

We have calculated HER over multiple time periods including both 100 year and 30 year periods. However, we consider data from the most recent period is the most relevant to our estimation of a forward looking MRP as it is most representative of

²⁰⁸ Dimson, Marsh and Staunton, Credit Suisse Global Investment Returns Sourcebook 2012, February 2012, p.37.

²⁰⁹ Bianchi, Drew & Walk, *The Unpredictable Equity Risk Premium*, November 2015; Partington & Satchell, Report to the AER, November 2018, p. 29-31

²¹⁰ Blume ME, *Unbiased Estimators of Long-Run Expected Rates of Return*, Journal of the American Statistical Association, vol. 69, 1974, pp. 634–638; Jacquier E, Kane A, Marcus AJ, *Geometric or Arithmetic Mean: A Reconsideration*, Financial Analysts Journal, 59, pp.46- 53.

²¹¹ Partington & Satchell, Report to the AER, November 2018

recent market trends including the introduction of imputation credits and higher levels of integration with international markets.

Table 7 Historical excess returns (per cent)

Sampling period	Arithmetic average	Arithmetic return Standard Deviation	Arithmetic average (2013 guidelines)	Geometric average	Geometric average (2013 guidelines)
1883–2017	6.3	0.163	6.3	5.0	4.8
1937–2017	6.0	0.191	5.9	4.2	3.9
1958–2017	6.6	0.214	6.4	4.3	3.8
1980–2017	6.5	0.210	6.3	4.3	3.8
1988–2017	6.1	0.169	5.7	4.6	3.6

Source: Handley, An estimate of the historical equity risk premium for the period 1883 to 2011, April 2012, p. 6. AER update for 2012–2017 market data. The 2013 guideline values are taken from data up to December 2012.

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

Other Evidence

Survey evidence

Some academics and market practitioners commission surveys of other market participants to ascertain market parameters in common use. These can provide a range within which the forward looking expectation of MRP sits. We consider:

Survey evidence provides an expectation of a forward looking MRP from market participants.

Surveys can vary from one another in many ways including number and type of participants as well as questions asked, making them hard to compare too closely.

Survey evidence supports a broad MRP value between 4.0 and 7.6 per cent. However the most common value for mode, mean and median in surveys over recent years has been 6.0 per cent.

Conditioning variables

We refer to dividend yields, credit spreads and implied volatility as conditioning variables. We use these to provide directional information because their main strength is the ability to detect changing market conditions which may indicate expectations of risk premium movement. We consider:²¹²

²¹² We have updated conditioning variables to 30 September 2018.

- The implied volatility approach assumes that the MRP is the price of risk multiplied by the volume of risk (volatility).²¹³ Volatility can indicate the degree of risk in the market. Low volatility is more likely to signal lower risk in the market. Volatility has been below the long term average for most of the period since our 2013 Guidelines, and has been significantly below the average for the 5 years that led up to the 2013 Guidelines. These consistently lower volatility values indicate that there has been less risk in the market in recent past years.
- Credit spreads are the spreads between the risk free rate (the yield on Australian government securities) and the return on debt for different debt instruments. Credit risk spreads can indicate whether spreads are widening, stabilising or falling which can indicate changes in market conditions. Credit spreads for state government instruments have increased slightly in recent months, however they are still around the pre-GFC level and reflect low risk in the market. Both BBB and A rated corporate yields have seen a small increase since the start of 2018, however there has not been any significant divergence from the data available at the time of our draft decision.
- Dividend yields, here represented by the average dividend yield of the ASX 200, can change in times of high market risk as seen during the 2008 financial crisis. We compare current dividend yields with the average dividend yield through time.²¹⁴ Dividend yields are slightly lower but have not changed significantly since the 2013 guidelines decision and are currently sitting around their long term average.

DGM

We have reviewed the use of dividend growth models (DGM) in view of divergent submissions from stakeholders. New evidence and material considered in this review process and since our 2013 Guidelines has diminished our confidence on the value of the DGM based MRP estimates for the following reasons:

- Analyst forecasts are an essential component of the DGM. However, upward bias in analyst forecasts is well-acknowledged. This impacts the credibility and accuracy of such data.
- DGM based results can be dependent on the risk free rate at the time. This suggests an assumption of stable return on equity which we do not consider is well supported.
- There are numerous issues surrounding the estimation of dividend growth rates selection and there is a wide variety of potentially acceptable growth rates which could be used in the DGM.

²¹³ This was based on Merton, R.C., On estimating the expected return on the market: An explanatory investigation, Journal of Financial Economics, 1980, Vol 8, pp.323–361.

²¹⁴ For a similar approach, see SFG, Market risk premium: Report for APT Petroleum Pipelines Ltd, October 2011, p. 13.

- Previous advice indicates the DGM may produce upwardly biased results when the risk free rate is low due to the term structure of equity.²¹⁵ We consider this advice is still relevant in the current market conditions.
- When markets encounter poor returns firms are less likely to lower their dividend payout ratio than they are to increase them during good times.²¹⁶
- Whilst many growth rate estimates are based on the expected growth of GDP with various adjustments, it is not clear what the best adjustments are for the current period. It is not clear that the expected dividend per share (DPS) growth rate is equal to the expected GDP growth rate. These adjustments may be considered arbitrary if not supported by empirical evidence.
- Various constructions of the DGM arrive at different and occasionally diverging estimates of the MRP over time. We consider this raises concerns over which model provides the best estimate of MRP, and whether the model can be relied upon to produce consistent and unbiased estimates over time. Consistent results are not derived from different studies using different econometric techniques or assumptions as shown by the variation in results from different constructions.

International estimates of the MRP

We have considered the use of international historical risk premium estimates as recommended by the Independent Panel. However, the lack of comparability hinders their usefulness in deciding our point estimate. They do appear to suggest a lower Australian MRP selected from within the range of MRP values obtained from HER.

Domestic regulator estimates

We have regard to other domestic regulators' estimates and evidence considered. However we do not place any reliance on their final MRP point estimate in isolation. A full understanding of their regulatory objectives and frameworks is necessary to consider the context of the decision being made and the role of the MRP estimate in that process.

Relationship between the MRP and the risk free rate

We accept the conclusion of the expert evidence sessions that there may be a relationship between movements in the MRP and risk free rate. However, the nature of such a relationship and the potential causality is unclear. We received a number of submissions over the review process on this topic. Having considered these we conclude that there is no reasonable, robust method to reliably estimate or model the potential relationship at any given time. As such, we have accepted submissions and

²¹⁵ Lally, The Dividend Growth Model, 4 March 2013, pp.5-9.

²¹⁶ AER, APA VTS Final Decision – Rate of Return, November 2017, pp. 216-217,212; Partington, *AER concurrent evidence Session*, 05 April 2018, p81.

expert advice that we should not make an explicit adjustment for this potential relationship.

Range and point estimate

As set out above we consider a range of evidence in determining our MRP estimate. We give evidence from the HER the most weight in our estimation of the MRP. We consider data from HER shows:

- The range given by arithmetic averages for different sample periods is 6.0 per cent to 6.6 per cent. The most recent, 30 year, period produces an estimate of 6.1 per cent and is most likely to reflect current prevailing conditions.
- Geometric averages indicate a range of 4.2 to 5 per cent. We place more weight on arithmetic returns however these geometric averages indicate the forward looking MRP value is most likely to be towards the bottom of the range given by the arithmetic averages. The most recent, 30 year, period produces an estimate of 4.6 per cent.

We derive a point estimate of 6.1 per cent from HER evidence. The range of other evidence to which we give less weight to indicate that:

- The current volatility is lower than the historical average and has been for a sustained period of time. Expert advice suggested it is unlikely that the MRP is relatively high when the implied market volatility is low.²¹⁷ The low volatility supports an MRP below long run historical average.
- Survey evidence supports a broad range of MRPs, however the most common value for mode, median and mean from surveys over the past 3 years is 6 per cent.
- Low credit spreads and average dividend yields give us no reason to move our point estimate from the HER result of 6.1 per cent.
- Results from our construction of the DGM arrives at a range of MRP estimates from 6.52 to 8.02 per cent, which upon applying sensitivity analysis extends to 5.96 to 8.59 per cent which suggest an MRP higher than 6.1 per cent.

In this final decision, having considered the utility and informative value of the other evidence, we are not persuaded to adjust our HER estimate to which we give most weight in selecting our MRP point estimate of 6.1 per cent. Based on the reasons above we note that our confidence in the informative value of the DGM based MRP estimates have diminished. In our 2013 Guidelines, we used our HER estimate of 6.0 per cent as the starting point and moved our estimate up based on the direction of the other evidence, particularly the DGM evidence. In this final decision we are not satisfied that such an upward adjustment is justified on the basis of the information available to us.

²¹⁷ Partington and Satchell, Report to the AER: Discussion of submissions on the cost of equity, 29 May 2017, p.47.

5.3.1.3 Equity beta

The equity beta is a key parameter within the Sharpe–Lintner CAPM which we use to estimate the return on equity. It measures the ‘riskiness’ of a firm’s returns 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.²¹⁸

Final decision

Our final decision is an equity beta point estimate of 0.6 (selected from a range of 0.42 - 0.88). This is derived by first deciding on a suitable comparator set from which empirical beta estimates are derived. We then identify a range and point estimate that will, or is most likely to, contribute to the achievement of our legislative objectives. Both range and point estimate are cross-checked against our conceptual analysis and international estimates.

Comparator set

We consider the comparator set of firms to estimate the equity beta should be made up of Australian energy network firms with a similar degree of risk as a service provider in the provision of Australian energy regulated services. After considering the relevant evidence and submissions, we consider the current comparator set consisting of nine firms (see Table 12) is appropriate for the following reasons:

- The existing comparator firms reflect information from firms that are most comparable to an efficient service provider in the provision of Australian regulated energy services. This has agreement from Gray, Wheatley and Sadeh at the expert concurrent evidence session.²¹⁹
- We do not include international energy network estimates and other Australian infrastructure firms because they face different risks to an efficient service provider in the provision of Australian regulated energy services. We did not receive sufficient evidence to persuade us to include them in our comparator set or use them to inform a point estimate within our range.
 - Experts have acknowledged difficulties with using international firms to estimate equity beta.^{220 221 222} APA, the CCP16 and ENA also previously

²¹⁸ R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, McGraw–Hill: First Australian edition, 2000, pp. 186–188 (Brealey et al, *Principles of corporate finance*, 2000).

²¹⁹ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 23, 24, 28

²²⁰ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 28, 33, 35

²²¹ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 28

²²² Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 46.

acknowledged the limitations of using international data for informing the equity beta.^{223 224 225 226}

- The CCP16 and the NSG noted that other Australian infrastructure firms are poor comparators and of limited use for estimating equity beta. 227 228
- Partington and Satchell and the CCP16 considered that it is difficult to quantify and interpret the impact of these differences.^{229 230}
- De-listed firms carry useful and (historically) reliable information. They provide information on the systematic risk of firms that are most comparable to the firms we regulate. Experts also expressed the view that they should be included in the comparator set.²³¹
- Experts noted that systematic risk and equity beta (for firms in the provision of regulated energy networks services) are relatively stable and change slowly.²³² We consider this provides additional support for the relevance and inclusion of de-listed firms in the comparator set.
- A small set of comparators does not necessarily justify expanding the comparator set just for the sake of increasing the sample size. If the additional firms do not carry a similar degree of risk or cannot be appropriately adjusted to be comparable to a service provider in the provision of Australian regulated energy services then they can inappropriately bias estimates.

Empirical estimates of beta

We consider that empirical studies of equity beta estimates are a source of evidence that should be used as the primary determinant of equity beta. This is likely to contribute to a rate of return estimate that achieves the regulatory objectives. Our empirical estimates of equity beta are based on regressions that relate the returns on the nine comparator firms to the return on the market. We have updated these

²²³ APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, pp. 18–19.

²²⁴ APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, p. 19

²²⁵ Consumer challenger panel 16, Submission to the AER on its rate of return guideline review concurrent evidence sessions, 4 May 2018, p. 70

²²⁶ Energy Networks Australia, AER review of the rate of return guideline response to Discussion Papers and concurrent expert evidence sessions 4 May 2018, p. 62

²²⁷ Consumer challenger panel 16, Submission to the AER on its rate of return guideline review concurrent evidence sessions, 4 May 2018, p. 82

²²⁸ Consumer challenger panel 16, Submission to the AER on its rate of return guideline review concurrent evidence sessions, 4 May 2018, p. 81.

²²⁹ Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, 25 May 2018, p. 24

²³⁰ Consumer challenger panel 16, Submission to the AER on its rate of return guideline review concurrent evidence sessions, 4 May 2018, p. 81.

²³¹ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 47

²³² Cambridge Economic Policy Associates, Expert Joint Report, April 2018, p. 51.

empirical estimates to September 2018 and the longer period of data gives us more confidence in the data than in 2013.

We consider empirical estimates for this comparator set best meet the criteria we set out in the 2013 Guidelines for assessing materials and their relevance/suitability for determining the rate of return²³³ because they are:

- Based on available market data and derived with sound, econometric techniques.
- Fit for purpose as they are based on businesses that most closely, albeit imperfectly, meet our definition of an efficient service provider in the provision of Australian regulated energy services.
- Implemented in accordance with good practice as they are derived from robust, transparent and replicable regression analysis. We note that consistent results are derived from different studies using different econometric techniques and sampling periods.
- 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 consider the most useful empirical estimates:

- use the Ordinary Least Squares (OLS) estimator
- use weekly return intervals
- use the Brealey–Myers formula to de- and re-lever raw²³⁴ estimates to a benchmark gearing of 60 per cent, although we consider both raw and re-levered estimates
- are based on averages of individual firm estimates and fixed weight portfolios (equal weighting and value weighting)
- do not apply a Blume or Vasicek adjustment.²³⁵

We calculated empirical estimates over three different time periods: the longest available period, the longest available period excluding the GFC and tech boom (PTEG) and the recent five years. These estimates have been updated since our draft decision (up to September 2018). Table 8 sets out updated (Henry's study) re-levered OLS equity beta estimates for the individual comparator firms (averaged across firms) and fixed weight portfolios²³⁶ respectively.

²³³ AER, Better Regulation Explanatory Statement Rate of Return Guideline, December 2013, pp. 23–26, 83-84,

²³⁴ Raw equity beta estimates are those that are observed from the initial regression

²³⁵ Henry does not apply a Blume or Vasicek adjustment of any of his estimates, as specified in our terms of reference.

²³⁶ Equally weighted and value weighted portfolios

Table 8 Re-levered weekly equity beta estimates from AER update (OLS, weekly)

		P1	P2	P3	P4	P5	P6	P7	P8
Firms	Avg of firm estimates ²³⁷	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
Equal weighted									
Longest available period	0.57	0.48	0.50	0.54	0.53	0.43	0.47	0.52	0.42
Post tech boom & excl. GFC	0.61	0.52	0.51	0.59	0.59	0.50	0.54	0.64	0.52
Recent 5 years	0.72	0.63				0.54	0.68	0.81	0.70
Value weighted									
Longest available period	n/a	0.53	0.67	0.47	0.47	0.44	0.49	0.55	0.43
Post tech boom & excl. GFC)	n/a	0.57	0.67	0.55	0.55	0.52	0.58	0.67	0.53
Recent 5 years	n/a	0.56				0.49	0.73	0.88	0.72

Source: AER analysis; Bloomberg

Note: Our comparator firms include AusNet Services (AST). This firm was included in the 2013 Guidelines under its former name of SP Ausnet (SPN). It was renamed in 2014.

Source: AER analysis, Bloomberg; Portfolio estimates for a scenarios reflect beta estimates available over that scenario. Portfolio estimates can start and end on different dates.

²³⁷ Average of firm-level estimates is based on available beta estimates for firms over the particular scenario. Firm estimates can start and end on different dates.

Range and point estimate

Table 8 shows our estimates range from 0.42 to 0.88 based on results from the three time periods we have employed. These estimates are consistent with our conceptual analysis and international estimates which indicates that an equity beta for an (efficient) firm in the supply of Australian regulated energy network services would likely be below that of the market average firm (1.0).

This range is different to that in our draft decision because we updated the data up to September 2018 and the top of the range has moved due to the recent 5 years data for the still listed firms (P7).

In exercising our judgment to derive the point estimate we recognise the need to balance a number of aspects of the empirical data.

We consider the longest term data is most reflective of the equity beta value. This is because estimates from this period incorporate information about the riskiness of our comparator set across the most comprehensive range of market conditions. Use of the longest available period is consistent with the expert opinion that equity beta is relatively stable over long periods.²³⁸ Most experts agreed that long periods of data are likely to produce the most statistically reliable results. However, they also noted that consideration should be given to both long and short term data as these could provide indications of movements in beta since the last review which could lead to further investigations.²³⁹ Whilst we place most reliance on the data from the longest available period we recognise there is no precise/robust method to apportion weight, rather it is an exercise of judgement.

We consider that we should place less reliance on estimates from the recent five years. This period spans a more limited range of market conditions. In particular, interest rates have been low and falling during this period.

In considering the comparator set, we agree with the CRG submission that equity beta estimates are lower for firms that have a high proportion of their revenue from regulated activities. So, we consider relatively more weight should be placed on estimates from firms that are (majority) regulated (under our framework) such as Spark and AusNet. These firms would better match an efficient firm in the supply of Australian regulated energy network services. APA has around 90 per cent unregulated revenue and therefore its inclusion may be less representative of the risks involved in providing Australian regulated services. We note that some of the portfolios do not have recent 5 year data and those that do (P5 and P6) largely consists of APA, AST and SKI. Further, ENV and DUET have progressively dropped off over the last 5 years.

²³⁸ Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, section 2.10, p.17.

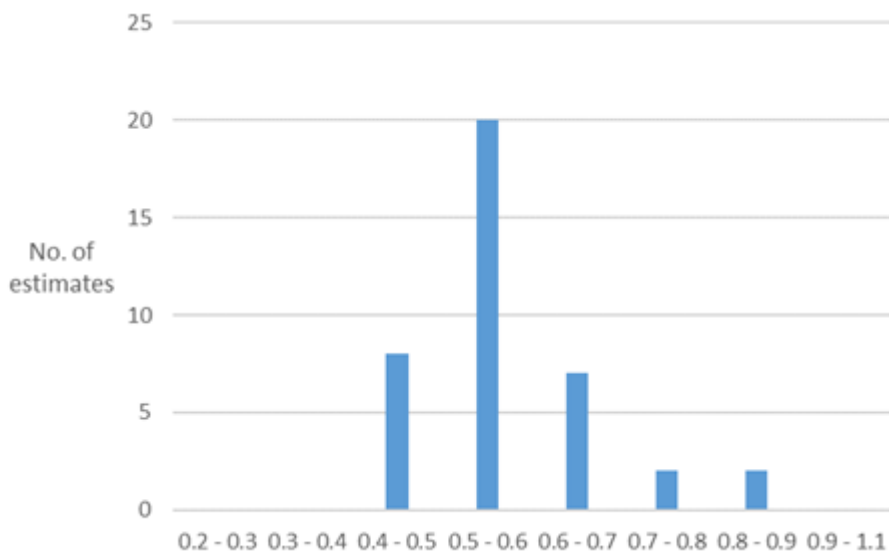
²³⁹ Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, p.17 and section 5.16, p.50.

Table 8 sets out the data from all comparator sets separated based on the three time periods we evaluated. Based on this data:

- the longest term estimates, to which we give most weight, indicates a range of 0.42–0.67
- recent 5 years estimates, to which we give some consideration, indicate a range of 0.49–0.88
- portfolio estimates for SKI and AST, which are still listed and have majority regulated revenues, range from 0.42²⁴⁰ (for the longest period) to 0.72²⁴¹ (for the recent five years). If we include APA (P7), which is still listed but with a low proportion of regulated revenues, then estimates range from 0.52²⁴² (for the longest period) to 0.88 (for the recent 5 years).²⁴³
- the averages of individual firm estimates for the longest period and recent 5 years produce estimates of 0.57 and 0.72 respectively.

We also analysed how the overall estimates are clustered. This is all the estimates under the different portfolios, firm averages and under all 3 scenarios (longest, 5 years and PTEG). As shown in Figure 3, most of the estimates cluster around 0.5–0.6.

Figure 3 Distribution of 2018 re-levered weekly beta by range (OLS)



Source: AER analysis; Bloomberg

²⁴⁰ Equal weighted portfolio

²⁴¹ Value weighted portfolio

²⁴² Equal weighted portfolio

²⁴³ Value weighted portfolio

We consider an equity beta of 0.6 is appropriate at this time based on the empirical evidence upon which we make our equity beta point estimate and stakeholders' and expert views about short term estimates:

- 0.6 sits within the range derived from the longest period and the recent five years.
- Estimates for all 3 scenarios cluster around 0.5–0.6.
- 0.6 is above the long run estimates for SKI and AST of 0.42, but below their estimates for the most recent five years of 0.72.
- 0.6 is consistent with our international estimates which indicates that the equity beta would likely be below 1.0 for an efficient firm in the supply of regulated energy network services

Overall, we consider using an equity beta of 0.6 is reflective of the data before us taking into account its strengths and weaknesses. A point estimate of 0.6 is also consistent with our conceptual analysis which indicates that the equity beta would likely be below 1.0 for an efficient firm in the supply of regulated energy network services.

Our draft decision concluded that in 2013, the Black CAPM was used for selecting an equity beta towards the upper end of our range. Our assessment of information since the 2013 Guidelines led to diminished confidence in the model. Hence, we were not persuaded to use it to select an equity beta point estimate in this way at this time.²⁴⁴

In this final decision, for the reasons stated in our draft decision and based on the further assessment of the submissions received in response to our draft decision, we do not consider the low beta bias and Black CAPM model are relevant to the estimation of equity beta. We also note that the Independent Panel stated that the Black CAPM and the 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.

We are confident that our equity beta estimate of 0.6 will or will most likely contribute to the achievement of legislative objectives.

We consider a single beta should apply for regulated gas and electricity firms.

Our conceptual analysis suggests that the equity beta for regulated gas and electricity firms is likely to be similar because of similar regulatory framework. Both face limited systematic risk by virtue of being regulated natural monopolies. Sadeh and Gray also stated differences between gas and electricity service providers may be reflected through operating expenditure and not the rate of return.^{245 246}

Applying HoustonKemp's classification to our firm-level equity beta estimates yields a range of 0.33–0.79 for mixed/electricity-dominant firms and 0.32–1.06 for gas firms. Although the estimates' wide-range and the (relatively) small number of comparators

²⁴⁴ AER, Draft rate of return guidelines explanatory statement, July 2018, pp. 281–284.

²⁴⁵ AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p. 63.

²⁴⁶ AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p. 58

does not provide robust information on a different beta for regulated gas firms, a point estimate of 0.6 falls into both ranges and the substantial overlap between the two suggests a value of 0.6 is not unreasonable.

5.4 Return on equity cross checks (steps 4 and 5)

We discuss steps 4 and 5 together because the submissions on our draft decision largely focused on step 5.

Under step 4, we set out the form of the other information that will inform our overall return on equity estimate.

Under step 5, we evaluate the outputs from step 3 and 4. We evaluate the strengths and weaknesses of the relative merits of the other information (selected at step 2 of our approach) in forming a view as to whether, overall, they persuade us to adjust our equity risk premium (from step 3). In undertaking this evaluation, we may have regard to matters including:

- patterns shown in other information
- the strengths and limitations of the other information
- the magnitude by which the other information suggests that the foundation model point estimate under or over estimates the expected return on equity (if at all).²⁴⁷

5.4.1 Final decision

Step 4 other information

Table 4 sets out the other information that inform our overall return on equity point estimate and the form of that information.

Table 9 Other relevant information

Additional 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

Step 5 evaluate outputs from step 3 and 4

²⁴⁷ AER, *Better Regulation, Rate of Return Guideline*, December 2013, p.16.

Table 10 sets out the outputs from step 3 and step 4 that we considered for this final decision. Having evaluated the strengths and weaknesses of the other information, on balance, we do not see a case for adjusting the ERP either via an adjustment to our Sharpe-Lintner CAPM input parameter estimates or an uplift to the Sharpe-Lintner CAPM output.

We have considered submissions that we should look at the outputs from step 4 in aggregate and we should adjust our Sharpe-Lintner CAPM/inputs and/or outputs where a large number of these are above or below the outputs from step 4.

We find that an ERP of 3.66 per cent is not inconsistent with the following:

- lowering of risks premiums (as evidenced by the lower DRP)²⁴⁸
- extended periods of low volatility (see section 9.5.4)
- trend (and range) in broker ERP estimates which suggest a lowering of the ERP (see section 5.4.5.1),

While we recognise that our ERP may be lower than other Australian regulators and takeover valuation reports, we are cognisant of their limitations (as discussed in section 5.4.5.3 and 5.4.5.4). For example, other Australian regulators set the return on equity for different industries and different methodological choices drive difference with our estimate.

We disagree with submissions that outputs from step 4 should be looked at in aggregate and where a larger number of these are above or below the step 3 output then we should adjust our Sharpe-Lintner CAPM inputs and/or output. Our approach to evaluating the other information recognises that each piece is independent of the other and we therefore give each piece appropriate merit based on their strengths and weaknesses. Not all of the cross checks provide the same informative value. We discuss the other information outputs and their strengths and weaknesses below. Submissions proposing that other information outputs should be considered in aggregate, in essence, would require us to exercise our judgment without considering the underlying differences and relative merits of the outputs in achieving our legislative objectives.

²⁴⁸ The draft decision calculation of the DRP was done on the cost of debt approach set out in our 2013 Decision [BVAL/FV/RBA (BBB)]. Post the draft decision we updated and published the DRP using both the 2013 Guideline approach and our 2018 Draft Decision approach [RBA/BVAL/TR (BBB and A)].

Table 10 Step 3 and 4 outputs

	Return on equity %		Equity risk premium%	
	Minimum	Maximum	Minimum	Maximum
AER Foundation Model*	4.75	8.46	2.1	5.81
Independent Valuation reports ²⁴⁹	8.44***	9.30	4.44	5.30***
Broker Reports - Unadjusted	6.4	8.4	3.0	5.0
Broker Report – Adjusted for Imputation	6.9	9.0	3.5	5.7
Other regulators decisions**	6.57	11.85	4.2	9.36
			Point estimate	
Final decision ERP				3.66
ERP margin over the DRP				1.85

Source: AER analysis; broker reports; other regulators' decisions; independent valuation reports; RBA; Bloomberg; Thomson Reuters

* Based on a risk free rate of 2.65 percent. Equity beta range 0.42–0.88 and MRP of 5.0-6.6 percent.

**Other regulatory decisions which were published from September 2017 to September 2018.

*** These figures have been corrected since the draft. Imputation adjustments have been removed from the minimum values for ROE and included in the maximum values for ERP.

5.4.2 Draft decision

Step 4 other information

Our draft decision on the other information that informs our overall return on equity is largely the same, except for the reasons discussed under step 2, we do not rely on the Wright approach to inform our overall return on equity.²⁵⁰

Step 5 evaluate outputs from step 3 and 4

Our draft decision updated the outputs from step 4 to reflect more recent data where applicable and concluded that an ERP of 3.6 per cent was appropriate.

5.4.3 Independent panel review

The Independent Panel acknowledged and noted information we considered that could support an adjustment (cross checks) to the Sharpe-Lintner CAPM and also

²⁴⁹ Based on the most recent valuation report which is a KPMG report for DUET released on 7 March 2017.

²⁵⁰ AER, Draft *Rate of return Guidelines, Explanatory statement*, July 2018, p.181.

recognised that we had not made any adjustment after evaluating the other information.²⁵¹

5.4.4 Stakeholder submissions

Stakeholder submissions related only to step 5.

Networks and network shareholders submitted that:

- The AER's ERP of 3.6 per cent fails 4 out of the 5 cross checks and in some cases is lower than the lower band of the range. The AER's ERP has failed the four long standing cross checks that have been applied and passed at the previous at the previous rate of return reviews. Therefore, the AER's conclusion to not adjust the ERP calculated by the Sharpe-Lintner CAPM is not reasonable.²⁵²
- The DRP cross check should not be used to justify the ERP. The relationship between the ERP and DRP is not stable, the two may move in opposite directions and are therefore irrelevant. The AER has previously argued against using this cross check.²⁵³
- As a theoretical matter, the ERP and DRP need not move together in lock-step (or necessarily together) so that the gap between the two need not remain constant.²⁵⁴
- Comparing a high point in the DRP cycle with a point that appears to be a low point and rising is incorrect. The average difference between the period 2013 to 2018 is materially higher than 170 basis points.²⁵⁵
- To enable a direct comparison of broker and independent valuation reports these should include the value of imputation credits. The AER's ERP is below the adjusted range.²⁵⁶
- The broker reports predate the most recent changes to the energy framework such as limited merits review and binding rate of return instrument. Since the release of

²⁵¹ Independent Panel Report, Review of the Australian Energy Regulator's Rate of Return Guidelines, September 2018, pp.23-24

²⁵² Australian Pipelines and Gas Association, *Submission to the AER, 2018 RORG draft guideline*, 25 September pp.27-32; Energy Networks Australia, Response to Draft Guideline, September 2018, p.68; Evoenergy, Review of rate of return guideline - draft decision, September 2018, p.4; Ausnet Services, Submission on the AER's Draft Rate of Return Guideline, September 2018, p.2; Joint Energy Businesses, Draft Rate of Return Guideline, September 2018 p.7.

²⁵³ Australian Pipelines and Gas Association, *Submission to the AER, 2018 RORG draft guideline*, 25 September pp.27-32; Energy Networks Australia, Response to Draft Guideline, September 2018, p.68; Evoenergy, Review of rate of return guideline - draft decision, September 2018,p.4; Ausnet Services, Submission on the AER's Draft Rate of Return Guideline, September 2018, p.2; Joint Energy Businesses, Draft Rate of Return Guideline, September 2018 p.7

²⁵⁴ HoustonKemp, *The relationship between the equity and debt risk premiums*, September 2018.

²⁵⁵ Australian Pipelines and Gas Association, *Submission to the AER, 2018 RORG draft guideline*, 25 September pp.27-32; Energy Networks Australia, Response to Draft Guideline, September 2018, pp.68, 72-75.

²⁵⁶ Australian Pipelines and Gas Association, *Submission to the AER, 2018 RORG draft guideline*, 25 September p.31; Energy Networks Australia, Response to Draft Guideline, September 2018, p.71.

the draft decision, broker reports have stated that the reduction to the ERP was beyond expectations.²⁵⁷

- Checks from other regulators should be given weight as there is no real reason based on risk differentials for their dismissal. The AER's ERP is low in comparison with other international regulatory allowances.²⁵⁸
- APGA recommends that the AER gives equal weight to all cross checks and if the ERP fails a majority of them, then the AER should make an appropriate adjustment. This is not suggesting an automatic adjustment, rather the AER should revisit its judgment calls on the market based evidence before it.²⁵⁹
- ENA submitted that the independent valuation reports considered in our draft were not adjusted for imputation credits.²⁶⁰

The CRG submitted²⁶¹:

- For a true comparison between the DRP and ERP the different taxation impacts for the two must be incorporated.
- CRG considers that the DRP should be based on a credit rating of broad A. The ERP should exceed the DRP only by 50bp above the 5 year average DRP based on a credit rating of broad A.
- Reflecting on Mr Ilan Sadeh's comments at the concurrent evidence sessions that return on equity can be considered to be a 'recurring bond', the ERP should be at a level that tracks the average DRP over time.
- The AER's 2013 approach of using a broad BBB rating overstates the DRP relative to present hybrid approach of using 2/3rd broad BBB and 1/3rd A ratings.
- An ERP setting of 3.6 per cent in 2013 would have delivered similar comparative ERP to DRP as those proposed by CRG in this review.
- The ERP, therefore should be no more than 2.5 percent and would be achieved by setting the MRP at 5.0 per cent and equity beta at 0.5 and would deliver an ERP consistent with observed values of the DRP over the past 5 years. This would also provide guidance for the value of MRP and equity beta.

The CCP 16 submitted:²⁶²

²⁵⁷ Network Shareholder Group, Response to the Australian Energy Regulator's draft Rate of Return Guideline, September 2018, p.9.

²⁵⁸ Energy Networks Australia, Response to Draft Guideline, September 2018,p.70.; Network Shareholder Group, Response to the Australian Energy Regulator's draft Rate of Return Guideline, September 2018, p.9., PP.6-7;John Earwaker, *The AER's draft WACC decision: and international perspective*, September 2018.

²⁵⁹ Australian Pipelines and Gas Association, *Submission to the AER, 2018 RORG draft guideline*, 25 September pp.32-33.

²⁶⁰ Energy Networks Australia, Response to Draft Guideline, September 2018, p. 71

²⁶¹ CRG, *Submission to the AER – Response to the rate of return draft decision*, September 2018, pp.27-29.

²⁶² CCP 16, *Submission to the AER on its draft rate of return Guidelines*, September 2018, pp.53-58.

- The equity market has taken the AER's draft decisions 'in their stride', and:
 - after an initial impact, there has been a subsequent recovery in share prices
 - there has been a relatively muted response in various broker reports
 - CKI's offer to purchase APA's eastern Australian Gas Networks at around 1.5 to 1.6 RAB multiple indicates that there is no significant change in market perceptions of the value of investing in network assets.
- The modest incremental changes made in the draft to the MRP and equity beta leads to an overall return on equity that provides a more reasonable balance between the long-term interest of consumers and the interests of investors and between the respective risks that consumers and investors face.
- It is important for the long term sustainability of the energy markets that a balanced outcome that takes into account the interests of and risks facing investors and consumers is achieved.
- The reduction in the return on equity in the draft is consistent with the trends in regulatory decisions in other comparable markets. Ofwat (UK) in its guidance for the current review indicates a much lower estimate for return on equity relative to its last price review.
- Ofgem has also foreshadowed a substantial reduction and has emphasised factors including the timing of the previous decision and improving market conditions at the current time. Ofgem noted that investors are now willing to accept lower equity returns from longer-term investments in regulated infrastructure and foreshadowed equity returns between 3 and 7 per cent in the next price control relative to the current return of 6 and 7 per cent.²⁶³

5.4.5 AER consideration

We consider that all of the issues raised by stakeholders appears to be related to step five of our approach. That is, our evaluation of outputs from steps 3 and 4 to inform our judgement about whether to apply adjustments in accordance with our 6 step model.

Network businesses and investors submitted that these cross-checks indicated that our range and point estimate determined at step 3 were unreasonably low. In contrast, some consumer submissions argued the opposite, that they were unreasonably high. In light of the submissions we re-examine the cross check information and provide more explanation on how we exercise our judgement about whether to make adjustments to our conclusions at step 3. We step through each of the cross checks in light of the submissions that our choice of ERP is unreasonable and therefore should be moderated.

5.4.5.1 Brokers return on equity estimates

²⁶³ CCP 16, *Submission to the AER on its draft rate of return Guidelines*, September 2018, p.46.

We analyse broker reports to derive a range for the expected return on equity.²⁶⁴ We use the range informatively since there may be a degree of circularity between our decisions and broker estimates. 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 in assumed required returns over time, as tracked by the firm's providing the reports. Given concerns about the comparability of the estimates at a point in time across broker reports, we view that examining trends over time may provide information on current returns relative to long term averages.

In our draft decision we set out ROE and ERP figures from a number of broker reports from March 2017 to May 2018. We showed that our draft ERP estimate of 3.6 per cent was between the range of broker estimates (3.5 to 5.3 per cent).²⁶⁵ Additionally, we noted that our ERP was below the average of broker estimates of ERP.

The NSG submitted that most of the broker reports used in our draft decision predated the recent changes in the energy framework. We have since updated the broker report data to the end of September 2018.

Table 11 below shows the broker ERP estimates included in our draft decision against the updated data. The figures indicate that the minimum value of estimates has decreased, while the maximum value is unchanged. We have extended our analysis and examined broker ERP estimates for 2017 against 2018 (until the end of September). Our findings are displayed in Table 11, Figure 4 and Figure 5. We see that our final ERP estimate of 3.66 per cent is within the range estimated from broker report.

Table 11 Updated broker reports data

		Revised draft ERP	Final ERP
Broker estimate—no imputation adjustment	Minimum	3.5%	3.0%
Broker estimate—no imputation adjustment	Maximum	5.3%	5.0%
Broker estimate—adjusted for imputation	Minimum	4.1%	3.5%
Broker estimate—adjusted for imputation	Maximum	6.1%	5.7%

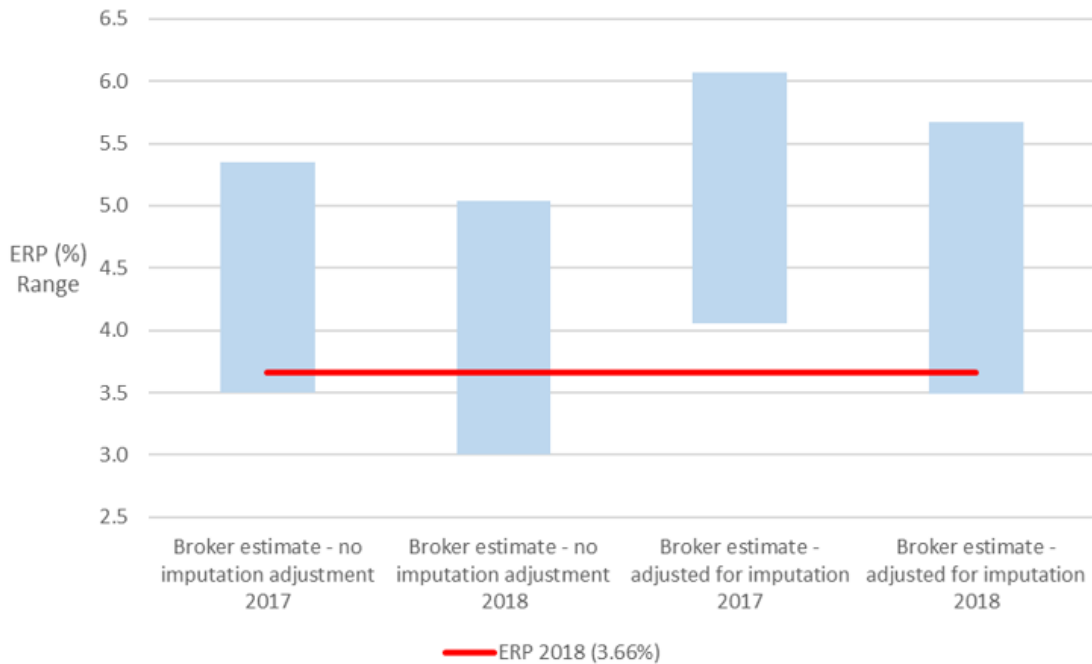
Source: AER analysis of broker reports, dated 30 March 2017 to 30 September 2018 that include a valuation for AusNet Services, Spark Infrastructure, APA Group, and/or DUET Group.

Note: Our revised draft ERP estimates (reports from March 30 2017 to May 2018) corrected for a computational issue in the draft decision. Our Final ERP analyses reports from September 2017 to September 2018.

²⁶⁴ AER, Rate of return Guideline 2013, Explanatory Statement, December 2013, p.30

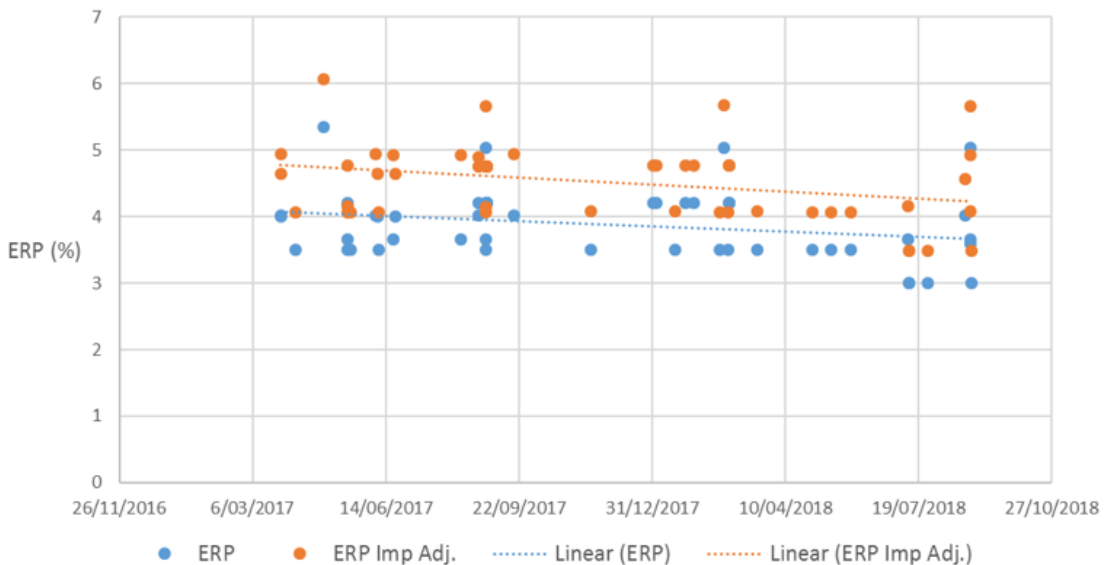
²⁶⁵ Based on broker estimates with no imputation adjustments from Table 4.

Figure 4 Broker ERP ranges for 2017 and 2018



Source: AER analysis of broker reports that include a valuation for AusNet Services, Spark Infrastructure, APA Group, and/or DUET Group.

Figure 5 Broker ERP estimates trend 2017 and 2018



Source: AER analysis of broker reports that include a valuation for AusNet Services, Spark Infrastructure, APA Group, and/or DUET Group.

Figure 4 and Figure 5 show that brokers' estimates of ERP have been trending downwards over the last two years. While our final ERP estimate is in the lower range of the 2017 broker estimates, it is more within the 2018 estimates for unadjusted

ERPs. The downward trend must be considered informatively as part of estimating a forward looking allowed return on equity estimate.

The APGA and ENA submitted that the best comparison to our imputation adjusted ERP would be with broker estimates that are adjusted for imputation.²⁶⁶ We do not agree because it is unclear the extent to which these estimates may be based on third party estimates that already account for the value of imputation credits. Further, there is insufficient information to support any precise adjustment for dividend imputation. The risk premium appropriately reflecting dividend imputation is likely somewhere between the adjusted and unadjusted premiums and we take into account both ranges.²⁶⁷ Submissions on our draft decisions have not provided any new material to persuade us that we should not take into account both adjusted and unadjusted risk premium data. We do not agree with some submissions that the evidence should lead us to conclude that this cross check fails because our ERP is below imputation adjusted broker ERP estimates.

We discuss NSG's submission that some brokers may have expected a smaller decrease and CCP16's view that equity markets have taken the draft decision 'in their stride', in section 13 on the risk-cost trade-off.

In conclusion, we consider that broker reports have some use and it is reasonable to give weight to more recent broker reports and the trend information. Whilst this material does not persuade us to adjust the Sharpe-Lintner CAPM calculated ERP estimate, it does show that our estimate is between the adjusted and unadjusted risk premiums.

5.4.5.2 Comparison of ERP and DRP

Since our draft decision we published and updated the ERP and DRP comparison chart applying the cost of debt calculation method proposed in the draft decision and also using updated RBA data.²⁶⁸

Having considered the submissions we consider that no material has been received that would lead us to change our draft decision on the ERP DRP comparison information or the manner in which we have regard to that information. We consider it reasonable to give weight to the DRP information consistent with our past practice.

We recognise that future DRPs could be higher or lower relative to the current value. Our updated data (up to end September 2018) for this final decision in Figure 6 show that the current margin is 185 bps. Our ERP estimate for the rate of return instrument is a reasonable margin above the DRP and as expected, not significantly higher. We

²⁶⁶ Australian Pipelines and Gas Association, *Submission to the AER, 2018 RORG draft guideline*, 25 September 2018, p.31; Energy Networks Australia, *Response to Draft Guideline*, September 2018, p.71

²⁶⁷ For more information, refer to AER, *Draft decision, TransGrid transmission determination 2018 to 2023*, Attachment 3 - Rate of Return, September 2017, p.93; AER, *Preliminary Decision AusNet Services Determination - Attachment 3 - Rate of Return*, October 2015, p. 526

²⁶⁸ Available at https://www.aer.gov.au/system/files/ERP%20vs%20DRP%20chart_0.pdf

acknowledge that adopting our 2018 approach to calculating the cost of debt has resulted in a narrowing of the margin compared to the cost of debt calculated applying our 2013 approach. However, this is not to say that as a theoretical principle the ERP and DRP must move together in lock step or that the gap between the two must remain constant, and at all times these must move together. In this regard HoustonKemp's conclusions are consistent with our understanding of the underlying theory.²⁶⁹

Figure 6 Comparison of ERP and DRP



Source: AER analysis; Bloomberg; Thomson Reuters; RBA

Note: AER allowed DRP 2013 is calculated the average of two 10 year yield curves ($\frac{1}{2} BVAL (BBB) + \frac{1}{2} RBA (BBB)$) minus the 10 year Commonwealth Government Security yield. AER allowed DRP 2018 is calculated as a weighted average of BBB and A curves ($\frac{2}{3} BBB (BVAL + RBA + TR) + \frac{1}{3} A (BVAL + RBA + TR)$) minus the 10 year Commonwealth Government Security yield.

In all of our determinations since the 2013 Guidelines we have had regard to the ERP margin over the DRP as a relative indicator.²⁷⁰ Our consistent position is that the DRP is a relative indicator. We expect that, most of the time, investors' expected return on equity will exceed the return on debt.

We also consider that for an efficient entity providing Australian regulated energy network services, the return on equity is not expected to be a long way above the return on debt.²⁷¹ Our 2018 draft decision continued this position and also noted that,

²⁶⁹ HoustonKemp, *The relationship between the equity and debt risk premiums*, September 2018.

²⁷⁰ AER, *Better Regulation, Rate of Return Guideline*, December 2013, Appendix B p.33.

²⁷¹ AER, Draft decision, TransGrid transmission determination 2018 to 2023, Attachment 3 - Rate of Return, September 2017, p.89, AER, AusNet Services distribution determination final decision 2016-20, Attachment 3 - Rate of Return, May 2016, p. 78

unlike the ERP, the DRP is easier to observe. We disagree that our approach is inconsistent with our characterisation of the informative value of the cost of debt in past determinations.

Some stakeholders submitted that we have evaluated and/or drawn conclusions from the DRP material in a manner inconsistent with our previous position/expert advice. Some also consider that we have added a new cross check. This could be driven by a misunderstanding that we used the DRP to justify the ERP to the exclusion of other material. Our approach considers the strengths and weaknesses of the available cross checks and make a judgment whether a further adjustment to the ERP result calculated using the Sharpe-Lintner CAPM is warranted.²⁷².

Our statement in the draft decision regarding our confidence that service providers had a reasonable opportunity to recover at least their efficient cost of equity was not a position that was defining a specific spread requirement between the ERP and DRP. We do not use the DRP information in a manner to predict the future direction and/or draw specific conclusions about the future/past (average) DRP margin over the ERP. This is consistent with previous advice from McKenzie & Partington.²⁷³ To the extent our draft decision was understood by some stakeholders as us having an expectation that the ERP margin over the DRP would be higher or lower than 2013 or from this point forward, we clarify that we do not put weight on such an expectation. Partington & Satchell advised that the value of debt and equity can have differential responses to changes in factors. They noted that the consequence is that depending on the variables that are changing and the direction of their change, the risk premiums of debt and equity may move together or apart.²⁷⁴

We use this cross check as it is expected that the risk premiums for equity and debt have value as a relative indicator as both are forms of capital. That is, we expect that most of the time investors' expected return on equity would exceed the return on debt. We also consider that for an efficient entity providing Australian regulated energy network services, the ERP would be generally higher than the DRP albeit not a long way above it.

The current ERP margin above the DRP relative to 2013 gave us assurance that our ERP estimate, although a reduction from the 2013 Guidelines is consistent with reductions in the DRP. Partington & Satchell advised that:

An extended period of low debt premiums coupled with an extended period of low volatility in equity markets suggests a stable low risk environment. In a

²⁷² AER, Draft *Rate of return Decisions, Explanatory statement*, July 2018, p. 189.

²⁷³ McKenzie & Partington, *Report to the AER: The relationship between cost of debt and the cost of equity*, March 2013.

²⁷⁴ Partington and Satchell, *Report to the AER: Discussion of submissions on the draft 2018 guideline*, November 2018, p 37

stable low risk environment it is more likely for the equity risk premium to be lower rather than higher.²⁷⁵

The CRG's submission implies that the ERP margin over the DRP is too high due to its view that:

- the DRP should be based on a credit rating of broad A
- the AER's 2013 approach of using a broad BBB rating overstates the DRP relative to present hybrid approach of using 2/3rd broad BBB and 1/3rd A ratings
- an ERP setting of 3.6 per cent in 2013 would have delivered similar comparative ERP to DRP as those proposed by CRG in this review.

This submission appears to be largely based on a proposition that setting a specific ERP premium above the DRP is appropriate. However, the submission does not provide robust evidence that justifies using a fixed margin above the DRP in setting the ERP or for revisiting our Sharpe-Lintner CAPM input parameter estimates. Therefore, as discussed above we do not consider an approach that is based on achieving a fixed ERP margin above the DRP is consistent with experts and our current understanding of the theoretical underpinnings.

Given we are in agreement with HoustonKemp and Partington and Satchell about the underlying theoretical position of the ERP and DRP information,²⁷⁶ we do not find it necessary to review in detail the work done by HoustonKemp based on the Merton model. Partington and Satchell agrees that the Merton model used by HoustonKemp to assess the relationship between equity risk premium and the defaultable / corporate debt risk premium is appropriate.²⁷⁷

No new evidence has been provided that would require us to move away from our position that:

- The DRP is a relative indicator and we expect that most of the time investors expected return on equity will exceed the return on debt
- For an efficient entity providing Australian regulated network services, the return on equity is not expected to be a long way above the return on debt.

5.4.5.3 Other regulators return on equity estimates

In our draft decision we set out ERP from a number of Australian regulators' determinations across energy, water, rail and transport sectors and acknowledged that our ERP estimate at step 3 is lower.

²⁷⁵ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, p.37

²⁷⁶ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, p.36-37

²⁷⁷ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 decision, November 2018, p.36

We recognise that other regulators' estimates of the expected return on equity is typically derived for the same purposes as us, which is for regulatory purposes. However, we have previously noted the limitations of these estimates and consequently, the limited role they play in our return on equity estimation process. In this review, prior to our draft decision, we had not received submissions suggesting we reconsider our previously stated strengths and weaknesses of other regulator estimates. In that context we noted that, of the other regulator estimates we set out in the draft decision, it was only the ERA that regulated energy network services.

The ENA submitted that we had dismissed the other regulators' evidence and that there was no reason to consider that the higher estimates were driven by risk differentials. It also submitted, given that other regulator estimates are above our ERP we should consider this cross check to have failed. It noted that the mean of the other regulators' estimates were 2 per cent higher.

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.

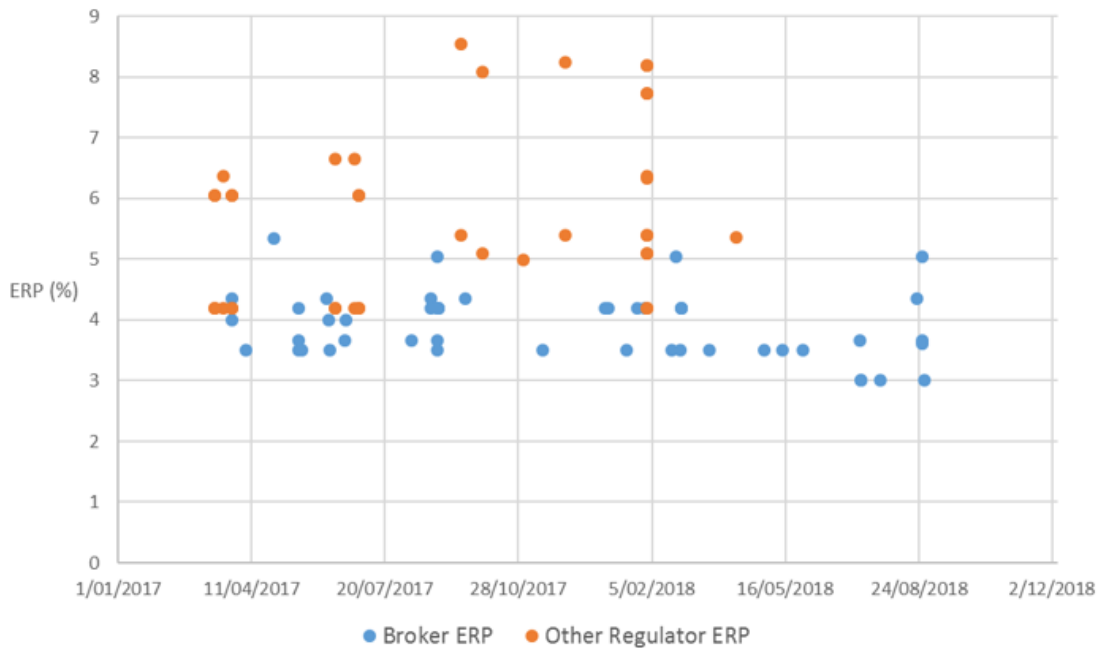
The limitations are largely driven by methodological differences between regulators and we discuss some of these below and why they need to be taken into account. For example, the ERA adopts a term of 5 years for its return on equity which differs from our term of 10 years. We prefer to give most weight to long term data when estimating equity beta whereas the ERA uses five year estimates.

However, they potentially also reflect differences in the industries that are subject to regulation.²⁷⁸ Although the regulatory purposes for setting a rate of return may be the same, the compensable risks being assessed by regulators are not necessarily the same across different industries.

In response to submissions, we compared other regulators' estimates of ERP (excluding the ERA's energy network decisions) alongside ERP estimates from broker reports for energy network business (APA, AST, SKI and DUET). As shown in Figure 7, the other regulator ERP estimates (other than ERA) are generally above those of broker estimates for energy networks. While the comparison has its own limitations, it provides some support that other regulator estimates could be driven by the different risk characteristics in the different industries being regulated.

²⁷⁸ 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, p.235-236, Footnote 953; AER, *AusNet Services distribution determination final decision 2016-20, Attachment 3 - Rate of Return*, May 2016, p. 247, footnote 985.

Figure 7 Other regulators and broker reports ERP estimates



Source: Broker reports for AST, APA, SKI from 1/1/2017 to 31/9/2018. IPART, Review of prices for rural bulk water services (Draft), March 2017, IPART, Review of prices for Sydney Desalination Plant Pty Ltd (Draft), March 2017, IPART, Sydney Water Corporation (Draft), March 2017, IPART, Hunter Water Corporation, March 2017 (Draft), IPART, Review of prices for rural bulk water services (Final), June 2017, IPART, Sydney Desalination Plant Pty Ltd (Final), June 2017, IPART, Sydney Water Corporation (Final), June 2017, IPART, Hunter Water Corporation (Final), June 2017, IPART, Fares for Private Ferry Services (Draft), September 2017, IPART, Maximum fares for rural and regional bus services (Draft), October 2017, QCA, Seqwater Bulk Water Price Review (Draft), November 2017, IPART, Review of fares for private ferry services (Draft), December 2017, IPART, WACC biannual update, February 2018, IPART, WACC Calculator, Feb 2018, QCA, Seqwater Bulk Water Price Review (Final), April 2018.

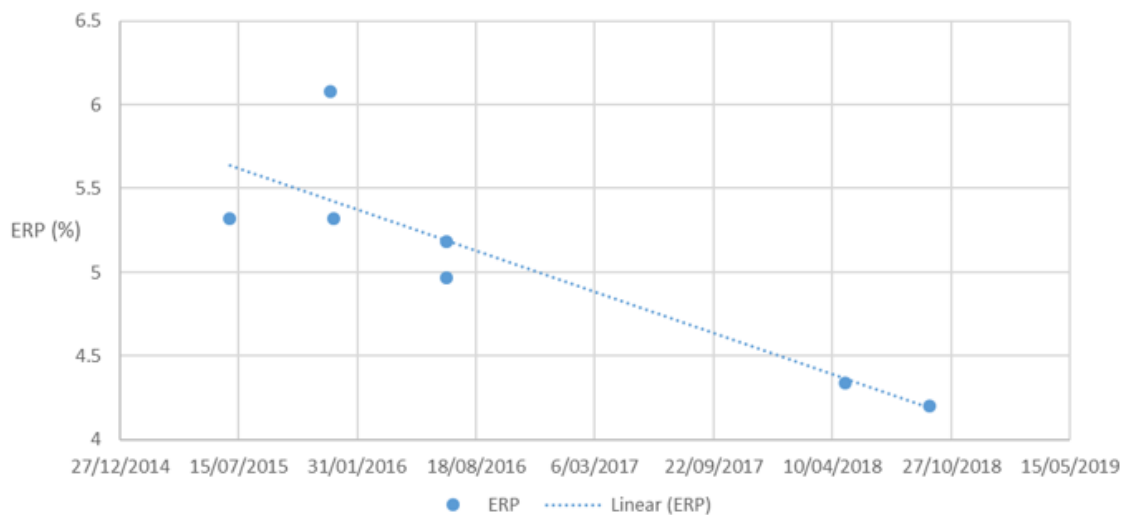
We disagree with the ENA that the ERA adopts a like-with-like beta of 0.79 for equity geared to 60 per cent. We have looked at the ERA's approach which appears to have been mischaracterised. The ERA sets equity beta and benchmark gearing based on 5 year estimates.²⁷⁹ We have regard to longer term estimates as we adopt a longer term for estimating the risk free rate and return on debt. We give most weight to estimates from the longest estimation period when estimating beta because longer term data reflects a range of market conditions and would be more statistically robust. Shorter term estimates can be affected by factors such as market volatilities, one-off events (such as financial crisis) and interest rate movements which can mask the systematic risk of an efficient firm supplying Australian regulated energy services.

²⁷⁹ ERA, *Draft rate of return guidelines (2018)*, 29 June 2018, p. 70; ERA, *Draft explanatory statement for the rate of return guidelines (2018)*, 29 June 2018, p. 48

We also note that there are further underlying estimation methodological differences between regulators resulting in further limitations to the usefulness of these estimates. The ERA released its draft rate of return guidelines in June 2018.²⁸⁰ In relation to the return on equity, its most recent analysis using data to 2017 indicated: a benchmark gearing of 55 per cent; and an equity beta point estimate of 0.7. The ERA also cautioned comparison with other regulators' decisions without understanding how the estimates are derived.²⁸¹

In response to submissions, we also looked at the ERA determinations since 2015. As shown in Figure 8, ERA's ERP for gas and electricity networks have been gradually coming down since 2015. Whilst noting the limitations in putting weight on this evidence, in the context of comparative risk due to commonality of energy regulation, the trend is informative. That is, the ERA is setting its more recent ERP estimates materially lower than 2015 levels.

Figure 8 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. Note: We have excluded ERAWA's draft guideline as there was no ERP provided.

The considerations above inform us that whilst our ERP is lower than other regulators, this is likely to be driven by methodological differences and a lack of a like for like risk comparison. Focussing on the ERA's comparable estimates inform us that the ERP

²⁸⁰ ERA, *Draft rate of return guidelines (2018)*, 29 June 2018.

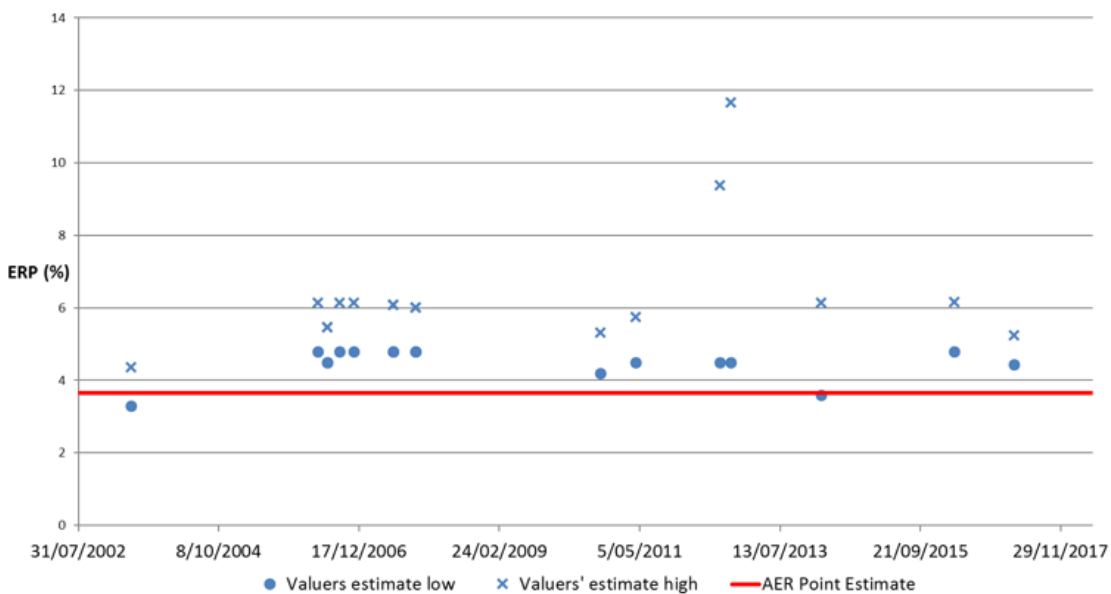
²⁸¹ ERA, *Draft explanatory statement for the rate of return guidelines (2018)*, 29 June 2018, p. 47

has trended down since 2015. In conclusion, we consider that whilst the other regulator information has some use, noting limitation of methodological differences but also recognising the ERA trend, on balance, it is reasonable to not give other regulator evidence much weight under our cross checks. We do not agree that the evidence leads us to conclude that this cross check fails because the mean of the other regulator estimates is 2 per cent above our ERP, as submitted by the ENA.

5.4.5.4 Independent takeover and valuation reports

The return on equity and ERP ranges from independent valuation reports are shown in Figure 9.

Figure 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.

Since our draft decision, there have been no new independent valuation reports. Our draft decision recognised that our ERP estimate was below that of the available estimates of risk premiums from valuation reports. Our draft decision we noted 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 time²⁸²

²⁸² There have been only 19 relevant independent valuation reports spanning a period going back to 1991. Only 13 reports included a discounted cash flow analysis with information on a return on equity estimate. These 13 reports

- the estimates include 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, the relevant investment period exceeding the term of the proxies)
- lack of clarity around adjustments for dividend imputations.

The ENA, whilst recognising some of the limitations above, submitted that we should give more weight to valuation report estimates. Further, we should consider the fact that our ERP is below all of the valuation reports and the most recent report even before the ERP is adjusted for dividend imputation.²⁸³

However, the ENA has not provided any new material to alleviate concerns about the limitations of valuation report estimates noted above. Our concerns about these limitations are well documented through our assessment of various submissions and reports in our determinations since the 2013 Guidelines.^{284 285} In the absence of any new information/evidence we consider it reasonable to place low weight on the ERP estimates from independent valuation reports.

5.4.5.5 International regulators return on equity estimates

Networks and network shareholders have submitted that we should consider international regulators' ERPs as a cross check on the reasonableness of our ERP estimate.

The ENA submitted a report from John Earwaker which argued for a higher ERP estimate than our draft decision and his reasoning included:²⁸⁶

- Ofgem's estimates of ERP have been stable around 450bp, with initial analysis suggesting an increase to 480bp from 2023. The risks borne by equity investors in Australian and UK networks are similar, with MRP potentially being higher in Australia due to broader country factors. Earwaker therefore disagrees with the assertion that international comparisons are invalid.
- Regulatory decisions made from 2015 to 2017 for USA and Canada have provided an average ERP of 546 and 631 bps, respectively while NZCC's estimates from 2010 - 2016 have been between 474 to 545 bps.

were provided by only four independent valuation firms, with 9 of the 13 reports being provided by Grant Samuel & Associates.

²⁸³ The most recent report for a regulated energy business we considered and noted in the draft decision is KPMG's report for DUET released on 7 March 2017. This report implies an equity risk premium of 4.44 to 4.62 per cent (without adjustment for dividend imputation)

²⁸⁴ For example, see: AER, Draft decision Multinet Gas Access Arrangement 2018–2022 Attachment 3–Rate of return, July 2017, p. 102. Available at: <https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/multinet-gas-access-arrangement-2018-22/draft-decision>

²⁸⁵ For example, see: AER, Draft decision Murraylink transmission determination 2018 to 2023 Attachment 3–Rate of return, September 2017, p. 94. Available at: <https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/murraylink-determination-2018-23/draft-decision>

²⁸⁶ Earwaker, The AER's draft WACC guideline: an international perspective, September 2018, p. 4.

- AER's proposed ERP is below most European regulator's calculations, the only countries which have previously set lower returns are Austria, Romania and Lithuania. Countries with more established regulatory frameworks tend to allow returns similar to the UK and NZ.
- The key difference in comparing beta estimation methodology was that AER gives the most weight to long term data, where other regulators tend to give greatest weight to recent beta estimates.
- The AER repeatedly took "extreme positions" and that "it is important for regulators to be 'in the pack' with expert opinion".²⁸⁷

Endorsing the Earwaker report, the ENA submits that the AER may wish to move to a more moderate ERP position by giving:

- more credence to the possibility that MRP could move higher when the risk free rate is lower
- placing more weight to latest empirical equity beta estimates as an up-to-date indicator investor perceptions.

We have considered the use of international regulators' return on equity estimates. However, we observe a number of limitations which restricts their comparability and use for informing our decision:

- Differences in regulatory framework, the domestic economy, geography, business cycles and other factors are likely to drive differences in estimates
- Different methodology
 - The use of international regulators' estimates introduces international data which is potentially inconsistent with our foundation model approach which employs a domestic Sharpe-Lintner CAPM as our foundation model.
 - Comparing estimates directly is unlikely to produce useful information as they are formed using different data sets from different economies. The economies' of European nations has been starkly different to that of Australia over the past 25 years.
 - Different methods in use by different regulators may not be appropriate for use in our regulatory framework, distorting the final estimate comparison when comparing raw numbers. The reliance on the Wright approach by UK regulators dramatically alters results in comparison to those we produce, however our own consideration of the Wright approach is that it is not suitable for our regulatory framework. Additionally, we observe that some US regulators uses DCF calculations to derive a return on equity, which is not directly comparable to our foundation model.²⁸⁸

²⁸⁷ Earwaker, The AER's draft WACC guideline: an international perspective, September 2018, p. 12.

²⁸⁸ Opinion No. 531, Order on Initial Decision, 19 June 2014, p.7. Link: <https://www.ferc.gov/whats-new/comm-meet/2014/061914/E-7.pdf>

We engaged Lally to review the Earwaker report and provide advice on the use of international ERP data. We have a number of concerns which is shared by Martin Lally:

- The US and Canadian regulators do not provide MRP and equity beta estimates. Only 2 of the remaining 19 regulators mentioned in the Earwaker report estimate an MRP higher than 6%.²⁸⁹ So higher estimates for ERP come from the beta estimates, and all of them exceed 0.6 (a median value of 0.89)
- Many of the betas estimation methods are sufficiently different to the AER that they raise concerns about their estimates rather than AER's, and that there is no merit in replicating inferior estimation methods.²⁹⁰
- Earwaker rules out the possibility of regulatory framework differences by comparing Australia with the UK, but ignores 18 other markets. It is unlikely that each of these markets would closely resemble the Australian regulatory framework.²⁹¹
- Australian regulated energy network businesses may have lower beta relative to the local market index than other markets.²⁹² Possibilities include differences in market leverage, or industry composition for the market portfolio proxy used in the regression.
- Differences in estimates may also be due to the use of longer estimation periods.²⁹³ Earwaker views that a shorter period better reflects the current situation, or in other words, because there is less bias. However the standard error of the estimate will be higher from using a shorter period - this is unfavourable and may not offset the lessening of bias. Earwaker referenced a 2018 report for UK regulators to support a shorter estimation period (for beta). However, three of the four authors favour using the longest data collection frequency to estimate beta, leading to significantly lower estimates of it.²⁹⁴ This is comparable to the AER's approach.
- Earwaker believes the AER's view is that the MRP is fixed even as the risk free rate moves.²⁹⁵ Apart from being irrelevant to the view that AER's ERP is too low (the AER's MRP estimate is above most the other regulators), his statement of the AER's view is wrong. The AER views that while the MRP may vary over time, there is no estimable inverse relationship between the MRP and the risk free rate. Lally agrees there is no clear evidence MRP is inversely related to the risk free rate, but considers that the concept is plausible.
- The estimates of international regulators should be considered as it may reveal useful methodologies or data sets not previously considered, as opposed to the

²⁸⁹ Martin Lally, Review of the Earwaker report, 28 November 2018, p. 3.

²⁹⁰ Martin Lally, Review of the Earwaker report, 28 November 2018, p. 3.

²⁹¹ Martin Lally, Review of the Earwaker report, 28 November 2018, p. 4.

²⁹² Martin Lally, Review of the Earwaker report, 28 November 2018, p. 4.

²⁹³ Martin Lally, Review of the Earwaker report, 28 November 2018, p. 5.

²⁹⁴ Available at: <http://www.bbk.ac.uk/ems/faculty/wright/wrightburnsmasonpickford2018.pdf>

²⁹⁵ Martin Lally, Review of the Earwaker report, 28 November 2018, p. 7.

estimates. Lally found the empirical evidence cited by Earwaker suggested that our approach is superior (for equity beta).²⁹⁶

We also note the CCP 16 submission and agree that Ofgem noted that investors are now willing to accept lower equity returns from longer-term investments in regulated infrastructure and foreshadowed lower equity returns.²⁹⁷ Ofgem in its open letter on RIIO 2 framework in July 2018 stated:

Together with other regulators in the UK Regulators Network (UKRN), we are commissioning a study by expert academics and consultants that will help us understand the implications of this market environment for our cost of capital estimates. While we cannot speculate as to the final conclusions of the study, the evidence seems to point towards a significantly lower cost of capital for regulated network companies than that set for the RIIO-1 price controls. For example, in their most recent framework consultation document, Ofwat also state that they will set the allowed return based on the prevailing market evidence, which points to a lower cost of capital at the 2019 price review (PR19).²⁹⁸

We note Lally's detailed analysis and in particular his opinion that he does not see anything in relation to beta that might warrant use by the AER, rather it reinforces the AER's approach. We do not agree with Earwaker's view which is endorsed by some of the stakeholders that our positions are extreme.

We have considered Earwaker's report and international regulators. We acknowledge that international regulators could provide useful methodologies or data sets not previously considered by us. However, we do not see a robust case to change our methodologies or data based on the evidence presented to us and therefore consider any adjustment simply by comparing allowed returns between regulators to be unreasonable.

We note the ENA's late submission presenting international regulator allowed returns as a weighted average cost of capital.²⁹⁹ For the same reasons discussed above we do not consider this information persuades us to moderate our overall return on equity estimate.

5.5 Distil point estimate (step 6)

²⁹⁶ Martin Lally, Review of the Earwaker report, 28 November 2018, p. 9.

²⁹⁷ OFGEM, RIIO 2, Framework consultation, March 2018, p.91. Available at: https://www.ofgem.gov.uk/system/files/docs/2018/03/riio2_march_consultation_document_final_v1.pdf

²⁹⁸ Available at: https://www.ofgem.gov.uk/system/files/docs/2017/07/open_letter_on_the_riio2_framework_12_july_final_version.pdf

²⁹⁹ ENA memorandum, Response to the AER Board questions, 23 October 2018.

In step 6, we distil a return on equity point estimate. We use our Sharpe-Lintner CAPM point estimate as the starting point and select final return on equity value having regard to information from steps 4 and 5.

5.5.1 Final decision

Our final decision is to calculate the return on equity using the Sharpe-Lintner CAPM with a market risk premium of 6.1 per cent and an equity beta of 0.6 resulting in an ERP of 3.66 per cent. We combine this ERP with a risk free rate observed at the time the Instrument is applied. We consider this approach will, or is most likely to, contribute to the achievement of our legislative objectives.

We consider our six step process:

- 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
 - recognises and allows for the inherent uncertainties in the data

When capital is priced via a competitive market, the opportunity to beat the benchmark creates incentives to seek efficiencies. Similarly, providing a benchmark return on equity for regulated businesses, reflecting a market rate of return for the risk of providing Australian regulated network services, furthers the revenue and pricing principles and is in the long term interests of energy users.

We are confident our Sharpe-Lintner CAPM input parameter estimates for MRP and equity beta are the most consistent with the empirical data and finance theory and will or will most likely to contribute to the achievement of legislative objectives.

On balance, our assessment of cross checks, do not provide a case for making adjustments to the ERP estimates from step 3. Compensation for risks as evidenced by the low DRP and extended periods of low volatility is consistent with a lower ERP.

We do not consider international regulators' allowed returns and ERPs make a robust case for us to moderate our return on equity estimate. As discussed in section 5.4.5.5 and 9.2.2, the differences between international regulators and us are predominantly driven by differences in the value of equity beta. However, the lack of comparability with our estimates hinders their usefulness and there are a number of possible explanations consistent with our estimate being appropriate.³⁰⁰ We have had regard to

³⁰⁰ Martin Lally, Review of the Earwaker report, 28 November 2018, p. 3.

other relevant equity beta evidence including international data based on their strengths and weaknesses.

We do not consider any adjustments to the ERP are justified on account of low beta bias and Black CAPM. We accept the Independent Panel's recommendation and discuss this bias and model and our reasons for not making an adjustment in a separate chapter 8.

We are confident our equity beta value is based on empirical evidence and is the estimate that will or is most likely to achieve our legislative objectives. In coming to the point estimate of 0.6, we have not limited the change to the 2018 Instrument estimate by reference to the 2013 Guidelines. We agree with the Independent Panel that our draft decision on equity beta was based on our diminished confidence on the Black CAPM which did not play the same role it did in 2013.³⁰¹

We recognise that our draft decision discussed the concept of stability in the context of the equity beta. We agree with the Independent Panel that this discussion was not clear and created the impression we may have been switching of methodologies. To be clear, we have not bounded the exercise of judgment in this Instrument. We have not limited movements in parameters by using the 2013 Guidelines as an anchor point. Rather, we reviewed the most robust evidence that is relevant to the task and utilised that evidence according to its merits.

We accept the Independent Panel recommendation that low beta bias and the Black CAPM have no relevance to the estimation of equity beta.

We accept the Independent Panel's view that if discontinuity (lack of stability) is a concern then it should logically apply to the ERP (and or overall rate of return). We do not value stability of the parameter value and/or the return on equity over using the most robust evidence and giving appropriate relative merit to the evidence. We note that stakeholders value predictability which we understand to be akin to our decisions being consistent with the evidence currently before us so that that stakeholders/market do not have large unexpected shocks which is not in the long term interest of users and investors. We consider our ERP estimate is predictable given its transparent anchoring on empirical data and our open consultative approach to developing this Instrument. The Independent Panel also stated:

Overall, we consider that the AER has undertaken an extensive consultation and engagement process. It has considered a significant amount of information, data and views to assist in developing its approach as set out in the Draft Guidelines and has demonstrated consideration of the range of submissions from practitioners, academics, and stakeholders. It has also

³⁰¹ Independent Panel Report, Review of the Australian Energy Regulator's Rate of Return Guidelines, September 2018, p.iv.

sought to link its conclusions to the information provided using logical reasoning plainly expressed.³⁰²

On balance, our risk cost trade-off assessment (see section 13), also found we were not persuaded to adjust the rate of return and therefore by extension the return on equity point estimate or individual input parameters.

Our 2013 Guidelines stated that we would select the final return on equity value as the foundation model point estimate, or a multiple of 25 basis points (from within the foundation model range). In this Instrument, we do not provide for such discretion as our approach is to set a fixed ERP for the life of the Instrument and adopt the risk free rate based on market data at the time of its application. In clause 28 of the Rate of Return Instrument we state our rounding policy. Section 3.2 discusses our rounding policy.

Overall, having followed our 6 step process and further considered the Independent Panel recommendations relevant to the overall return on equity, we are confident that our ERP point estimate of 3.66 per cent will or is most likely to contribute to the achievement of our legislative objectives to the greatest degree.

³⁰² "One Panel member, with over three decades' experience as a regulatory litigator, advisor and expert witness, adds that he has never seen, in his country, a treatment of any issue more careful, more evidence-based, more analytical, and more deserving of replication by other regulatory bodies than the AER's Explanatory Statement. Having said that, he agrees fully with all of this Report and its recommendations".

6 Risk free rate

The risk free rate is a key parameter within 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, as in practice it is difficult to observe the returns on a riskless investment. In choosing a proxy, we have to consider which investments have the minimum amount of risk and the appropriate term.

We also have to consider the appropriate period over which to observe the returns on this proxy investment 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.

We have had regard to submissions from stakeholders and recommendations from the Independent Panel³⁰³ in coming to our final decision.

6.1 Final decision

Our final decision is to use the return on Commonwealth Government Securities (CGS) with a term of 10 years as our proxy for a riskless asset. We have also decided to allow regulated businesses to nominate an averaging period over which we will observe the 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 7 months prior to the commencement of the regulatory period
- Ends no later than 3 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.

Our final decision is based on our considerations in the following sections:

- 6.2 The term of the risk free rate
- 6.3 The averaging period length
- 6.4 The nomination window

³⁰³ For more information on the purpose and process we followed in establishing the Independent Panel, see AER, Consultation paper - process for reviewing the rate of return guideline, 31 July 2017, p. 14-15

- 6.5 Other issues

6.2 The term of the risk free rate

The term of the risk free rate determines which CGSs we will use as a proxy in calculating the risk free rate. We need to choose an appropriate term that achieves our legislative objectives of the NEO and NGO. We have considered the different perspectives on the appropriate term.

6.2.1 Final decision

Our final decision is to maintain use of a 10 year term for the risk free rate. We consider the use of a 10 year term will lead to an overall rate of return that will better contribute to the achievement of the NEO and NGO. We consider a 10 year term is consistent with the theory of the Sharpe-Lintner CAPM which is a single period equilibrium model, estimating the returns an investor requires over a long-term investment horizon. The 10-year term also reflects the actual investor valuation practices and academic works.

We consider a reasonable argument could be made in support of a five year term. However, we found the evidence for this term to be less persuasive than that for a 10 year term. The appropriate term length is considered in more detail below.

6.2.2 Draft decision

We decided in our draft decision that the use of a 10 year term was appropriate as this is consistent with other Return on Equity parameter estimates, namely the MRP. In response to positions advocating for a five-year term, we noted that our 10 year term was consistent with our decision in the 2013 guidelines and regulatory determinations since then.³⁰⁴

6.2.3 Independent Panel review

The Independent Panel noted that the draft decision did not go into detail on this issue and the last time we did was in the 2013 guidelines.³⁰⁵

6.2.4 Stakeholder submissions

The CRG put forward that we did not appropriately engage with their submission prior to the draft decision.³⁰⁶ They also stated that they would support recalculating the MRP using a five year risk free rate. Beyond the CRG, we also received a submission from

³⁰⁴ AER, Draft Rate of return guidelines - explanatory statement, 10 July 2018, p.196

³⁰⁵ Independent Panel, Review of the AER's Rate of Return Draft Guidelines, 7 September 2018, pg. 27

³⁰⁶ CRG, Response to Rate of Return draft decision, 25 September 2018, p.39

the APA which stated that a 10 year term is appropriate and reflects the conceptual application of the CAPM.³⁰⁷

6.2.5 AER considerations

In explaining our considerations, we note stakeholder submissions have centred on choosing between a five or a 10 year term. We first explain the theory underlying the appropriate term and consider the arguments for a five or a 10 year term. There are two opposing principles considered below that guide how we have decided the appropriate term for the risk free rate. They are whether:

- a term that reflects the long-lived nature of the underlying assets is more appropriate, or
- whether to a term that is consistent with how investors would value an investment in a government bond is more appropriate.

We consider these two principles and their supporting evidence below.

Considerations with respect to a 10 year term

We use the CAPM to estimate how an investor will value the potential returns from an investment in an infrastructure business with long-lived underlying assets. Equity investors seek out efficient returns for their diversified investment portfolio over long-term investment horizons. Although reinvestments may be more frequently, they are still being made with reference to a long-term equilibrium rate of return. This will reflect the excess return required for bearing the systematic risk of the investment over the return on a long-term riskless asset.

We find support for using a 10 year term in actual investor valuation practices, and academic works. The 2013³⁰⁸ and 2017³⁰⁹ KPMG market practitioner surveys indicate around 85 per cent of practitioners use 10 year CGSs as a proxy for the risk free rate. Academic works by Pratt & Grabowski (2010), and Damodaran (2008) also argued that 10 year CGS yields were appropriate proxies for the risk free rate, as they reflect the long-term nature of the underlying assets.³¹⁰

We consider that setting a rate of return using a 10 year term will provide for allowed returns on an investment in a regulated business that are comparable with the investor valuations of other stocks within the market with a similar degree of systematic risk. The APA supported our view.³¹¹

³⁰⁷ APA, Submission on AER draft guidelines, 25 September 2018, p.9-14

³⁰⁸ KPMG, Valuation Practices Survey 2013, p. 12.

³⁰⁹ KPMG, Valuation Practices Survey 2017, p. 10

³¹⁰ Shannon Pratt and Roger Grabowski, *Cost of Capital: Applications and Examples*, 4th ed. Hoboken: Wiley, 2010, pp. 118– 120; Aswath Damodaran, 'What is the risk free rate? A search for the basic building block', December 2008, pp. 9-10, downloaded from <http://pages.stern.nyu.edu/~adamodar/> on 27 September, 2018.

³¹¹ APA, Submission on AER draft guidelines, 25 September 2018, p.9-14

We received a number of suggestions from the CRG prior to our draft decision opposing the use of a 10 year term.³¹² In maintaining a 10 year term, the draft decision relied on reasoning from the 2013 guidelines as these suggestions were previously considered in 2013. However, the CRG has stated in their submission on the draft decision that we did not sufficiently address their concerns.³¹³

Therefore, we have reconsidered the key points put forward by the CRG in their submission prior to the draft decision against the use of a 10-year risk free rate, including:

- The cost of debt is now effectively set each year under the trailing average approach, so the only impact on using the 10 year bond rate is on the RoE.
- The Market Risk Premium is measured each year but averaged over a longer term, to find the 10 year term. The equity beta comes from an index of share price volatility measured weekly but averaged over a longer period.
- Investors in shares assess, rebalance and re-risk their portfolios on a much shorter basis than 10 years.

We note the 2013 guidelines changed our approach to the return on debt from the on the day rate to the trailing average approach.³¹⁴ The position put forward by the CRG is that because of this change, we are not required to keep the return on debt and return on equity approaches consistent and therefore can use a different term for the risk free rate. However, it is not clear that moving to a trailing average cost of debt necessitates a change in the term for the risk free rate. We disagree with the broad statement that the cost of debt is set each year. Although a proportion of the regulated firm's debt is updated each year, each portion still reflects a 10 year term and 10 year cost of debt. The return on debt approach is discussed in section 10.

Section 9 goes into more detail on the methodology we used in producing our 10 year MRP estimate. We consider this approach is consistent with using a risk free rate of 10 years. The 10 year risk free rate is used as part of the historic excess returns method, in line with market practitioners and academics. Whilst we place most weight on series, with lengths spanning from 30 years to over 100 years, of single year market returns this is to make sure results are statistically significant, as discussed in section 2409.3.1. The use of a 10 year risk free rate accounts for a balanced, market portfolio which consists of long and short term investors which is necessary for estimating a market risk premium.

Section 7 goes into more detail on the methodology for our equity beta estimate. We use estimation periods that are longer and shorter than the benchmark 10 year term when estimating equity beta. This is because there are trade-offs with long and short

³¹² CRG, Submission on the Rate of Return Guideline Review, 4 May 2018, pg. 44

³¹³ CRG, Response to Rate of Return draft decision, 25 September 2018, pg.39

³¹⁴ For more information on this transition of approach, see AER, Explanatory statement - rate of return guideline, 17 December 2013, p.120-125.

term data as discussed in section 7.7. However, we place most weight on the longest estimation period as they can yield more robust results and short term estimates can be effected by one-off events (e.g. financial crisis), interest rate movements and cyclicity which can cause temporary 'movement' in the equity beta. We consider this approach for equity beta is reasonable and consistent with using a 10 year term for the risk free rate.

The CRG submitted that investors in shares assess, rebalance and re-risk their portfolios on a shorter basis than 10 years. We note that it is important to recognise the purpose of the CAPM and the appropriate term for our purposes, explained above. Although the investments may change, investments are still being made with reference to a long-term equilibrium rate of return.

Considerations with respect to a different term

A shorter term

The CRG put forward that a five year term is appropriate as it matches the length of the regulatory period³¹⁵:

“The benefit of using the 5 year bond rate is that it reflects the 5 year regulatory period over which the return on equity is compounded before it is reset at the start of the next regulatory period... In contrast, the use of the 10 year bond rate to set the return on equity has no logic to support its use other than perhaps convention.”

The Independent Panel submitted that the draft decision did not go into detail on this issue and the last time we did was in the 2013 guidelines. In light of the CRG submission and the Independent Panel's recommendations, we have reassessed the reasons put forward in support of a change to the risk free rate term.

We see two reasons that could support the use of a different term in our estimation of the appropriate risk free rate:

- If it was used by most market practitioners and agreed upon by academics as the appropriate term for equity investments
- If cash flows from an equity investment in a regulated business are effectively similar to an investment in a floating government bond, which implies investors might value it using a term equal to the regulatory period.

We have not received evidence that market practitioners and or academics consider the appropriate term for equity investments should be equal to the length of the regulatory control period, on the contrary the recent KPMG market valuation survey indicated that 10 years is commonly used by market practitioners.

³¹⁵ CRG, Response to Rate of Return draft decision, 25 September 2018, pg.39

The second reason was advocated by Lally (2012)³¹⁶ who explained that using a CGS yield with a term equal to the length of the regulatory period (five years) satisfies the present value principle³¹⁷ better than a ten year term. Specifically, Lally submitted the structure of the bond payments and the structure of the regulatory payments are similar with the intuition that the cashflows from the building block model have a similar structure to the cashflows from a bond. This then leads to the conclusion that investors will value an investment in a regulated business in a similar method to how they would value an investment in a government bond. Namely, that the appropriate term for an investment in a regulated business would be equal to the term over which the cashflows are structured (i.e. equal to the length of the regulatory control period).

We considered Lally's advice previously in our 2013 guidelines³¹⁸ and noted that his reasoning is reasonable based on his assumptions that a regulated business has fixed returns and a guaranteed return of the initial investment at the end of the regulatory period. In this scenario, the investment in a regulated business would effectively be very similar to an investment in a government bond, and using a term equal to the length of the regulatory control period may be appropriate.

However, the issue with using a term equal to the length of the regulatory control period, is it requires the assumption that the full recovery of the residual value of the RAB (in cash) at the end of the term is guaranteed. The ability of regulated businesses to over or under perform their allowed rate of return and other allowances, and the volatility of the stock market make it difficult to say whether (and to what extent) Lally's assumptions would hold in reality.

The uncertainty in the initial investment being (fully) recoverable was also highlighted by the ENA, in a report produced by Incenta:³¹⁹

...investors are unlikely to evaluate regulated assets with reference to a five year bond because – unlike the case of the bond – the residual value at the end of each five year period is inherently risky. This is because the residual value is not returned in cash, but rather comprises a 'value' whose recovery remains at risk from future regulatory decisions and changes in the market (both technological changes and changes to customer preferences).

Based on the evidence before us, we consider it reasonable to use a 10 year term rather than move to a 5 year term.

We note the CRG submission that the ERA adopts a five year term in their 2013 rate of return review and indicate using the same in 2018,^{320 321} as this reflects the length of

³¹⁶ Dr Martin Lally, The risk free rate and the present value principle, 22 August 2012.

³¹⁷ The present value principle is that the net present value of cash flows should equal the purchase price of the investment.

³¹⁸ AER, Explanatory statement - draft rate of return guideline, 30 August 2013, p. 181-184

³¹⁹ ENA, Response, Attachment 14: Updated dividend drop-off estimate of theta, INCENTA, June 2013, p. 7.

the regulatory control period. We recognise that different Australian regulators use different terms in the context of their reasoning. However, this evidence whilst being informative, we consider our approach is consistent with the long lived nature of the assets to which we are applying the CAPM, market practitioners and academic evidence.

A longer term

Given that we have proposed a long term to match the nature of investments in relatively long lived assets, the question arises of why we do not use a longer term for our risk free rate. We have not received any submissions advocating for a longer term for the risk free rate. We would consider however that the lack of reliable and consistent data for longer term CGSs prevent the use of CGSs with a term beyond 10 years.

6.3 Averaging period length

The averaging period is the length of time during which we observe the yields on CGS with a 10 year term 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 estimates are relevant to the on the day rate and that they are not unduly biased by short-term volatility in the CGS yields. A longer averaging period reduces the volatility but also reduces relevance, while a shorter averaging period is more relevant but also more volatile.

6.3.1 Final decision

Our final decision is for regulated businesses to have the flexibility to choose an averaging period between 20 and 60 consecutive business days. We consider the reasoning from our draft decision is appropriate for supporting the change to our methodology. We also do not consider there is a material risk that regulated businesses will be capable of accurately and consistently predicting favourable averaging periods.

6.3.2 Draft decision

Our draft decision considered the appropriate averaging period length, and the benefit of flexibility between 20 and 60 business days. We considered an averaging period length of 20 to 60 business days reduces exposure to short term volatility in CGS

³²⁰ ERAWA, Explanatory statement, rate of return guidelines, <https://www.erawa.com.au/cproot/11952/2/Explanatory%20Statement%20for%20the%20Rate%20of%20Return%20Guidelines.PDF> pg. 85

³²¹ ERAWA, Explanatory statement, draft rate of return guidelines, 29 June 2018, <https://www.erawa.com.au/cproot/19250/2/Draft%20Explanatory%20Statement%20for%20the%20Rate%20of%20Return%20Guidelines%20-%20202018%20review.pdf> , p. 66

yields while maintaining relevance to the on the day risk free rate. Our decision to allow flexibility provided regulated businesses more scope to manage their financial risks.³²²

6.3.3 Independent Panel review

The Independent Panel considered that the averaging period length aspect of the rate of return calculation is explained soundly.³²³

6.3.4 Stakeholder submissions

The CRG agreed that an averaging period of either 20 or 60 business days has little difference overall, and supported the change in their submission prior to the draft decision.³²⁴ The CRG submitted that in late 2016, there was a run of two months where choosing a 20 day averaging period would have resulted in a figure that was higher than the 60 day averaging period. The CRG notes that fixing the averaging period well ahead of time will reduce the ability of regulated businesses to game their averaging period nomination.³²⁵ No other stakeholders commented on this issue after the draft decision.

6.3.5 AER consideration

Before our draft decision, we received a number of submissions from stakeholders supporting allowing a regulated business to use an averaging period of between 20 and 60 business days.³²⁶ We decided to allow regulated businesses to use an averaging period between 20 and 60 business days. The CRG submitted concerns with this approach.

A longer or shorter averaging period?

We considered the length of the averaging period and justification for allowing a 60 day averaging period in our draft decision. Our reasoning, which we maintain, is that allowing a longer averaging period is a departure from the on the day ideal of the CAPM, however it was justified by the benefit it provides in reducing exposure to CGS volatility.³²⁷ We note there is at times material disparity between the minimum 20 day and maximum 60 day averaging period rate. However, this disparity appears directionally symmetrical and we consider that it does not introduce significant upward or downward bias to the calculated risk free rate.

³²² AER, Draft Rate of Return Guidelines Explanatory Statement, 20 July 2018, pg. 193-4

³²³ Independent Panel, Review of the AER's Rate of Return Draft Guidelines, 20 September 2018, p. 28-30

³²⁴ CRG, Submission on the Rate of Return Guideline Review, 4 May 2018, p. 39

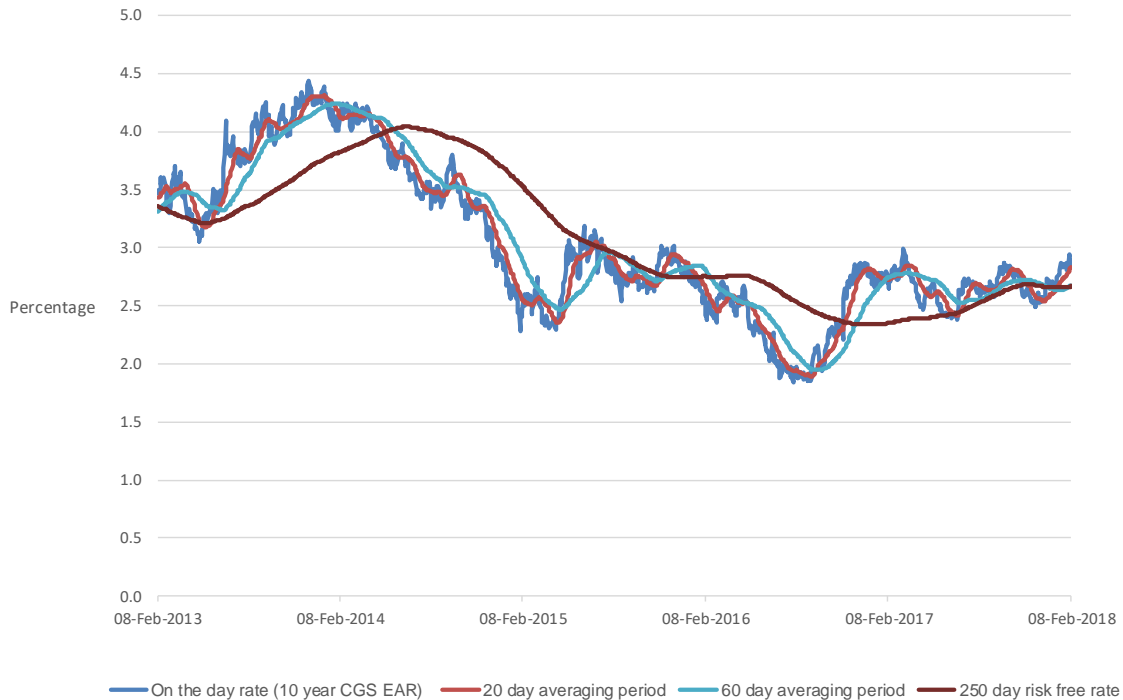
³²⁵ CRG, Response to Rate of Return draft decision, 25 September 2018, p.38

³²⁶ AER, Draft Rate of Return Guidelines, 20 July 2018, Table 23 Summary of submissions on the risk free rate, p. 197.

³²⁷ AER, Draft Rate of Return Guidelines Explanatory Statement, 20 July 2018, p. 190-192

Figure 10 shows the impact of different averaging periods, the 60 day averaging period is less volatile than the 20 day averaging period. It is the graph that was used in our draft decision.

Figure 10 Impact of different lengths of averaging CGS yields



Source: RBA interest rate statistics f16, AER analysis

Predictability of market fluctuations

We consider the concerns raised about the ability for a regulated business to pick an averaging period that upwardly biases the risk free rate, in order to game the risk free rate, are unlikely to hold in reality. The averaging periods are fixed in advance of the period commencing and cannot be changed after they have been fixed. Therefore a regulated business would need to be capable of accurately and consistently predicting market fluctuations ex-ante. We have not received evidence that identifies this as a material risk.

6.4 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. This is a result of the instrument being binding, which will reduce our ability to select the nomination window for each determination.

6.4.1 Final decision

We propose to use a nomination window of between 3 and 7 months prior to the commencement of the regulatory control period. We maintain the reasoning from our draft decision to justify the change to our methodology. We consider the additional month protects the confidentiality of the 60-day averaging periods. We do not consider the additional month added to the nomination window represents a significant departure from the ideal of an on-the-day rate.

6.4.2 Draft decision

Our draft decision allowed a nomination window of 3-7 months prior to the commencement of the regulatory control period to protect the confidentiality of averaging periods. Given this has been in practice for some time, we did not go into detail on the importance of averaging period confidentiality.³²⁸

6.4.3 Independent Panel review

The panel stated that we should explain the reasons why confidentiality, and thus the confidentiality of a regulated business' nominated averaging period, are important.³²⁹

6.4.4 Stakeholder submissions

The CCP16 raised concerns that the nomination window of between 3 and 7 months prior to the commencement of the regulatory period was unnecessarily long, and that its departure from the theoretical ideal of an on the day rate was not sufficiently justified by the concerns for confidentiality. The CCP16 also stated that there was an opportunity for gaming as the regulated business may have their period start and end before their revised revenue proposal, giving them an opportunity to nominate another averaging period if their first is unfavourable.³³⁰

6.4.5 AER considerations

We need to specify the nomination window within which the averaging period can be set. We cannot have an averaging period end any later than three months prior to the regulatory control period commencement and revision commencement dates, to give us sufficient time to come to a final decision.³³¹ We also need the nomination window to be at least 3 months long, to provide 60 business days for the averaging period. Therefore, we need at a minimum, a nomination window of 3-6 months prior to the commencement of the regulatory control period.

Relevance to the on the day risk free rate

³²⁸ AER, Draft Rate of Return Guidelines Explanatory Statement, 20 June 2018, p.196-7

³²⁹ Independent Panel, Review of the AER's Rate of Return Draft Guidelines, 20 September 2018, p. 29-30

³³⁰ CCP16, Submission to the AER Draft Rate of Return Guideline, 25 September 2018, p. 95

³³¹ Our final decisions for determinations and access arrangement are generally produced at least 2 months prior to the commencement of their regulatory control period or revision commencement date. Please see AER, 7 year regulatory determination calendar 2015-2022, February 2018 for more guidance on reset timeframes

We consider the relevance to the on the day risk free rate and the confidentiality of averaging periods are important considerations in how we select the length of the nomination window. We do not want to set a nomination window that is too far removed from the on the day risk free rate. However, we also want the nomination window to be set such that it is long enough to protect the confidentiality³³² for the nominated averaging period of up to 60 business days. Using a longer nomination of 3-7 months instead of 3-6 months provides around 80 business days for the nomination window but is not too far removed from the on the day risk free rate. This longer nomination window of 80 business days provides more options for a regulated business to nominate their averaging period over and protects the confidentiality of their nominated averaging period.

Overlap with the revised regulatory proposal

We consider that although there is the potential for an overlap with the revised proposal in a regulatory determination, there is little scope for gaming. These concerns for gaming likely come from the perception that regulated businesses are capable of resubmitting their suggested averaging period in their revised regulatory proposal, allowing them to take another chance on the averaging period if the result is unfavourable. We will allow regulated businesses to submit and fix their averaging period in their initial regulatory proposal, and not resubmit an averaging period after their initial period has commenced. We have made this clearer in the Instrument.

6.5 Other issues

We note the Independent Panel commented on some areas that deserve some additional consideration. These are broadly the adverse impacts of allowing regulated businesses to nominate an averaging period and an explanation of the reasoning for our approach to confidentiality. We consider them below

6.5.1 Final decision

We have considered the Independent Panel's view that the confidentiality of averaging period ex-post was not sufficiently explained in the 2018 draft decision. We agree that disclosing this information ex-post would result in better replicability of AER returns. However, we consider the potential costs to regulated businesses in respect of raising debt are potentially significant. In light of this we are considering publishing monthly indicative WACC's as part of our benchmarking for profitability measures. We also note that that the actual rates of return are published through the PTRMs once we finalise annual return on debt values under the trailing average approach. These may be helpful for stakeholders to see trend in regulatory WACCs through time.

³³² We have tried to protect confidentiality of averaging period where possible, see for example, AER preliminary decision Powercor distribution determination - Attachment 3 - Rate of return, October 2015

We see there is value in protecting the confidentiality of averaging periods for regulated businesses. We also consider that regulated businesses are unlikely to be capable of materially effecting the CGS yields over the entirety of an averaging period.

We have also provided an explanation of why we use our CGS yield to maturity formula below.

6.5.2 Draft decision

Our 2018 draft decision did not consider these issues, as they were not concerns that were raised.

6.5.3 Independent Panel review

The panel stated that we should explain clearly³³³:

- What, if any, scope there would be, given the regulated business' ability to nominate the averaging period, for the service provider to manipulate the market in the two bonds during that period
- Why it is reasonable that the averaging period nominated by the regulated business will not be made public after the period has passed, since ongoing confidentiality results in the rate of return estimate not being replicable by stakeholders other than the regulated entity.
- Why the CGS estimation formula involves identifying two CGS yields and an adjustment is necessary for changing the remaining maturity during the averaging period, to provide clarity for non-expert readers

6.5.4 Stakeholder submissions

We have not received submissions from stakeholders regarding these two issues.

6.5.5 AER consideration

Adverse impact of businesses nominating their own averaging periods

The Independent Panel's concern was that we have not analysed whether a regulated business being able to nominate its own averaging period has adverse consequences, in the form of them being able to manipulate bond yields. We consider that the risks of this occurring are difficult to quantify due to a range of variables that impact the ability of a regulated business to manipulate bond yields. Some factors that influence this ability are the liquidity of the bond market and the costs and benefits associated with manipulating the market. On balance, we consider that although a regulated business could potentially manipulate the yields of government bonds, the low probability of this occurring does not require a safeguard mechanism to be in place. This is because the

³³³ Independent Panel, Review of the AER's Rate of Return Draft Guidelines, 20 September 2018, p.25-31

high liquidity of the Australian bond market and significant legal penalties (discussed in the sections below) in place for doing so reduce the risk and likelihood of regulated businesses engaging in market manipulation.

How a business could affect bond yields

It is important to understand the inverse relationship between CGS bond yields and price to understand how a business could impact the yields. As an example, the price of a fixed coupon semi-annual debt security that has just paid a coupon with two years to maturity can be approximately calculated as:³³⁴

$$Price = \frac{coupon}{(1 + yield)^1} + \frac{coupon}{(1 + yield)^2} + \frac{coupon}{(1 + yield)^3} + \frac{coupon + face\ value}{(1 + yield)^4}$$

The coupon and face value are set when the bond is first issued by the Reserve Bank of Australia and is a fixed exogenous variable in this calculation. In the above formula, the only values that can change are yield and price, and the formula shows that as the price decreases, the yield increases (and vice versa)

A regulated business acting in the secondary bond market and trying to manipulate the yields on a bond to achieve a higher yield, would need to reduce the market value (or price) of the bond. This could potentially be achieved through selling (including potentially short selling) sufficient numbers of relevant bonds, on every day throughout the averaging period, to lower the price. The averaging period itself, was used in the 2013 guidelines partially to reduce this risk of a regulated business being able to manipulate the CGS yields.³³⁵

Liquidity of the bond market

In a market with higher liquidity, firms will be less capable of substantially reducing the market value of a specific investment over a long period.³³⁶ This is due to the greater number of market participants in a liquid market willing to buy the investment as soon as the price drops. Although businesses may still be capable of manipulating bond yields in a liquid market, it would likely be at a significant cost for a material reduction in the market value.

Liquidity in a market is difficult to define and more so to quantify, however we can observe indicators of liquidity. The large growth in number of bonds available over the past decade, shown in Figure 11, indicates that liquidity is increasing. Further to this, the growth in annual turnover of CGSs has also increased which is a further indicator

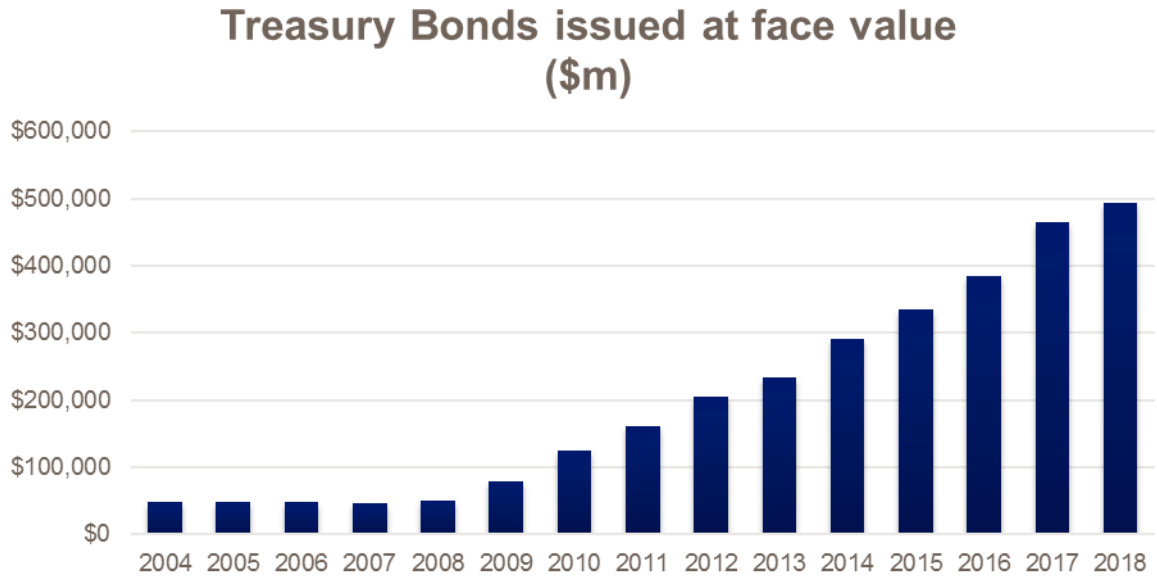
³³⁴ More precise pricing Commonwealth Government security pricing formula are available on the Australian office of financial management's webs site here: <https://aofm.gov.au/ags/treasury-bonds/>

³³⁵ AER, Rate of Return Guidelines Explanatory Statement, 17 December 2013, p. 77

³³⁶ Rajesh K. Aggarwal and Goujun Wu, Stock Market Manipulations, July 2006, pg. 27 accessed at <https://www.jstor.org/stable/pdf/10.1086/503652.pdf?refreqid=excelsior%3Ac6755ffdef9beb7e0578a4a41e416cf3> on 15 November 2018

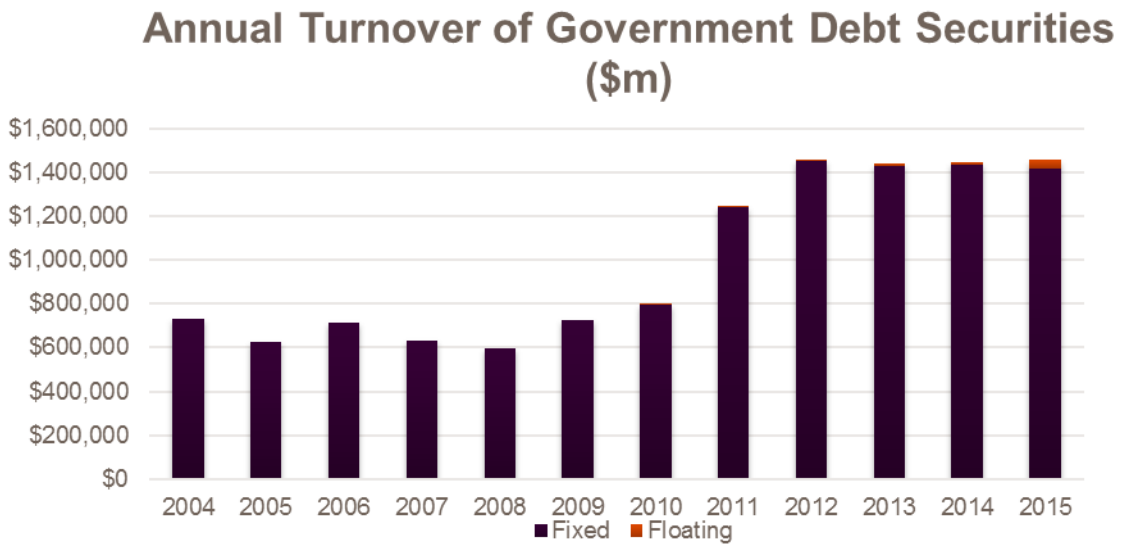
of liquidity, shown in Figure 12. These are two of many potential indicators of the liquidity of the Australian CGS market.³³⁷

Figure 11 Treasury bonds issued at face value



Source: AOFM database³³⁸

Figure 12 Annual turnover of government debt securities



Source: Australian Financial Markets Association³³⁹

³³⁷ World Bank Group, Bond market development indicators, p.1-4, accessed at <http://siteresources.worldbank.org/INTTOPACCFINSER/Resources/Bndind.pdf>

³³⁸ Australian Office of Financial Management, Table H12: Government securities on issue at 30 June 2004 to 2018 (summary), 30 October 2018

The Australian CGS market experienced significant illiquidity during the Global Financial Crisis but it has gradually returned to a higher level of liquidity. The AOFM's annual report for 2017 indicated that the liquidity in the government bond market was relatively consistent.³⁴⁰ The RBA released a bulletin in 2016 indicating that the current liquidity conditions in the Australian bond market are overall more robust than in some overseas markets.³⁴¹ We consider that given this information there is reasonable liquidity in the market of Australian CGSs.

Legal implications for market manipulation

We note that engaging in market manipulation risks significant penalties which would substantially reduce the incentive for regulated businesses to manipulate the Australian bond market. Under the Corporations Act 2001, it is an offence to take part in transactions that create an artificial price or artificially maintain a price level for trading in financial products.³⁴² Individuals found breaching this law face either a fine of 4,500 penalty units (\$945,000 as at 2018)³⁴³, a fine of three times the total value of the benefits received, both of these fines or 10 years imprisonment.³⁴⁴ A body corporate found in breach of this section face a penalty of either 45,000 penalty units (\$9,450,000), 3 times the value of the total value gained or 10 percent of the body corporate's annual turnover during the 12 month period ending in the month when the body corporate committed or began committing the offence.

Further to this, depending on the circumstances, it is possible that the AER may be able to remake a determination affected by such conduct. The AER has a power to reopen determinations that contain a material error or deficiency that results from the provision of materially misleading information to the AER. For instance, clause 6.13(a) of the NER provides that the AER may revoke a determination during a regulatory control period if it appears that the determination is affected by a material error or deficiency resulting from the provision of false or misleading information to the AER.³⁴⁵

AER approach to confidentiality

We explain our approach to confidentiality here in response to the Independent Panel's concern that we did not provide enough information on the reasoning for our approach to confidentiality. We treat averaging periods for the risk free rate and return on debt as confidential information, and protect them under our Confidentiality Guidelines.

³³⁹ Australian Financial Markets Association, 2015 Australian financial market report excel data, accessed at <https://afma.com.au/data/AFMR>

³⁴⁰ Australian Office of Financial Management, Annual Report 2017-18, 17 September 2018, p. 19-21

³⁴¹ RBA, Liquidity in Fixed Income Markets, June 2016, accessed at <https://www.rba.gov.au/publications/bulletin/2016/jun/7.html>

³⁴² Section 1041A of the Corporation Act 2001

³⁴³ Penalty units were updated to \$210 in the Crimes Amendment (Penalty Unit) Bill 2017

³⁴⁴ Schedule 3, Section 310, Corporations Act 2001

³⁴⁵ Clause 6.13(a) applies to electricity distribution determinations, the equivalent provision for transmission is clause 6A.15 of the NER and the equivalent provision for gas is clause 68 of the NGR.

Our 2013 and 2017 Confidentiality guidelines establish that there must be a significant benefit to the public in order for us to release confidential information.³⁴⁶

We publish the averaging periods for the risk free rate ex-post, as we see this information as beneficial to the public and not posing a material cost to regulated businesses.

However, we consider that the release of return on debt averaging periods ex-post could adversely impact the regulated businesses debt raising practices. Under a trailing average approach, the regulated business will need to use an averaging period each regulatory year and often use the same period each year. This could result in market participants being aware of the regulated business' return on debt figures or debt raising dates. We do not consider that the ability for stakeholders to calculate the exact WACC calculations outweighs the potential cost of breaching confidentiality. Market knowledge of debt averaging periods could affect the regulated businesses if they were undertaking debt strategies that align with their averaging periods. Hence, the cost of releasing the information is likely to outweigh benefits to the public. We also note that the actual rates of return are published through the PTRMs once we finalise annual return on debt values under the trailing average approach and this provides some level of increased transparency for stakeholders.

Formula for calculating the CGS yields for a target term

We may not be able to observe yields on a CGS with a maturity exactly 10 years after a specific business day (the target term maturity date). We use the formulas referenced in clause 30 of the rate of return instrument to produce an estimate of the yields we would expect from a CGS with the target term of 10 years, on any given business day. Clause 30 of the Instrument specifies that, if available, we will use the yield to maturity on a CGS with a 10 year term. If we cannot observe a CGS with a term of 10 years, we will then use linear interpolation, which uses two CGSs with a term above and below the target term of 10 years and interpolates an estimate of the yield to maturity on a CGS with a 10 year term. Then, if there is not a CGS with a term above and a CGS with a term below the 10 year target term, we will use two CGSs between 7 and 10 years in length and linearly extrapolate an estimate of the yield to maturity on a CGS with a 10 year term.

These formulas enable us to estimate the yield to maturity on a CGS with a 10 year term when we are unable to directly observe the yields on a CGS with a 10 year term.

³⁴⁶ AER, Confidentiality Guidelines Explanatory Statement, August 2013, p.34 and AER Confidentiality Guideline, 30 August 2017, p.13

7 Equity beta

The equity beta is a key parameter within the Sharpe–Lintner CAPM which we use to estimate the return on equity. It measures the ‘riskiness’ of a firm’s returns 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.³⁴⁷

Investors are generally assumed to be able to diversify away non-systematic (or business-specific risk) and do not require compensation for business specific risk.³⁴⁸ Therefore, equity beta estimates compensate investors for bearing systematic risk.

A firm’s sensitivity or exposure to systematic risk will depend on its business activities and its level of financial leverage.³⁴⁹ For firms we regulate, this reflects the risk in providing Australian regulated energy network services.³⁵⁰

7.1 Final decision

We have selected a point estimate of 0.6 from a range of 0.42–0.88, after considering a range of submissions on the equity beta draft decision and other information.

We have maintained our overall approach to estimating the equity beta parameter from the 2013 Guidelines:

- We gave most weight to empirical estimates of relevant Australian energy network businesses
- We considered:
 - conceptual analysis of the risks of the regulated energy network businesses relative to the market portfolio
 - empirical estimates of international energy network businesses
 - the theoretical underpinnings of the Black CAPM.

³⁴⁷ R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, McGraw–Hill: First Australian edition, 2000, pp. 186–188 (Brealey et al, *Principles of corporate finance*, 2000).

³⁴⁸ G. Pierson, R. Brown, S. Easton and P. Howard, *Business Finance*, 8th Edition, p. 214.

³⁴⁹ 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 (McKenzie and Partington, *Estimation of equity beta*, April 2012). This report is available on the AER website at:

[http://www.aer.gov.au/sites/default/files/RBP%20gas%20transmission%202012%20-20Equity%20Beta%20report%20-%20McKenzie%20and%20Partington%20\(Public\)%20-%203%20April%202012_0.pdf](http://www.aer.gov.au/sites/default/files/RBP%20gas%20transmission%202012%20-20Equity%20Beta%20report%20-%20McKenzie%20and%20Partington%20(Public)%20-%203%20April%202012_0.pdf)

³⁵⁰ NER 6.5.2(c), 6A.6.2(c) and NGR 87(3)

Stakeholders had different views on the merits of each type of evidence (i.e. conceptual analysis, low beta bias, empirical estimates, Black CAPM and international estimates). For example, networks proposed giving (more) weight to short-term estimates while consumer groups opposed this proposal.

Given these differences, we reviewed the relevant arguments to assess for their strengths, weaknesses and suitability for our regulatory task.

We continue to give most weight to empirical estimates from firms that are reasonably comparable to efficient firms that supply Australian regulated energy services. We have further updated our empirical analysis to include data up to September 2018. This supported an empirical range of 0.42–0.88. This range is consistent with our conceptual analysis and international analysis which indicate that the equity beta estimate to likely be below 1.0 for an efficient firm that supplies Australian regulated energy network services. We consider our comparator set of domestic firms is the best empirical guide currently available.

We consider that our analysis supports a point estimate of 0.6 from a possible range of 0.42–0.88:

- This estimate sits within the range derived from the longest period (0.42–0.67) and the recent five years (0.49–0.88)
- Estimates for all 3 scenarios cluster around 0.5–0.6.
- It is above the long run estimates for SKI and AST (0.42), but below their estimates for the most recent five years (0.72).
- It is consistent with our international estimates.

Overall, we consider using an equity beta of 0.6 is reflective of the data before us taking into account its strengths and weaknesses. It is also consistent with our conceptual analysis.

We have considered the Black CAPM and the potential for low beta bias. We conclude that they relate to the overall return on equity which was also noted by the Independent Panel. Therefore, we consider that the Black CAPM and potential for low beta bias should not be used to adjust the equity beta parameter (we discuss this in more detail in section 8).

We noted some increase in estimates since the 2013 Guidelines, but overall empirical results, particularly the longest estimation period, support a value of less than 0.7. We do not agree with some stakeholders that the empirical results support a value of 0.7 or more.

We also considered whether gas and electricity businesses required separate betas. We conclude that systematic risks between gas and electricity networks are sufficiently similar to warrant a common equity beta.

Our final decision for a point estimate of 0.6 is based on our considerations in relation to the following matters:

- Section 7.2–Conceptual analysis

- Section 7.3–Black CAPM and low beta bias
- Section 7.4 to 7.12–Empirical analysis
- Section 7.13–Range and point estimate

7.2 Conceptual analysis

7.2.1 Final Decision

Our conceptual analysis suggests an equity beta for an efficient firm providing Australian regulated energy network services would likely be below 1.0. That is, conceptually, the overall systematic risk for an efficient firm providing Australian regulated energy firm network services would be below that of the market average firm.

This is because we expect an efficient firm providing Australian regulated energy network services would have low intrinsic risk exposure relative to the market average due to the supply of regulated monopoly services. The higher financial leverage of an efficient firm providing Australian regulated energy network services—relative to the market average—does not necessarily correspond to an equivalently high exposure to financial risk.

Our conceptual analysis is used to cross-check the range and point estimate derived from our empirical analysis which we give primary weight to.

7.2.2 Draft decision

The draft decision considered that conceptual analysis can inform where the equity beta for an efficient firm in the supply of regulated energy services sits relative to the average equity beta across all firms in the market, which is 1.0 by definition.³⁵¹

Conceptual analysis is necessarily qualitative in nature and was therefore used as a cross-check against the empirically derived range.³⁵²

7.2.3 Independent panel review

The Independent Panel recommended we clarify the discussion of financial risk:³⁵³

- It considered that financial risk depends on the fixed cost of servicing debt.
- It disagreed with our view that 'high financial leverage does not necessarily result in equivalently high financial risk' because the risk of default and bankruptcy is low.

³⁵¹ AER, *Explanatory statement to the rate of return guideline (appendices)*, December 2013, pp. 39; AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 248.

³⁵² AER, *Explanatory statement to the rate of return guideline (appendices)*, December 2013, pp. 43; AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 248.

³⁵³ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 38.

7.2.4 Stakeholder submissions

The AEC and ECA submitted that the sort of increased risks highlighted by networks do not warrant compensation in the rate of return.³⁵⁴ ³⁵⁵ Origin submitted that the commercial risk of a regulated network is very low and that they are 'largely insulated' from the business cycle.³⁵⁶ Origin considered that the risk of regulated businesses would be at the 'lowest end of the spectrum'.³⁵⁷

The NSG submitted that risk has increased for regulated energy network firms:³⁵⁸

- The draft RORG incorrectly considers technological risk as non-systematic risk and therefore does not compensate for it through the rate of return. The unique technological risks facing NSPs are not fully diversifiable.³⁵⁹
- Sovereign and regulatory risk has increased as a result of interventions by government, a deterioration in the governance underpinning energy and regulatory policy decisions and the effective removal of appeal rights on rate of return matters.
- The draft RORG does not address the increased risk to equity holders in a low inflation environment under the AER's inflation approach because equity holders bear the risk of the AER's forecast of expected inflation being inaccurate.³⁶⁰
- The ENA agreed with the Independent Panel's view. It submitted that the AER's 'conceptual analysis' has no proper basis.³⁶¹

7.2.5 AER considerations

We consider conceptual analysis can indicate the systematic risk of an efficient firm supplying Australian regulated energy network services relative to the market average firm. This allows us to form an expectation of the equity beta for an efficient firm in the supply of Australian regulated energy network services and acts as a cross-check for our empirical estimates.

Section 2.4 examines the business risk and financial risk for an efficient firm in the supply of Australian regulated energy network services. Our analysis suggested the firm's intrinsic business risk is the main driver of its systematic risk, and that we expect an efficient firm in the supply of Australian regulated energy network services to have low intrinsic risk exposure (relative to the market average). This low risk reflects both

³⁵⁴ AEC, Draft rate of return guideline response, September 2018, p. 12

³⁵⁵ ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 16.

³⁵⁶ Origin, AER rate of return guideline, 18 September 2018

³⁵⁷ Origin, AER rate of return guideline, 18 September 2018

³⁵⁸ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 2, 10–11

³⁵⁹ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 11

³⁶⁰ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 11

³⁶¹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 85-86

its monopoly position and NER and NGR provisions that are likely to mitigate various systematic and non-systematic risks (including demand risk).³⁶²

The draft decision stated that high financial leverage does not necessarily result in equivalently high financial risk.³⁶³ We acknowledge the Independent Panel's view that we should clarify the discussion of financial risk because it depends on the fixed cost of service debt rather than the risk of default and bankruptcy. We consider that the Independent Panel's view on leverage and financial risk is consistent with our view. That is, all else equal, a higher leverage leads to higher financial risk. We have also noted this previously:³⁶⁴

“Frontier, in its 2015 report, also submitted that financial leverage increases the financial risk of a firm, regardless of the likelihood of bankruptcy. It submitted that this is because financial leverage, of itself, increases the volatility of cash flows to equity. We agree with this submission, as do Partington and Satchell.”

As the Independent Panel observed, low default risk does not necessarily guarantee low financial risk. However, we consider that the overall financial risk of a regulated energy network business may not necessarily be higher than the market average despite its higher-than-average gearing level. In arriving at this conclusion, we considered Partington and McKenzie's comments on the exact relationship between financial leverage and financial risk is unclear.³⁶⁵ We also considered Frontier's previous analysis that various risks that form the overall financial risk are of low to medium magnitude.³⁶⁶

Given this view, we consider the higher financial leverage of an efficient firm in the supply of Australian regulated energy services (relative to the market average) does not necessarily result in the firm experiencing an equivalently higher exposure to financial risk.

Rather, there are reasonable conceptual grounds to expect the overall systematic risk for an efficient firm in the supply of Australian regulated energy network services to likely be below that of the market average firm, and therefore its equity beta to likely be below 1.0.

In assessing the risks to firms supplying Australian regulated energy network services, we considered submissions of increased risk to energy network businesses arising from technological risk, catastrophic and policy risks in section on risk.

We acknowledge that to the extent technological risk is systematic, it would be reflected in the empirical equity beta estimates. However, the technological

³⁶² For example, see: NER 6.3.2(b), 6.2.6, 6.5.9, 6.4.3(a)(1)-(3), 6.5.1, 6.5.2, 6.5.5, S6.2.1, S6.2.2B, S6.2.3; NGR 50, 92, 97(5), 76, 77, 78, 87(1), 90.

³⁶³ AER, 2018 draft guideline decision, p. 111.

³⁶⁴ Jemena Electricity Networks determination 2016 - 2020:

³⁶⁵ McKenzie and Partington, Estimation of equity beta, April 2012, p.10

³⁶⁶ Frontier Economics, Assessing risk for regulated energy networks, July 2013, p. 65

developments and risks energy network businesses and investors submitted as evidence of increased risk are not systematic. They are energy sector specific, and so do not warrant compensation in the return on equity.

Similarly, the regulatory risks noted by energy network businesses, investors and network associations are unlikely to have significant effects outside the energy sector. So, policy risks cannot be considered systematic³⁶⁷ and therefore be accounted for in the equity beta (or the rate of return generally). Investors could 'diversify' such risks.

We also reject the NSG's concern about forecasting errors in a low inflation environment increases risk to equity holders:

- We noted (in our inflation review) that the current regulatory framework acts to deliver the intended target: the initial real rate of return plus ex-post inflation outcomes.³⁶⁸ This approach would reduce systematic risk exposure because firms are insulated from inflation risk.
- We have consistently applied the same methodology (RBA method) for forecasting inflation over time.
- Conceptually, the effects of inflation on revenue are already included in the observed data.³⁶⁹ To the extent the current inflation approach changes equity holder returns, it would be reflected in the observed financial market data. So the equity beta derived from using this data would reflect that level of inflation.³⁷⁰ Hence, there are strong conceptual grounds to consider that the effects of inflation on revenues are already included in the observed data.³⁷¹
- Spark Infrastructure previously noted that inflation forecasting errors are not a systematic risk.³⁷²
- Our use of a trailing average cost of debt provides a natural hedge against movements in interest rates and our method for accounting for inflation provides compensation to regulated firms for outturn inflation.

7.3 The Black CAPM and low beta bias

The Black CAPM and low beta bias are two different concepts:

- The Black CAPM is an alternative model to the Sharpe-Lintner CAPM. The key theoretical difference between the two models relates to borrowing and lending

³⁶⁷ For example, AER, Final decision SA Power Networks determination 2015–16 to 2019–20, October 2015, pp. 447–448;

³⁶⁸ AER, Regulatory treatment of inflation final position, December 2017, p. 64; Where we describe the 'target' of the current approach, we mean that the combined regulatory framework (PTRM, RFM and annual pricing process) is designed so that the delivered (realised or ex-post) real rate of return on capital will equal the initial (expected or ex-ante) real rate of return on capital.

³⁶⁹ AER, Regulatory treatment of inflation final position, December 2017, p. 79.

³⁷⁰ AER, Regulatory treatment of inflation final position, December 2017, p. 93.

³⁷¹ AER, Regulatory treatment of inflation final position, December 2017, p. 79.

³⁷² AER, Regulatory treatment of inflation final position, December 2017, p. 92.

assumptions.³⁷³ As a result of different starting assumptions, the Black CAPM predicts a slope of estimated returns that can be flatter than for the Sharpe-Lintner CAPM.³⁷⁴

- Low beta bias is an observation that ex-post returns implied by the Sharpe-Lintner CAPM from low beta stocks tend to outperform expected returns.

7.3.1 Final Decision

We consider that the low beta bias and Black CAPM should not be used to adjust the equity beta parameter. We consider both are related to the overall return on equity which was also noted by the Independent Panel.

Section 8 provides more detail on the low beta bias and Black CAPM and their role in setting the overall return on equity.

7.3.2 Draft decision

The draft decision concluded we should give no weight to the low beta bias. Key reasons included that it is not used in practice to estimate an ex-ante return on equity and that there is no clear link to the estimation of ex-ante returns.

Our assessment of information since the 2013 Guidelines diminished our confidence in the Black CAPM. Our concerns with the model's empirical issues and lack of use in practice were reinforced by submissions, market practitioners' material, and considerations of expert advice received since the 2013 Guidelines.³⁷⁵ Given these problems, we concluded we should not use the theory of the model to select an equity beta point estimate (towards the top of the empirical range).

7.3.3 Independent panel review

The Independent Panel stated 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.³⁷⁶

³⁷³ The Sharpe-Lintner CAPM assumes that investors can access unlimited borrowing and lending at the risk free rate. The Black CAPM relaxes this assumption, and instead assumes that investors can access unlimited short selling of stocks, with the proceeds immediately available for investment. Either of these assumptions might correctly be criticised as being unrealistic, and it is not clear which assumption is preferable.

³⁷⁴ Fischer Black's 1972 paper on the Black CAPM develops two model specifications. The base specification assumes no risk free asset exists (no risk free borrowing or lending). The second specification assumes that the representative investor can lend but not borrow at the risk free rate. In the base specification, the return on the zero beta portfolio can be above the risk free rate. In the second specification, the return on the zero beta portfolio must be above the risk free rate. See: Black, *Capital market equilibrium with restricted borrowing*, Journal of Business 45(3), July 1972, pp. 452–454.

³⁷⁵ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 282–283.

³⁷⁶ Independent panel, Review of the Australian Energy Regulator's rate of return draft guidelines, 7 September 2018, p. 81.

It recommended that we clarify, whether, in estimating beta, the Black CAPM and the low beta bias have any relevance.³⁷⁷

7.3.4 Stakeholder submissions

The ENA, APGA and APA submitted we should select an equity beta estimate towards the upper end of empirical range (from the 2013 Guidelines) in response to the low beta bias.³⁷⁸

Evoenergy, the ENA and NSG submitted the Black CAPM should be used in its 2013 Guidelines' role to select an equity beta point estimate towards the upper end of the range.³⁷⁹

The CCP16 is reluctant for the AER to arbitrarily adjust beta for an assumed low beta bias.³⁸⁰ It also noted the Black CAPM is not suitable in the regulatory context due to its implementation issues.³⁸¹

See section 8 for additional stakeholder submissions on the Black CAPM and low beta bias.

7.3.5 AER consideration

The draft decision considered the Black CAPM and low beta bias in the equity beta section because energy network businesses submitted them in the context of adjusting equity beta.³⁸² However, stakeholders' views on their use differ:

- The ENA, APGA and APA supported using the low beta bias to select an equity beta towards the upper end of the empirical range.³⁸³ The ENA, NSG and

³⁷⁷ Independent panel, Review of the Australian Energy Regulator's rate of return draft guidelines, 7 September 2018, p. vii, vi.

³⁷⁸ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 97; APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 27; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 28

³⁷⁹ Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 38; NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13

³⁸⁰ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

³⁸¹ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

³⁸² The Black CAPM has previously been submitted in unison with the low beta bias because both indicate a flatter relationship between the return on equity estimate and the equity than the Sharpe-Lintner CAPM would indicate. Network businesses have previously submitted that the Black CAPM can functionally address the low beta bias as the model's zero beta rate is above the risk free rate—resulting in a flatter relationship. For example see: Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, September 2018; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018; Frontier, Low beta bias, December 2017, p. 1, 16–18.

³⁸³ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 97; APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 27; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 28

Evoenergy also supported using the Black CAPM in its 2013 Guidelines' role to select an equity beta point estimate towards the upper end of the range.³⁸⁴

- The CCP16 considered the equity beta point estimate should not be adjusted for the low beta bias or the Black CAPM.^{385 386}

We consider the low beta bias and Black CAPM are not relevant to estimating beta (see section 8) which was also noted by the Independent Panel. The low beta bias and Black CAPM relate to the return on equity and effectively imply a flatter relationship between the equity beta and the expected return on equity from the Sharpe-Lintner CAPM. Given this, the Black CAPM and low beta bias should not be used to adjust the equity beta parameter (as discussed in section 8):

- A number of explanations for empirical observations of the low beta bias do not imply a bias in equity beta
- Experts have observed stability in beta estimates that do not support a bias in beta estimates
- We have diminished confidence in the Black CAPM and the information it provides as shortcomings identified in the 2013 Guidelines have been reinforced: lack of use in practice, empirically unstable, sensitivity to the choice of inputs and lack of consensus.
- Energy network businesses previously proposed use of the Black CAPM to address the low beta bias which, in turn, is related to the overall return on equity. We do not consider it is appropriate to adjust the Sharpe-Lintner CAPM for the low beta bias or the Black CAPM at the return on equity level (discussed in chapter 8).

Please see chapter 8 for our consideration of the low beta bias and Black CAPM.

7.4 Comparator set

7.4.1 Final Decision

We to use the comparator set that was set out in the draft decision and to use international comparators as a cross-check for our empirical estimates:

- AGL Energy Limited
- Alinta
- APA Group
- DUET Group

³⁸⁴ Evoenergy. Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 38; NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13

³⁸⁵ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

³⁸⁶ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

- Envestra Limited
- GasNet
- Hastings Diversified Utilities Fund
- Spark Infrastructure
- AusNet Services

This is because the existing comparator firms reflect firms that are most comparable to an efficient service provider supplying Australian regulated energy services. International energy network estimates and other Australian infrastructure firms are different to an efficient service provider supplying Australian regulated energy services. We did not receive sufficient evidence to be persuaded to include these other firms in our comparator set or use them to inform a point estimate within our range.

7.4.2 Draft decision

The draft decision maintained the nine firms from the 2013 Guidelines in the comparator set because they provide useful information for informing the equity beta parameter.³⁸⁷

- They provide (historically) reliable and accurate information on the systematic risk of a service provider supplying regulated energy services.
- Alternatives (such as other Australian infrastructure firms and international energy firms) differ from an efficient firm supplying regulated energy services. They are also problematic due to issues quantifying differences with a service provider of regulated energy services. Therefore, they do not provide much useful information on the systematic risk (as captured by the equity beta) of firms supplying regulated energy network services.³⁸⁸
- Experts at the concurrent expert evidence session agreed equity beta is relatively stable because the true systematic risk is likely to be stable.³⁸⁹

7.4.3 Independent panel review

The Independent Panel did not comment on our comparator set.

7.4.4 Stakeholder submissions

The CCP16, CRG, AEC and SACES supported not expanding the comparator set:

- The task of collecting and validating each firm included in the data set is very significant and will raise many issues about the validity of the data and the firms that are finally included.³⁹⁰

³⁸⁷ AER, Draft rate of return guidelines explanatory statement, July 2018, pp. 271.

³⁸⁸ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 267.

³⁸⁹ Cambridge Economic Policy Associates, Expert Joint Report, 21 April 2018, p. 51.

- Only firms listed on the ASX and providing energy transport services in Australia should be used to provide data to inform the AER.³⁹¹
- Frontier's estimates from the transport sector may not be good comparators for the regulated energy networks.³⁹²
- Firm selection can be highly judgemental raising concerns about comparability (due to differences such as regulatory framework, institutional frameworks, capital market, tax, etc).³⁹³

The CRG submitted the small number of firms in the comparator set not only 'delivers an outcome that might not be representative now, but will be less so in the future'.³⁹⁴ It considered that the comparator set is 'contaminated by the fact that the listed firms available to use in the cohort have varying amounts of regulated and unregulated revenues'. It proposed moderating the equity beta for each of the listed firms by removing the impact of unregulated revenues to derive a value of equity beta for a firm in the provision of only regulated energy network services.³⁹⁵

The AEC suggested we diversify our evidence base for estimating beta in the future.³⁹⁶ Similarly, the CCP16 suggest we consider using indices such as the Bloomberg Utility Index.³⁹⁷

We received a February 2018 report from Frontier titled 'An equity beta estimate for Australian energy network businesses' that was submitted by Evoenergy.³⁹⁸ Frontier submitted that other ASX-listed infrastructure firms support an equity beta materially higher than 0.7.³⁹⁹

7.4.5 AER consideration

³⁹⁰ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 81.

³⁹¹ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 15

³⁹² South Australian Centre for Economic Studies, Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report, July 2018, p. 3.

³⁹³ South Australian Centre for Economic Studies, Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report, July 2018, p. 3; AEC, Draft rate of return guideline response, September 2018, p. 16

³⁹⁴ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 15

³⁹⁵ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 19

³⁹⁶ AEC, Draft rate of return guideline response, September 2018, p. 14-16

³⁹⁷ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 74.

³⁹⁸ Evoenergy, *Regulatory Proposal for the ACT electricity distribution network 2019–24 Attachment 8: rate of return, imputation credits and forecast inflation*, January 2018, p. 8–5; Frontier, *An equity beta estimate for Australian energy network businesses*, February 2018 (A January 2018 version of this report was also submitted).

³⁹⁹ Frontier, *Estimation of certain aspects of the allowed rate of return*, April 2018, pp. 14–27; Frontier, *An equity beta estimate for Australian energy network businesses*, February 2018, p. 25–28.

Ideally, we would use information from firms that share all or most of the key characteristics of an efficient service provider supplying Australian regulated energy services to estimate the equity beta estimates.

However, in practice, few firms fully reflect this. Therefore, we use market data for domestic businesses that are considered to be reasonable comparators of: domestic energy network firms. The ENA, Gray and Sadeh supported this approach.⁴⁰⁰⁴⁰¹ ⁴⁰²

To include additional firms in the comparator set, we must first be satisfied that they bear a sufficiently similar degree of risk as an efficient service provider supplying Australian regulated energy services after assessing their risks, operations, regulatory framework, etc.

As the APA noted, it is necessary to weigh up the potential statistical improvement from expanding the comparator set against the suitability of the additional firms.⁴⁰³ A small set of comparators does not necessarily justify expanding the comparator set in itself. If the additional firms do not carry a similar degree of risk or cannot be appropriately adjusted to be comparable to an efficient service provider supplying Australian regulated energy services then they can bias estimates.

Partington and Satchell, Sadeh and the NSG also agreed a small sample for firms does not necessarily require expanding the comparator set:⁴⁰⁴ ⁴⁰⁵ ⁴⁰⁶

Having considered the relevant evidence and submissions, we consider the current comparator set is appropriate for the following reasons:

- The existing comparator firms reflect information from firms that are most comparable to an efficient service provider supplying Australian regulated energy services. This has agreement from Gray, Wheatley and Sadeh at the expert concurrent evidence session.⁴⁰⁷
- International energy network estimates and other Australian infrastructure firms are different from an efficient service provider supplying Australian regulated energy services. We did not receive sufficient evidence to be persuaded to include these

⁴⁰⁰ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 28

⁴⁰¹ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 23

⁴⁰² Energy Networks Australia, AER review of the rate of return guideline response to Discussion Papers and concurrent expert evidence sessions 4 May 2018, p. 62.

⁴⁰³ Energy Networks Australia, AER review of the rate of return guideline response to Discussion Papers and concurrent expert evidence sessions 4 May 2018, p. 62.

⁴⁰⁴ Partington and Satchell, Report to the AER: discussion of comparator firms for estimating beta, June 2016, p. 9.

⁴⁰⁵ Network shareholder group, Submission on the Rate of Return Guideline (RORG) review from the Network Shareholder Group (NSG), 4 May 2018, p. 15.

⁴⁰⁶ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 44.

⁴⁰⁷ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 23, 24, 28

other firms in our comparator set or use them to inform a point estimate within our range:

- Experts acknowledged difficulties with using international firms to estimate equity beta.^{408 409 410} APA, the CCP16 and ENA also previously acknowledged the limitations of using international data for informing the equity beta.^{411 412 413 414}
 - The CCP16 and NSG noted other Australian infrastructure firms are poor comparators and of limited use for estimating equity beta.^{415 416}
 - Partington and Satchell and the CCP16 considered it is difficult to quantify and interpret the impact of these differences^{417 418}
 - The Frontier report used other Australian listed infrastructure firms to inform an equity beta point estimate. However, it did not address if these firms are sufficiently similar to an efficient firm supplying Australian regulated energy network services.
- De-listed firms carry useful and (historically) reliable information. They provide information on the systematic risk of firms that are most comparable to the firms we regulate. Experts also agreed they should be included in the comparator set.⁴¹⁹
 - Experts noted systematic risk and equity beta (for firms supplying Australian regulated energy networks services) are relatively stable and change slowly.⁴²⁰ This provides additional support for the relevance and inclusion of de-listed firms in the comparator set.

⁴⁰⁸ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 28, 33, 35

⁴⁰⁹ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 28

⁴¹⁰ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 46.

⁴¹¹ APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, pp. 18–19.

⁴¹² APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, p. 19

⁴¹³ Consumer challenger panel 16, Submission to the AER on its rate of return guideline review concurrent evidence sessions, 4 May 2018, p. 70

⁴¹⁴ Energy Networks Australia, AER review of the rate of return guideline response to Discussion Papers and concurrent expert evidence sessions 4 May 2018, p. 62

⁴¹⁵ Consumer challenger panel 16, Submission to the AER on its rate of return guideline review concurrent evidence sessions, 4 May 2018, p. 82

⁴¹⁶ Consumer challenger panel 16, Submission to the AER on its rate of return guideline review concurrent evidence sessions, 4 May 2018, p. 81.

⁴¹⁷ Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, 25 May 2018, p. 24

⁴¹⁸ Consumer challenger panel 16, Submission to the AER on its rate of return guideline review concurrent evidence sessions, 4 May 2018, p. 81.

⁴¹⁹ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 47

⁴²⁰ Cambridge Economic Policy Associates, Expert Joint Report, April 2018, p. 51.

- A small set of comparators does not necessarily justify expanding the comparator set for the sake of increasing the sample size. If the additional firms do not carry a similar degree of risk or cannot be appropriately adjusted to be comparable to an efficient service provider supplying Australian regulated energy services then they can inappropriately bias estimates.

Table 12 Firms in the AER's comparator set

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
Envesta 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 ⁴²¹ – present	Electricity, Gas
AusNet Services (AST), formerly SP AusNet (SPN)	December 2005 – present	Electricity, Gas

Source: AER analysis

We have not received sufficient evidence to persuade us that international energy and other Australian infrastructure firms have a similar degree of risk as an efficient service provider in the provision of Australian regulated energy network services. Networks and investors have not provided material on why international firms are sufficiently comparable to warrant inclusion in the comparator set or to select a point estimate.

Frontier's report used other Australian listed infrastructure firms to inform the equity beta point estimate. However, Frontier's list consists of transport infrastructure firms.⁴²² Our assessment is that the risk characteristics of these businesses are different to those of an efficient firm in the provision of Australian regulated energy services (for example, due to demand risk, different (or no) regulatory framework, etc.). The NSG also previously observed that domestic infrastructure firms from other sectors are of very limited value due to different regulatory environments and capital requirements.⁴²³

⁴²¹ The SKI data is available from December 2005, but the data prior to March 2007 reflects stapled securities traded as instalment receipts—these instalments requires further leverage adjustment and makes beta estimation difficult.

⁴²² Frontier's list includes Auckland International Airport, Aurizon, Macquarie Atlas Roads, Qube Logistics, Sydney Airport and Transurban.

⁴²³ Network shareholder group, Submission on the Rate of Return Guideline (RORG) review from the Network Shareholder Group (NSG), 4 May 2018, p. 15.

We recognise concerns with the number of comparator firms. As a result, we have retained de-listed firms and looked into industry indices for information on equity beta estimates.

The CRG noted a further problem with the current comparator set: some comparator firms contain a mix of regulated and unregulated revenue. In particular, some firms derive a relatively high proportion of their revenue from unregulated activities (see section 7.10). This result suggests firms in the comparator set are not necessarily of equal value and firms with a relatively high proportion of revenue from regulated activities (such as SKI and AST) better match an efficient firm in the supply of Australian regulated energy network services. In section 7.12 we estimated beta for still-listed firms that we consider better matches an efficient firm in the supply of Australian regulated energy network services.

7.5 International comparators

7.5.1 Final Decision

We consider that international comparators should be used as a cross check for our empirical estimates to inform whether the equity beta for an efficient firm in the supply of Australian regulated energy services would likely be above or below that of the market (1.0). We did not include international firms in the comparator set because we cannot reliably quantify and adjust for differences with a firm in the supply of Australian regulated energy network services.

Updated re-levered equity beta estimates (see section 7.12.2) suggest an equity beta estimate of less than 1.0 as average estimates range from:

- 0.63 (monthly) to 0.78 (weekly) for the longest period
- 0.75 (monthly) to 0.86 (weekly) for PTEG⁴²⁴
- 0.39 (monthly) to 0.55 (weekly) for recent 5 years

7.5.2 Draft decision

The draft decision considered international estimates cannot be (reliably) quantified and adjusted to make them comparable to domestic estimates which are the most suitable comparators. So, we did not consider it appropriate to retain international comparators in their role from the 2013 Guidelines which was to inform a point estimate from within the empirical range.⁴²⁵

However, they can provide some qualitative information on the systematic risk of an efficient firm supplying Australian regulated energy services, similar to conceptual

⁴²⁴ Post tech boom excluding GFC

⁴²⁵ AER, 2013 Guidelines explanatory statement, December 2013, p. 83.

analysis. This is because both are unable to provide information that can be (reliably) quantified.⁴²⁶

7.5.3 Independent panel review

The Independent Panel did not comment on the draft decision's use of international comparators.

7.5.4 Stakeholder submissions

The ENA noted that the draft decision Explanatory Statement uses the same reasoning as the 2013 Guidelines to now support not using the international evidence to inform the selection of a point estimate.⁴²⁷ It submitted that the relative importance of international evidence would seem to increase given the reduction in comparator firms.⁴²⁸

The ENA submitted that it does not understand the role of international comparators in the draft decision.⁴²⁹ The ENA stated that international evidence should be compared against the domestic estimates, as was done in past Guidelines.⁴³⁰

The CCP16 suggested qualifying our conclusion that international firms can still provide some information on the systematic risk of a firm by a 'clearer explanation of the selection criteria used to select international firms that are reasonably representative of the Australian [benchmark efficient entity]'.⁴³¹

7.5.5 AER consideration

We first consider if international firms are sufficiently similar to an efficient firm in the supply of Australian regulated energy network services.

We noted several difficulties with including international firms in our comparator set:⁴³²

- International firms do not operate within Australia, and differences in regulatory framework, the domestic economy, geography, business cycles and other factors are likely to drive different equity beta estimates for (potentially) similar businesses between countries.⁴³³ It is difficult to quantify the impact of these qualitative factors.

⁴²⁶ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 272.

⁴²⁷ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 83

⁴²⁸ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 83

⁴²⁹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 92

⁴³⁰ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 93

⁴³¹ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 82.

⁴³² AER, Draft rate of return guidelines explanatory statement, July 2018, p. 277; AER, Better Regulation Explanatory Statement Rate of Return Guideline, December 2013, p. 85.

⁴³³ This is supported by Partington and Satchell. See Partington and Satchell, *Report to the AER: Cost of equity issues 2016 electricity and gas determinations*, April 2016, p. 11. They stated, 'Considerable caution in reaching conclusions about beta needs to be exercised when the comparators are drawn from overseas countries. This is because of differences in industry structure, technology, the nature of competition, the economic environment and regulatory and tax systems'.

Partington and Satchell noted difficulties in interpreting different betas from different countries due to these differences.⁴³⁴

- International firms may not have the same structure as an efficient firm supplying Australian regulated energy network services. For example, a number of US comparator businesses identified by the Competition Economists Group (CEG) are vertically integrated.⁴³⁵ They engage in energy generation, wholesale and retail supply of energy, as well as other activities distinct from energy distribution and transmission. Some of the firms even engage in telecommunications, real estate development and manufacturing activities.⁴³⁶ These activities are very different from an efficient firm in the supply of regulated energy services (operating within Australia).
- We employ equity beta estimates in the context of our foundation model, the domestic Sharpe-Lintner CAPM.⁴³⁷ This approach provides a strong rationale for estimating the equity beta using Australian data. If we included international energy firms in our comparator set, it may be more appropriate to use an international or global CAPM.⁴³⁸
- Equity beta estimates from international comparators are measured with respect to the market portfolio of their home market.⁴³⁹ That is, the equity beta estimates from international comparators do not measure the firm's systematic risk relative to the Australian domestic market portfolio.⁴⁴⁰

Given these factors, we cannot (reliably) quantify and adjust international estimates to make them comparable to domestic estimates which are the most suitable comparators. Experts previously acknowledged difficulties with using international firms to estimate equity beta:

⁴³⁴ Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, 25 May 2018, p. 24

⁴³⁵ CEG describes vertically integrated US energy utility firms as 'common among [its] sample'. See: CEG, *Information on equity beta from US companies*, June 2013, p. 20.

⁴³⁶ CEG, *Information on equity beta from US companies*, June 2013, pp. 47–68.

⁴³⁷ We implement the Sharpe-Lintner CAPM under the assumption of a domestic market, but with a presence of foreign investors. This allows us to recognise that foreign investors cannot utilise imputation credits. However, a service provider in the provision of regulated energy services operates in the Australian market by definition, and we estimate the MRP in the context of the Australian market portfolio.

⁴³⁸ See Handley, *Advice on the return on equity*, October 2014, p. 24; Partington and Satchell, *Report to the AER: Cost of equity issues 2016 electricity and gas determinations*, April 2016, p. 16.

⁴³⁹ This is the case unless the equity betas are estimated using an international CAPM framework.

⁴⁴⁰ This is supported by Handley and Partington and Satchell. See Handley, *Advice on the return on equity*, October 2014, pp. 23–24; Partington and Satchell, *Report to the AER: Cost of equity issues 2016 electricity and gas determinations*, April 2016, p. 16. In his May 2015 report, Handley concluded that he does not consider it necessary to change any of the findings in his earlier (2014) report. See: Handley, *Advice on the rate of return for the 2015 AER energy network determination for Jemena Gas Networks*, 20 May 2015, p. 28.

- Using international energy firms would be problematic (for example due to different regulatory frameworks and systematic risks)⁴⁴¹ and foremost weight should be placed on domestic comparators because they are the most relevant.⁴⁴²
- Sadeh noted market practitioners use international estimates as a cross check.⁴⁴³ Sadeh also noted assessment would be more qualitative if the evidence is not domestic Australian firms.⁴⁴⁴
- No simple mathematical adjustment exists to allow appropriate consideration of international data.⁴⁴⁵
- Stephen Satchell advised 'it is not clear that a cross section of betas in one market is directly comparable with those from another market'.⁴⁴⁶

Consumer groups shared our concerns about international comparators, suggesting that:

- only firms listed on the ASX and providing energy transport services in Australia should be used to provide data to inform the AER.⁴⁴⁷
- firm selection can be highly judgemental and afflicted with comparability concerns.⁴⁴⁸
- APA also acknowledged issues with relying on data from markets in different institutional contexts, and with potentially different characteristics'.⁴⁴⁹ If we cannot reliably quantify and adjust for these differences, it would not be appropriate to use this material to compute estimates that will form the empirical range and point estimate.

However, international comparators can still provide some information on the systematic risk of an efficient firm supplying Australian regulated energy services. This

⁴⁴¹ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 33, 29, 28

⁴⁴² AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 28, 33, 35

⁴⁴³ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 28

⁴⁴⁴ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 33

⁴⁴⁵ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 46.

⁴⁴⁶ AER, Transcript of proceedings Australian Energy Regulator Office: Review of rate of return guidelines concurrent expert evidence session 2, 5 April 2018, p. 26

⁴⁴⁷ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 15

⁴⁴⁸ South Australian Centre for Economic Studies, Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report, July 2018, p. 3; AEC, Draft rate of return guideline response, September 2018, p. 16

⁴⁴⁹ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 23-24

will necessarily be in a qualitative role, like conceptual analysis, because both are unable to provide information that can be (reliably) quantified.

The ENA's proposed maintaining international comparators' role from the 2013 Guidelines—to compare against domestic estimates and inform selection of point estimate.⁴⁵⁰

However, this proposal misunderstood the role of international estimates in the 2013 Guidelines. We did not compare international estimates with domestic estimates under the 2013 Guidelines. Rather, we used international estimates to inform a point estimate from within the empirical range.⁴⁵¹ However, this approach relies on international comparators (and other firms) bearing a sufficiently similar degree of risk as a firm supplying Australian regulated energy services.⁴⁵² We found it would be difficult to use international comparators in accordance with good practice for estimating the equity beta parameter.⁴⁵³

The ENA submitted the relative importance of international evidence would seem to increase given the reduction in comparator firms.⁴⁵⁴ However, a small set of comparators does not necessarily justify expanding the comparator set in itself. If the additional firms do not carry a similar degree of risk or cannot be appropriately adjusted to be comparable then they can bias estimates.

Experts and submissions also noted that a small sample for firms does not necessarily require expanding the comparator set:

- Partington and Satchell's previously advice indicated a small sample of comparable firms is preferable to a larger sample of firms with different risks to that of a service provider supplying Australian regulated energy services.⁴⁵⁵
- The NSG noted a 'narrow set of firms is of itself an [insufficient] rationale to include additional comparators'.⁴⁵⁶
- Graham Partington and Sadeh disagreed with expanding the comparator set.⁴⁵⁷

7.6 Industry analysis

7.6.1 Final Decision

⁴⁵⁰ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 83.

⁴⁵¹ AER, 2013 Guidelines explanatory statement, December 2013, p. 83.

⁴⁵² AER, Draft rate of return guidelines explanatory statement, July 2018, p. 266.

⁴⁵³ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 277; AER, Better Regulation Explanatory Statement Rate of Return Guideline, December 2013, p. 85.

⁴⁵⁴ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 83

⁴⁵⁵ Partington and Satchell, Report to the AER: discussion of comparator firms for estimating beta, June 2016, p. 9.

⁴⁵⁶ Network shareholder group, Submission on the Rate of Return Guideline (RORG) review from the Network Shareholder Group (NSG), 4 May 2018, p. 15.

⁴⁵⁷ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 44.

We do not use the Bloomberg Utilities Index to inform our equity beta estimate for this review.

We acknowledge the value industry analysis can have in informing our equity beta decision. However, the Bloomberg Utilities index includes firms that do not supply of Australian regulated energy network services, so it would be less reflective of the systematic risk of supplying those services.

7.6.2 Draft decision

The draft decision considered industry analysis using Australian industries classified by Bloomberg can inform the equity beta of an efficient firm in the supply of Australian regulated energy network services.⁴⁵⁸ This utilities index includes our comparator firms⁴⁵⁹ which make up 3 of the top five firms in this index.⁴⁶⁰

7.6.3 Independent panel review

The Independent Panel did not comment on our industry analysis.

7.6.4 Stakeholder submissions

The CCP16 noted the small number of still-listed firms and suggested we consider using indices such as the Bloomberg Utility Index.⁴⁶¹

7.6.5 AER considerations

We recognise the decline of still-listed firms in our comparator set and that material such as industry indices could have potential value in providing information on the equity beta for an efficient firm in the supply of Australian regulated energy network services. However, its use would depend on if the firms included in the index are sufficiently similar to the firms we regulate.

After examining the Bloomberg Utilities index, we conclude that it would have limited use in this review. It contains firms that do not supply Australian regulated energy network services and so would be less reflective of the systematic risk of an efficient firm supplying Australian regulated energy services.

However, we do not exclude using industry indices in the future. We will monitor this material and its suitability for our regulatory task.

⁴⁵⁸ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 295

⁴⁵⁹ The Bloomberg utilities index includes our comparator firms that remain listed (APA, AST and SKI).

⁴⁶⁰ The top 5 firms in the utilities index make up the majority of the index: 3 of these firms are part of our comparator set (APA, AST and SKI).

⁴⁶¹ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 74.

7.7 Relative merits of short-term and long-term beta estimates

7.7.1 Final Decision

Our view is to construct our empirical range based upon estimates from three estimation periods:

- the longest period available
- the period after the ‘technology bubble’ and before the global financial crisis (GFC) and the period after GFC (PTEG)
- the last five years of available data

We place the greatest weight on estimates from the longest estimation period to inform the point estimate for several reasons:

- To obtain a more robust and statistically reliable equity beta estimate requires a sufficient number of observations (which would suggest a longer period).
- We observe cyclical in short term beta estimates. Long-term estimates better account for the cyclical in factors affecting empirical equity beta estimates.
- Shorter estimates may be influenced by factors such as one-off events (for example, the GFC), shocks and interest rate movements. These factors can (temporarily) obscure the systematic risk of a firm supplying Australian regulated energy services whose exposure is mitigated by regulation and the monopoly nature of the service it provides.
- We set the forward looking rate of return for relatively long-lived assets. Therefore the investment horizon (and risks) needs to be compatible with these assets (which is better met by estimates from the longest estimation period).

7.7.2 Draft decision

Our draft decision examined shorter and longer term estimates of equity beta from three estimation periods. This approach recognised the trade-offs in the length of the estimation period:⁴⁶²

- To obtain a robust and statistically reliable equity beta estimate we need to have sufficient number of observations (which would suggest a longer period).
- Older data might be considered less reflective of current systematic risk assessments (which would suggest a shorter period).
- We placed most weight on long term estimates because they provide more robust and statistically reliable equity beta estimates. They can also better account for any cyclical in factors affecting empirical equity beta estimates. We noted that short

⁴⁶² AER, Draft rate of return guidelines explanatory statement, July 2018, p. 253

term estimates may be influenced by factors such as one-off events (for example, the Global Financial Crisis), shocks and interest rate movements.⁴⁶³ These factors can obscure the 'true' systematic risk of a firm supplying Australian regulated energy services whose exposure is mitigated by regulation and the monopoly nature of the service it provides. For example, one-off events and shocks can cause temporary 'increase' or 'decrease' in empirical equity beta estimates. Similarly, interest rate movements tend to be cyclical, and a short-term estimate may risk capturing only a part of the cycle.

7.7.3 Independent panel review

The Independent Panel did not comment on the relative merits of short-term and long-term beta estimates.

7.7.4 Stakeholder submissions

The CRG, ECA, CCP16 and Energy Australia supported giving most weight to the longest estimation period.⁴⁶⁴ In particular, CCP16 noted that:

- It has limited confidence in the 5-year results when these are based on a shorter estimation periods because of the limited regression observation points relative to the volatility of the data. A far more extensive analysis is required for the regulator to be confident the 'trend' is sufficiently statistically robust to be relevant in making an ex-ante regulatory decision that has a long-term horizon for the expected returns of 10 years.⁴⁶⁵
- To modify the ROE parameters by an equity beta based on short-term movements is conceptually unsound. Each of these parameters is calculated to reflect the long-term expected returns to investors or debt providers on long-lived assets, an expectation that is not anchored to short-term economic or financial cycles⁴⁶⁶
- The AER is correct in placing limited emphasis on these findings in determining a long-term average equity beta value for the regulatory Sharpe-Lintner CAPM.⁴⁶⁷

The South Australian Centre for Economic Studies (SACES) submitted beta estimates fluctuate over time. But this does not mean that the latest observation tells us very much about what betas to expect in the coming few years. Unless one can establish evidence of random walks or trends in the data then we should not put too much

⁴⁶³ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 243

⁴⁶⁴ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 19; Energy Australia, AER-Draft rate of return guideline, 25 September 2018; ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 16; CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 77.

⁴⁶⁵ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 85, 87.

⁴⁶⁶ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 86.

⁴⁶⁷ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 78-79.

weight on the latest observation. Rather we should regard it as one more piece of evidence to assist with estimating the noisy random variable beta.⁴⁶⁸

The APGA and NSG proposed more weight for short term estimates:

- Given the challenge is to estimate a forward-looking rate of return commensurate with prevailing market conditions, it would be prudent to place greater confidence in more recent beta estimates taken from live firms than aging data from de-listed firms. Experts agreed in the CEPA Expert Joint Report that the weight placed on the estimates should decline in line with the length of the time since delisting. However, it submitted that the AER appears to have disregarded this advice.⁴⁶⁹
- The AER did not provide any evidence that the short term estimates have been distorted, or explain how it has accounted for distortions on longer term estimates.⁴⁷⁰
- Short-term estimates are most likely to reflect prevailing market conditions. It is counter-intuitive for the AER to conclude otherwise without presenting reasoned analysis for reaching its conclusion.⁴⁷¹
- UK and New Zealand regulators have given greatest weight to the most recent five-year period and making reference to data showing regulated firms betas have been either trending up or trending down. In Australia, the more recent five-year period estimates have increased.⁴⁷²

Evoenergy, the APGA and ENA submitted that our empirical study relies disproportionately on outdated data such as de-listed firms.⁴⁷³ The ENA noted that this is difficult to reconcile with the requirement to produce an estimate that is commensurate with the prevailing conditions in the market.⁴⁷⁴ The APGA submitted we did not provide evidence (such a cycling or stable beta) to support retaining old data.⁴⁷⁵

Frontier used 5 year estimates in support of an equity beta of at least 0.7 and increased empirical estimates. However, it supported using longer term data and noted that 'five years of data is insufficient to provide statistically reliable estimates of beta' in its report.⁴⁷⁶

⁴⁶⁸ South Australian Centre for Economic Studies, Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report, July 2018, p. 3.

⁴⁶⁹ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 19.

⁴⁷⁰ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 20.

⁴⁷¹ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 20.

⁴⁷² NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13-14

⁴⁷³ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 19; Evoenergy. Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 87, 89

⁴⁷⁴ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 87, 89

⁴⁷⁵ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 19.

⁴⁷⁶ Frontier, Updated rate of return parameter estimates, August 2017, p. 14; Frontier, Estimation of certain aspects of the allowed rate of return, April 2018, p. 19.

7.7.5 AER consideration

Generally, there is a trade-off in the length of the estimation period. Longer term estimates might be considered less reflective of current systematic risk assessments (which would suggest a shorter period). However, to obtain a robust and statistically reliable equity beta estimate we need sufficient observations (which would suggest a longer period).

- Recognising this trade-off we form our range from three estimation periods to reflect longer term and shorter term estimates of equity beta:
- the longest period available
- the period after the 'technology bubble' and before the global financial crisis (GFC) and the period after GFC
- the last five years of available data

We give most weight to estimates from the longest estimation period to inform the point estimate for several reasons:

- A more robust and statistically reliable equity beta estimate requires sufficient observations (which would suggest a longer period).
- We observe cyclicalities in short-term beta estimates. Long-term estimates better account for the cyclicalities in factors affecting empirical equity beta estimates
- Shorter estimates may be influenced by factors such as one-off events (for example, the GFC), shocks and interest rate movements. These factors can (temporarily) obscure the systematic risk of a firm supplying Australian regulated energy services whose exposure is mitigated by regulation and monopoly nature of the service it provides. For example, one-off events and shocks can temporarily 'increase' or 'decrease' empirical equity beta estimates. Similarly, interest rate movements tend to be cyclical, and a short term estimate may risk capturing only a part of the cycle.
- Damodaran has noted that for firms that are fairly stable in terms of business mix and leverage, longer term estimates should be used.⁴⁷⁷ We observe that the benchmark gearing ratio has remained at 60 per cent since the 2008 WACC review⁴⁷⁸ which supports giving most weight to the longest estimation period.

Estimates need to reflect the systematic risk of an efficient firm supplying Australian regulated energy services. The most relevant data for estimating equity beta comes from domestic energy network firms. De-listed firms may not necessarily provide the most up-to-date information about the equity beta. However, they provide (historically) reliable and accurate information on the systematic risk of an efficient service provider supplying Australian regulated energy services (as discussed in section 7.9).

⁴⁷⁷ Damodaran, Aswath, Estimating risk parameters, p. 9.

⁴⁷⁸ AER, Final decision Electricity transmission and distribution network service providers review of the weighted average cost of capital (WACC) parameters, May 2009

The increasing equity beta estimates observed in recent years may reflect falling interest rates since the 2013 Guidelines. Our comparator firms can be considered bond proxies⁴⁷⁹ and ‘there is likely to be an inverse relation between [prices of bond proxies] and interest rates.’⁴⁸⁰ As a result, we consider that they would tend to outperform the market during times of interest rate decreases⁴⁸¹ (a view shared by Partington and Satchell).⁴⁸² This outperformance would drive an increase in short term equity beta estimates as we and energy network businesses observed.⁴⁸³ The low risk from the market would make bond proxies even more bond like which would increase the outperformance and thus beta estimates.⁴⁸⁴

We considered cyclical movements in empirical beta estimates. The rolling one-year betas for the still-listed firms (APA, SKI and AST) indicate cyclical in short term estimates as they moved up and down over time (Figure 13).⁴⁸⁵

Figure 13 Rolling 1 year equity beta for still listed firms



Source: Bloomberg; AER analysis

Consistent with our draft decision, this trend warrants emphasising long term data series for estimating parameters and avoiding over-reliance on short term estimates

⁴⁷⁹ Partington and Satchell, Report to the AER: Allowed rate of return 2018 Guideline review, 25 May 2018, p. 18; DJ Carmichael, Increasing Focus on Global Bond Yields, 20 July 2017; Motley Fool, Citigroup thinks this income could deliver a fatter-than-expected dividend, February 2018, available at: <https://www.fool.com.au/2018/02/28/citigroup-thinks-this-income-stock-could-deliver-a-fatter-than-expected-dividend/>

⁴⁸⁰ Partington and Satchell, Report to the AER: Allowed rate of return 2018 Guideline review, 25 May 2018, p. 21.

⁴⁸¹ <https://www.clime.com.au/investing-report-archive/time-sell-bond-proxies/>;
<https://www.commbank.com.au/guidance/retirement/what-you-need-to-know-about-bond-proxies-201610.html>;

⁴⁸² Partington and Satchell, Report to the AER: Allowed rate of return 2018 Guideline review, 25 May 2018, p. 18.

⁴⁸³ Equity beta measures the ‘riskiness’ of a firm’s return compared with that of the market. Both negative and positive outperformance compared with that of the market would drive increase in the equity beta estimate.

⁴⁸⁴ Partington and Satchell, Report to the AER: Allowed rate of return 2018 Guideline review, 25 May 2018, p. 19.

⁴⁸⁵ We use 1 year rolling beta because this would illustrate any cyclical movement more acutely.

that may capture a section of the cycle and be affected by interest rate movements, volatilities and 'one-off' events.⁴⁸⁶

The NSG noted international regulators and other Australian regulators have given more weight to short-term estimates.⁴⁸⁷ The NSG and ENA noted UK regulators gave greatest weight to five-year estimates. John Earwaker, in a report for the ENA, noted that regulatory practice in the UK and New Zealand tends to give more weight to short term data than the AER.⁴⁸⁸

- However, in a report for the UK Regulators Network (UKRN), Robertson and Wright cautioned against reliance on short term beta estimates:
- Strong historical evidence suggests short-term shifts in volatility and correlations do not persist indefinitely. They concluded the most recent rolling beta estimates are very likely to prove temporary.⁴⁸⁹
- Both short and long-term beta estimates appear to have been quite stable and so there is a strong prima facie argument to use all available data to estimate beta, not just a relatively short recent sample.⁴⁹⁰

Advisors to the UKRN noted the length of the investment horizon may affect the nature of systematic risk over that horizon, and hence, the cost of capital within a CAPM framework.⁴⁹¹ They also observed that beta estimates should incorporate all available evidence and that volatilities and correlation change over time.⁴⁹² Partington and Satchell noted that they are 'not convinced that the AER should do anything different than what they are currently doing'.⁴⁹³

Reflecting these considerations, we give most weight to the longest estimation period because:

- it is more consistent with the investment horizon (and risks) of the long-lived assets we regulate and set a rate of return for
- it would incorporate and reflect a longer and larger range of market conditions.

We have considered the John Earwaker report. In observing the UK regulators' practice, it has also acknowledged that a recent study commissioned by the UK

⁴⁸⁶ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 300.

⁴⁸⁷ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13-14

⁴⁸⁸ John Earwaker, The AER's draft WACC guideline: an international perspective, September 2018, p. 11

⁴⁸⁹ Estimating the cost of capital for implantation of price controls by UK Regulators – Page 52

⁴⁹⁰ Estimating the cost of capital for implantation of price controls by UK Regulators – Page 52

⁴⁹¹ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), March 2018, p. 52.

⁴⁹² Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), March 2018, p. 139.

⁴⁹³ Partington and Satchell, Report to the AER: discussion of submissions on the draft 2018 guideline, November 2018, p. 20

regulators has highlighted the possibility that regulators' faith in short horizon beta estimates is misplaced which has triggered further investigations.⁴⁹⁴

7.8 Empirical beta estimates are increasing but our point estimate is decreasing

7.8.1 Final Decision

We disagree with energy network businesses' and investor's view that increase in empirical beta estimates warrant an equity beta of at least 0.7.

Our equity beta point estimate of 0.6 balances a range of factors and reflects further considerations since the 2013 Guidelines.

The main factors suggesting the increase in the point estimate are an increase in short term estimates and a marginal increase in estimates from the longest estimation period (see section 7.12 and 7.13). However, we caution over-reliance on short-term results as bubbles and corrections are normal part of market operation. During these periods, the firms we regulate (sometimes referred to as 'defensive stocks and due to their steady regulated revenue), attract greater investor attention (sometimes called the 'flight to quality') and experience rising beta estimates.

In 2013 we took a conservative step in setting the beta point estimate at 0.7 (down from 0.8) despite empirical estimates supporting a lower value. However, we now have an even longer time series for our empirical analysis. We give most weight to this longest period and long-term estimates continue to remain below 0.7. The consistency of the results means we have more confidence to align our point estimate with our empirical results. We also better understand how unregulated activities affect beta estimates – long term estimates for firms with the greatest per cent of regulated revenue are below 0.5.

7.8.2 Draft decision

Our draft decision acknowledged that there were signs of increased empirical estimates since the 2013 Guidelines.⁴⁹⁵ However, our analysis indicated a point estimate of 0.6 was appropriate for reasons including:⁴⁹⁶

- The result of our empirical analysis which we give most weight. This supported an equity beta estimate of 0.6 as estimates clustered around the 0.5–0.6 range.
- Our conceptual analysis and international empirical estimates supported an equity beta estimate below 1.0.
- We did not use the theory of the Black CAPM to select towards the upper end of our empirical range after further considering the model.

⁴⁹⁴ John Earwaker, The AER's draft WACC guideline: an international perspective, September 2018, p. 11

⁴⁹⁵ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 261.

⁴⁹⁶ AER, Draft rate of return guidelines explanatory statement, July 2018, pp. 297–300.

- Promoting stability by not departing substantially from our previous value and leaving some scope to account for concerns around market imperfections affecting the Sharpe-Lintner CAPM while recognising the other factors we have identified as relevant.
- It was also not clear to us that the movements since 2013 are supportive of an increase in the systematic risk in the supply of Australian regulated energy services and an equity beta above 0.7.⁴⁹⁷
- Our empirical analysis (which we give most weight) supported an equity beta point estimate of 0.6 as estimates clustered around the 0.5–0.6 range.
- Some firms have undertaken a range of transactions that would increase their exposure to systematic risk from unregulated assets and/or assets that are different from the risk of providing the Australian regulated energy network services.⁴⁹⁸
- Increases since 2013 coincided with and would likely be affected by falling interest rates and historically low volatilities in the market due to the comparator firms being bond proxies.
- Submissions of increased risk focused on non-systematic risks (such as regulatory and technology) that do not warrant compensation through the Sharpe-Lintner CAPM

7.8.3 Independent panel review

The Independent Panel did not comment on this topic.

7.8.4 Stakeholder submissions

The ENA, Evoenergy and NSG noted that domestic firms' estimates since the 2013 Guidelines support an increase in equity beta⁴⁹⁹ and international evidence supports an equity beta above 0.6.⁵⁰⁰ The NSG observed that other Australian regulators have set an equity beta of 0.7 or higher⁵⁰¹ and the AER has increased its top of the range estimate to 0.8 from 0.7.⁵⁰²

⁴⁹⁷ AER, Draft rate of return guidelines explanatory statement, July 2018, pp. 297–300.

⁴⁹⁸ <https://www.apa.com.au/about-apa/our-history/>; <http://www.duet.net.au/getattachment/ASX-releases/2015/DUET-Completes-Acquisition-of-Energy-Developments/DUET-Completes-Acquisition-of-Energy-Developments-L/DUET-Completes-Acquisition-of-Energy-Developments-Limited.pdf.aspx>

⁴⁹⁹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 86; Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13-14

⁵⁰⁰ Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 83; NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13–14

⁵⁰¹ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13-14

⁵⁰² NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 14-15

The CCP16 submitted that the observations of increase rely on analysing a shorter estimation period⁵⁰³ which cannot readily be explained by reference to the theory of the equity beta, changes in systematic risk, changes in gearing, a more hostile regulatory environment or worsening economic conditions. Absent such explanations, it is impossible to determine if these results represent a long-term shift in equity beta for a business in the provision of regulated energy services, structural changes in the comparator set, cyclical conditions that will revert over time, or merely a statistical ‘blip’.⁵⁰⁴ The AER is correct therefore in placing limited emphasis on these findings in determining a long-term average equity beta value for the regulatory Sharpe-Lintner CAPM.

7.8.5 AER consideration

We recognise empirical estimates have increased since the 2013 Guidelines. However this does not necessarily lead to maintaining 2013 value (0.7) or an increase for this review.

In the 2013 Guidelines, our empirical estimates supporting a lower value. However, we selected a point estimate of 0.7 (from a range of 0.4–0.7) due to consideration of the theory of the Black CAPM and international estimates.

Further consideration in this review (in section 7.5 and the draft decision) concluded that international estimates are better suited in a cross-checking role and the theory of the Black CAPM should not be used to select a point estimate (see section 8).

Observations of increase are most prevalent in short-term estimates. We did not ignore this information; indeed it feeds into our empirical range with the top of the range now 0.88.

We give most weight to estimates from the longest estimation period in selecting a point estimate (see section 7.7) which shows marginal increase since the 2013 Guidelines. Our empirical update, similar to that in the 2013 Guidelines, indicated a point estimate of less than 0.7. A range of considerations also support an equity beta less than 0.7 (see section 7.13):

- the impact of regulation on systematic risk and equity beta estimates
- it uncertainty that movements since 2013 support an increase in the systematic risk of supplying Australian regulated energy services and an equity beta of at least 0.7.

7.9 Relative weight of estimates from still-listed and de-listed firms

7.9.1 Final Decision

⁵⁰³ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 74.

⁵⁰⁴ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 78-79.

Our view is to include de-listed firms in our comparator set as they provide (historically) reliable and accurate information on the systematic risk of an efficient service provider supplying Australian regulated energy services.

7.9.2 Draft decision

The draft decision recognised that de-listed firms may not necessarily provide the most up-to-date information about the equity beta. However, we retained them in the comparator list because they should still provide useful information for informing the equity beta parameter for reasons including.⁵⁰⁵

- They provide (historically) reliable and accurate information on the systematic risk of a service provider in the provision of Australian regulated energy services.
- Alternatives such as international energy firms and other Australian infrastructure firms are problematic due to issues quantifying differences with a supplier of Australian regulated energy services.
- Experts at the concurrent expert evidence session agreed that equity beta is relatively stable because the true systematic risk is likely to be stable.⁵⁰⁶

7.9.3 Independent panel review

The Independent Panel did not comment on the relative weight of estimates from currently listed and delisted firms.

7.9.4 Stakeholder submissions

The ENA submitted that we disregarded a number of agreed positions set out in the Expert Joint Report including reducing the weight of de-listed firms.⁵⁰⁷ Similar submission was made by the Joint Energy Businesses (JEB).⁵⁰⁸

The CCP16 submitted that it is reasonable to include de-listed firms in the comparator set and to have regard to the two still-listed majority regulated firms.⁵⁰⁹ It considered that more regard should be given to the results for the latter firms as they are the only remaining firms that 'approach the conceptual definition of the BEE' and the estimates have been relatively consistent over time.⁵¹⁰

7.9.5 AER consideration

⁵⁰⁵ AER, Draft rate of return guidelines explanatory statement, July 2018, pp. 271.

⁵⁰⁶ Cambridge Economic Policy Associates, Expert Joint Report, 21 April 2018, p. 51.

⁵⁰⁷ ENA, Public forum presentation initial network sector perspectives, 2 August 2018, slide 23.

⁵⁰⁸ Joint Energy Businesses, Submission to draft 2018 rate of return guideline, 25 September 2018, p. 6

⁵⁰⁹ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 80.

⁵¹⁰ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 80.

We consider that firms included in our comparator set should reflect the systematic risk of an efficient firm supplying Australian regulated energy services. The most relevant data for estimating equity beta comes from domestic energy network firms.

We recognise that de-listed firms may not necessarily provide the most up-to-date information about the equity beta. However, they provide (historically) reliable and accurate information on the systematic risk of an efficient service provider supplying Australian regulated energy services.

Experts at the concurrent expert evidence session also agreed that equity beta is relatively stable because the true systematic risk is likely to be stable.⁵¹¹ We consider this view supports including de-listed firms which should provide useful information for informing the equity beta parameter.

Further, Partington and Satchell supported the use of de-listed firms as 'beta has been stable through time and therefore historic estimates of beta, including from companies that are now delisted, can be used to inform current estimates'.⁵¹²

We also considered the Expert Joint Report and consider it should be read in the appropriate context.

First, the report's author (CEPA) confirmed that agreed positions in the report may have been taken if no one objected rather than by requiring positive agreement. Assessing the views was not a quantitative voting exercise.⁵¹³

Second, the report should be read together with the transcripts for the sessions. We found experts did not reach agreement on a number of areas indicated as such in the Expert Joint Report.⁵¹⁴

The ECA also noted that 'caution should be exercised when considering the Expert Joint Report and unless expressly stated in that report no expert should be assumed to have changed their view from anything stated in the sessions themselves'.⁵¹⁵

⁵¹¹ Cambridge Economic Policy Associates, Expert Joint Report, 21 April 2018, p. 51.

⁵¹² Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, 25 May 2018, p. 25; Partington and Satchell, Report to the AER: discussion of comparator firms for estimating beta, June 2016, p. 9..

⁵¹³ See CEPA, *AER RORG Expert Joint Report*, 21 April 2018, p. 11: "It should be noted that not all experts were present in all the sessions and may therefore not have given views on all issues. The issues on which experts contributed were set out above in Section 1.1. Graham Partington (GP) was unavailable due to overseas commitments from 14 April 2018 and provided limited input from that date, but did have sight of the final draft. David Johnstone provided input on drafts until 10 April 2018.

The report indicates when most experts held a particular view. However, assessing the views was not a quantitative voting exercise, but a way of identifying alternative views and the reasons for them. Dissenting views of any expert were considered to be of value and may inform the views of the AER."

⁵¹⁴ For example, the Expert Joint Report noted that experts agreed the AER should only compare equity beta estimates that have been relevered to the same level of gearing (page 39). However, Expert Evidence Session 2 transcript does not indicate that experts reached such agreement (page 6–20).

⁵¹⁵ ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 7.

It is clear from the Expert Joint Report that experts did not reach agreement on the use of de-listed firms amongst other issues. Jim Hancock stated that 'delisted firms should be in the comparator set as the case for reducing their weight with time since listing has not been made'.⁵¹⁶ We note that the comparator firms need to reflect the systematic risk of an efficient firm supplying Australian regulated energy services. The most relevant data for estimating equity beta comes from domestic energy network firms.

7.10 The effect of regulation and beta

7.10.1 Final Decision

Our view is that regulation reduces the equity beta estimate of a firm which suggests placing relatively more weight on firms that are (majority) regulated (under our framework) such as Spark and AusNet. This is because they would better match an efficient firm in the supply of Australian regulated energy network services (see section 7.4).

7.10.2 Draft decision

The draft decision looked at the impact of regulation on empirical equity beta estimates. We found a general trend of increasing beta estimates as the proportion of regulated revenue decreased. This result is consistent with the conclusion that regulation lowers a firm's equity beta estimate.⁵¹⁷

7.10.3 Independent panel review

The Independent Panel did not comment on this issue.

7.10.4 Stakeholder submissions

The CRG, ECA and Energy Australia submitted that equity beta estimates should reflect the lower risk of supplying regulated services as some comparator firms operate a mix of regulated and unregulated services.^{518 519 520} The CRG submitted that equity beta decreases as the proportion of regulated revenue increases.⁵²¹

⁵¹⁶ Cambridge Economic Policy Associates, Expert Joint Report, 21 April 2018, p. 51.

⁵¹⁷ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 109.

⁵¹⁸ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 20

⁵¹⁹ ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 17.

⁵²⁰ Energy Australia, AER-Draft rate of return guideline, 25 September 2018.

⁵²¹ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. xiii

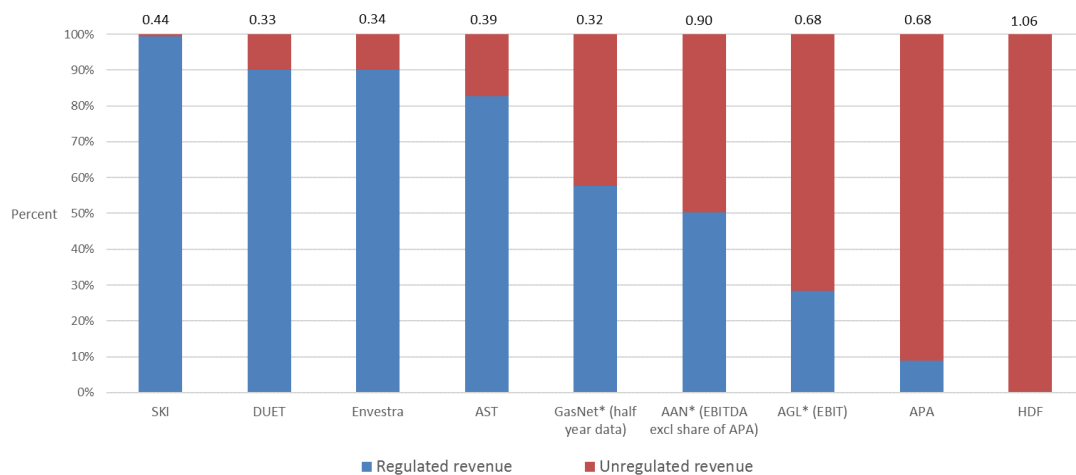
AGL and AEC submitted that regulated networks have very low systematic risk exposure.^{522 523} AEC added that it is reasonable to expect beta to be relatively low and there is no obvious reason for the AER to take the high end of the numerical range derived from its quantitative analysis.⁵²⁴

7.10.5 AER consideration

Determining the effect of regulation can be difficult. Public data (such as annual reports) on the proportion of revenue businesses derive from regulated activities is imperfect because firms can change their reporting metric and is subject to reporting requirements outside the scope of our regulation. Firms are also not required to report revenue split by regulated and unregulated operations.

Based on annual report information, we observe a general trend of decreasing beta estimates as the proportion of regulated revenue increases (see Figure 14).

Figure 14 Regulated revenue and beta estimates



Source: Bloomberg; AER analysis

This result suggest regulation reduces systematic risk, lowers a firm’s equity beta estimate and indicates a point estimate towards the bottom half of the range:

Our comparator set contains firms with varying levels of regulated operations and firms with majority regulated operations typically have lower equity beta estimates. We do not exclude firms with fewer regulated operations from our comparator set. However, estimates for the longest estimation period derived from firms with a high proportion of regulated operations are clustered in the bottom half of the empirical range.

⁵²² AGL, Re: Draft rate of return guidelines, 25 September 2018

⁵²³ AEC, Draft rate of return guideline response, September 2018, p. 12

⁵²⁴ AEC, Draft rate of return guideline response, September 2018, p. 13–14

Our use of a trailing average cost of debt provides a natural hedge against movements in interest rates and our method for accounting for inflation provides compensation for outturn inflation. Separate beta estimates for gas and electricity

7.11 Separate beta estimates for gas and electricity

7.11.1 Final Decision

We apply a single beta for regulated gas and electricity firms. Our conceptual analysis (in section 7.2) suggests 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. International information do not provide persuasive evidence that separate betas are warranted due to differences in regulatory frameworks, environments and risk characteristics.

7.11.2 Draft decision

Our draft decision determined a single beta for gas and electricity businesses:

- Gas and electricity service providers face similar regulatory frameworks and limited competition risk as regulated natural monopolies
- To the extent there are genuine risks of extreme changes in demand which present the potential of asset stranding, the regulatory regime can mitigate this risk by providing prudent discounts and accelerated depreciation provisions.
- There was no consensus within our expert panel on whether different betas were warranted.⁵²⁵
- International comparators did not provide clear guidance on whether gas and electricity network service providers should be subject to different betas.
- The New Zealand Commerce Commission's 2016 decision to include a 0.05 beta uplift for gas firms was not sufficiently persuasive to warrant different betas in Australia⁵²⁶
 - Its beta analysis was based on a comparator sample of NZ, Australian, UK and US utility firms, which included vertically integrated utilities. This approach conflicts with our decision to use a domestic pure-play comparator set due to differences in risk and regulatory environments.⁵²⁷
 - The low gas penetration factor is less relevant in the Australian market, with 56 per cent of Australia connected to gas compared to only 21 per cent of the North Island.⁵²⁸

⁵²⁵ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 103.

⁵²⁶ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 103.

⁵²⁷ See AER, Final decision AusNet distribution determination – attachment 3 – rate of return – May 2016, pp 38

⁵²⁸ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016, Paragraph 418*

- It is not clear whether gas has a higher price elasticity than electricity. The ACCC’s east coast gas inquiry concluded that suppliers had market power over gas users.⁵²⁹
- The NZCC acknowledged that “neither of these factors are sufficient in supporting an uplift in isolation”.⁵³⁰
- Our empirical analysis is based on a comparator set which includes gas service providers. Therefore, if there are differences in the systematic risks of electricity and gas service providers, this may be captured in our Australian empirical estimates of equity beta.

7.11.3 Independent panel review

The Independent Panel did not comment on the issue of separate beta estimates for gas and electricity.

7.11.4 Stakeholder submissions

APA submitted that gas businesses possess higher risk (and warrant a higher equity beta) than electricity businesses:

- Quantitative analysis from HoustonKemp, supports gas pipelines having a higher beta than electricity networks⁵³¹
- The AER’s conclusion of similarity was based on a qualitative assessment. However, it lacks the precision required to assess whether there is a difference between the betas for those service providers.⁵³²
- the Commerce Commission set different beta for gas and electricity businesses based on firms from 3 markets indicates a possible difference, but not much more. There are then, reasons for thinking that the equity betas of electricity network service providers might be different from those of gas pipeline service providers.⁵³³
- The experts noted difference between gas and electricity providers do not necessarily translate into the rate of return and the difficulty in measuring the differences. However, this tells nothing about those differences between gas and electricity.⁵³⁴

⁵²⁹ ACCC Inquiry into the east coast gas market, April 2016, p.18-19

⁵³⁰ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016, Paragraph 344*

⁵³¹ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 15

⁵³² APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 15

⁵³³ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, pp. 23-24

⁵³⁴ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, pp. 23-24

- “the experts, it seems, had nothing to say on whether there are differences in systematic risk, and nothing to say about whether the betas might be different as between electricity network and gas pipeline service providers”⁵³⁵
- Competition in the electricity sector is different from competition in the gas pipeline sector.
 - Gas transmission pipeline service providers are not revenue capped; they are subject to price caps⁵³⁶
 - There is competition among gas supply chains of which transmission pipelines are an integral part, for gas delivered to end-users.⁵³⁷
 - Pipeline service providers are also exposed, through their contracts with users, to volatility in downstream markets. These risks are not reduced by regulation which, in the event of prolonged downturn or plant closure, allows pipeline costs to be recovered through higher tariffs for remaining users.

The APGA submitted that there is overseas precedent demonstrates the differing beta for gas networks, and there is general acceptance among experts that there is a difference in risk between the regulated gas and electricity businesses (though experts acknowledged it is difficult to quantify).⁵³⁸ It added that there is no reason as to why they should be treated the same.⁵³⁹

7.11.5 AER consideration

If the systematic risk of providing different network services by gas and electricity networks is different then we may need to recognise different benchmarks. In assessing whether more than one benchmark is required, the key issue is whether there is a difference in systematic risk between supplying gas and electricity regulated network services. If we were to accept there are reasons why equity beta for gas firms may be high than electricity firms, we would then need to consider whether gas firms should have a beta above 0.6 or should electricity firms have a beta less than 0.6.

Our conceptual analysis (in section 7.2) suggests that the equity beta for regulated gas and electricity firms is likely to be similar (but may be different). The regulatory framework for gas and electricity service providers are similar because both face limited systematic risk by virtue of being regulated natural monopolies.

⁵³⁵ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, pp. 23-24

⁵³⁶ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, pp. 23-24

⁵³⁷ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 23

⁵³⁸ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 4-5.

⁵³⁹ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 8.

Applying HoustonKemp's classification to our empirical equity beta updates, we observe gas firms⁵⁴⁰ ranged from 0.32–1.06 and mixed/electricity-dominant⁵⁴¹ firms ranged from 0.33–0.79. However, the estimates' wide-range and the (relatively) small number of comparators do not provide robust information on a different beta for regulated gas firms. A point estimate of 0.6 falls into both ranges and the substantial overlap between the two suggests a value of 0.6 is not unreasonable.

We have not received evidence to suggest that there is material difference in risk between revenue and price cap. Our 2009 WACC review found no compelling evidence to suggest the equity beta should differ based on the form of control (revenue cap versus price cap).⁵⁴² The MEU acknowledged there was only marginal difference between price and revenue caps on exposure to systematic risk and did not propose to set a different equity beta based on the form on control. Further, KPMG previously accounted for any difference in price vs revenue cap in the cashflows.⁵⁴³

We disagree with APA's view that HoustonKemp's results indicate a higher beta for gas firms. HoustonKemp disaggregated firms⁵⁴⁴ in our comparator set into the following sectors: 'gas' and 'mixed'. It estimated beta for these firms and a gas-only portfolio but did not account for the proportion of revenue a firm generates from regulated operations. It is difficult to tell if the results were driven by regulation or difference between gas and electricity. HoustonKemp cautioned that its results should not be relied on to indicate the equity beta of a firm that operates solely gas businesses.⁵⁴⁵

It is also not clear that HoustonKemp's derivation of equity beta estimates for a gas-only portfolio is entirely appropriate. Its derivation appears to be based on accounting data or book value from annual reports (where available). However, 'decomposing the beta of a firm into its constituent parts the market value weights of the constituent parts are required'.⁵⁴⁶ Partington and Satchell noted 'there is no tight link between book values and market values' and the relationship changes over time.

Further, HoustonKemp provided estimates for a pure play gas beta both greater than and less than 0.7, but only the evidence for a beta 0.7 is statistically significant.⁵⁴⁷

⁵⁴⁰ Alinta, APA, Envestra, GasNet, Hastings. Based on HoustonKemp's analysis that all or most of their operations or revenue were from gas businesses.

⁵⁴¹ SKI, AST, AGL, Duet. HoustonKemp classified AGL as mixed as there was insufficient information to allow disaggregation. AST and SKI are classified as mixed but they derive the bulk of their EBITDA from electricity businesses. Duet has a 42:58 mix for electricity vs gas EBITDA.

⁵⁴² AER, Final decision: WACC review, May 2009, pp. 251–252, 341.

⁵⁴³ KPMG, DUET Independent Expert's Report and Financial Services Guide, March 2017, p. 252.

⁵⁴⁴ HoustonKemp stated that this is based on segment information from financial statements in annual reports (p. 11). It appears that EBITDA was used when available for APA, AST, DUET, HDF. Where EBITDA information was not available, notes and comments from annual reports were used.

⁵⁴⁵ HoustonKemp, Australian estimates of the equity beta of a gas business, September 2018, p. 20.

⁵⁴⁶ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, p. 17

⁵⁴⁷ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, p. 18

- Decisions by international regulators do not provide persuasive evidence of separate betas:
- The NZCC’s reasons for applying a small uplift (0.05) to gas firms do not appear to be relevant to the firms we regulate.⁵⁴⁸
 - Its beta analysis was based on a comparator sample of NZ, Australian, UK and US utility firms, which included vertically integrated utilities. This methodology is distinct from ours, which uses a domestic pure-play comparator set given differences in risk and regulatory environments.⁵⁴⁹
 - The low gas penetration factor is less relevant in the Australian market, with 56 per cent of Australia connected to gas compared with only 21 per cent of the New Zealand North Island.⁵⁵⁰
 - It is not clear whether gas has a higher price elasticity than electricity. The ACCC’s east coast gas inquiry concluded suppliers had market power over gas users.⁵⁵¹
 - The NZCC applied an uplift (of 0.05) and acknowledged that “neither of [the factors it considered] are sufficient in supporting an uplift in isolation”.⁵⁵²
- The NZCC noted that given differences in context, regulatory frameworks and environments, decisions by international regulatory entities provide limited benefit.⁵⁵³
- European evidence also provides mixed direction, with half of the regulators in the NZCC sample using the same asset beta, or a lower asset beta for gas.⁵⁵⁴
- APA previously expressed concern with relying on data from markets in different institutional contexts, and with potentially different risk characteristics. This position makes the NZCC’s decision of a beta uplift less convincing.

It is also not clear experts supported different betas for gas and electricity businesses:

- There was no agreement on whether different benchmarks were warranted.⁵⁵⁵ Partington noted difficulty in reliably measuring the risk differences, Johnstone noted the possibility of upside risks and Gray noted there may be discussions on whether risks are partially non-systematic.

⁵⁴⁸ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 104.

⁵⁴⁹ See AER, Final decision AusNet distribution determination – attachment 3 – rate of return – May 2016, pp 38

⁵⁵⁰ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016, Paragraph 418*

⁵⁵¹ ACCC Inquiry into the east coast gas market, April 2016, P.18-19

⁵⁵² New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016, Paragraph 344.*

⁵⁵³ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016, Paragraph 442*

⁵⁵⁴ New Zealand Commerce Commission, *Input methodologies review decisions, topic paper 4 cost of capital issues, December 2016, Paragraph 434*

⁵⁵⁵ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence Expert Joint Report, April 2018, p.49

- Both Sadeh and Gray stated differences between electricity and gas network service providers may translate to operating expenditure rather than rate of return.
556 557

Further, we consider that regulated gas firms would not face substantively different competition (if any) to regulated electricity firms to warrant a separate beta.

We set the rate of return for Australian regulated energy network firms. A number of inherent characteristics of an energy network firm lead to low systematic risk exposure because they are relatively insulated from systematic risk due to operation of a natural monopoly and provision of an essential services. The structure of the regulatory regime insulates service providers from systematic risk.

We note that the return on equity should only compensate investors for bearing systematic risk. Sadeh and Gray's statements indicate the difference in risk between regulated gas and electricity firms are not systematic and do not warrant compensation via the rate of return.

7.12 Empirical updates

7.12.1 Domestic estimates

Our empirical estimates of equity beta are based on regressions that relate the returns on a set of comparator firms to the return on the market. Our comparator set comprises Australian energy network firms with a similar degree of risk as a service provider in the provision of regulated services. We consider that empirical estimates for this comparator set best meet the criteria we set out in the 2013 Guidelines for assessing materials and their relevance/suitability for determining the rate of return.⁵⁵⁸ That is, these empirical estimates are:

- Based on available market data and derived with sound, econometric techniques.
- Fit for purpose because they are based on businesses that most closely, albeit imperfectly, 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.

⁵⁵⁶ AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p.63.

⁵⁵⁷ AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p. 58

⁵⁵⁸ AER, Better Regulation Explanatory Statement Rate of Return Guideline, December 2013, pp. 23–26, 83-84,

- As a result, we consider empirical studies are likely to contribute to a rate of return estimate that achieves the regulatory objectives and a source of evidence that should be used as the primary determinant of equity beta.

We have further updated our draft decision estimates by including data up to September 2018. This updates Professor Olan Henry's 2014 study which was used in the 2013 Guidelines and previously updated in 2017 and our draft decision.^{559 560}

We consider the most useful empirical estimates:

- use the Ordinary Least Squares (OLS) estimator
- are measured over multiple estimation periods
- use weekly return intervals
- use the Brealey–Myers formula to de- and re-lever raw⁵⁶¹ estimates to a benchmark gearing of 60 per cent, although we consider both raw and re-levered estimates
- are based on averages of individual firm estimates and fixed weight portfolios (equal weighting and value weighting)
- do not apply a Blume or Vasicek adjustment.⁵⁶²

Table 13 sets out updated re-levered OLS equity beta estimates for the individual comparator firms (averaged across firms) and fixed weight portfolios⁵⁶³ respectively. We formed a portfolio (P8) for the still listed majority regulated firms. We noted that firms with a relatively high proportion of revenue from regulated activities (such as SKI and AST) better match an efficient firm in the supply of Australian regulated energy network services (see section 7.4).

The results show that:

- The re-levered individual firm estimates (averaged across firms) range from 0.57–0.72.
- The re-levered fixed weight portfolio estimates range from 0.42–0.88

⁵⁵⁹ While Professor Henry's report was published in 2014, estimates were provided to the AER during 2013 to inform the Rate of Return Guideline review. For example, see: AER, Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return, November 2017, pp. 64–67.

⁵⁶⁰ In this update, we estimated Ordinary Least Squares (OLS) and Least Absolute Deviation (LAD) estimates of equity beta for our comparator firms just as Professor Henry did in his 2014 study. See AER, staff beta analysis, June 2017.

⁵⁶¹ Raw equity beta estimates are those that are observed from the initial regression

⁵⁶² Henry does not apply a Blume or Vasicek adjustment of any of his estimates, as specified in our terms of reference.

⁵⁶³ Equally weighted and value weighted portfolios

Table 13 Re-levered weekly equity beta estimates from AER update (OLS, weekly)

		P1	P2	P3	P4	P5	P6	P7	P8
Firms	Avg of firm estimates ⁵⁶⁴	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		23/06/2000	28/12/2001	23/12/2005	9/03/2007	9/03/2007	9/03/2007	9/03/2007	9/03/2007
End		12/09/2014	6/10/2006	23/11/2012	23/11/2012	12/09/2014	28/04/2017	28/09/2018	28/09/2018
<i>Equal weighted</i>									
Longest available period	0.57	0.48	0.50	0.54	0.53	0.43	0.47	0.52	0.42
Post tech boom & excl. GFC	0.61	0.52	0.51	0.59	0.59	0.50	0.54	0.64	0.52
Recent 5 years	0.72	0.63				0.54	0.68	0.81	0.70
<i>Value weighted</i>									
Longest available period	n/a	0.53	0.67	0.47	0.47	0.44	0.49	0.55	0.43
Post tech boom & excl. GFC)	n/a	0.57	0.67	0.55	0.55	0.52	0.58	0.67	0.53
Recent 5 years	n/a	0.56				0.49	0.73	0.88	0.72

Source: AER analysis; Bloomberg

Note: Our comparator firms include AusNet Services (AST). This firm was included in the 2013 Guidelines under its former name of SP Ausnet (SPN). It was renamed in 2014.

Portfolio estimates for a scenarios reflect beta estimates available over that scenario. Portfolio estimates can start and end on different dates.

Table 14 compares equity beta portfolio-level estimates (both value and equal weighted) for the still-listed firms with those from the whole comparator set.

⁵⁶⁴ Average of firm-level estimates is based on available beta estimates for firms over the particular scenario. Firm estimates can start and end on different dates.

Table 14 Comparison of estimates for entire comparator set to listed comparators (OLS, weekly)

	Whole comparator set	Still listed firms (APA, SKI, AST)	Still listed majority regulated firms (SKI, AST)
Equal and valued weighted portfolio estimates			
Longest	0.42 - 0.67	0.52 - 0.55	0.42 - 0.43
Post tech boom & excl. GFC	0.5 - 0.67	0.64 - 0.67	0.52 - 0.53
Recent 5 years	0.49 - 0.88	0.81 - 0.88	0.7 - 0.72

Source: AER analysis, Bloomberg

The ENA contacted us on 4 December 2018 noting a potential error because our Bloomberg price data (PX_LAST) excludes the effect of dividends and therefore may not reflect total return.⁵⁶⁵ The ENA suggested an alternative Bloomberg data series⁵⁶⁶ for estimating beta.

We reviewed the ENA's concern and consider our data an appropriate measure of total return because it accounts for the impact of dividends and other corporate transactions and events.⁵⁶⁷

Further, the ENA noted 'its estimates tend to increase slightly—in the order of 0.02' when its proposed series is used. Given the timing of when this issue was brought to our notice, we could not practically verify the ENA's claim about the differences in results. However, we consider such a slight change would not change our decision to set the beta at 0.6 (see section 7.13). We also note that at this stage of the review it is practically not possible to consult with stakeholders about the alternative data series.

7.12.2 International estimates

As discussed in section 7.5, we use international estimates in a qualitative role, similar to conceptual analysis. We updated our international estimates to September 2018 using the set of firms from a 2016 Frontier report⁵⁶⁸ and recognising differences with the firms we regulate in section 7.4.

⁵⁶⁵ ENA, Followup to ENA/Frontier request for data and beta estimate replication, 4 December 2018.

⁵⁶⁶ TOTAL_RETURN_INEX_NET_DIVS

⁵⁶⁷ Bloomberg allows the PX_LAST information to be adjusted for dividends and corporate transactions and events (such as share splits, dividend reinvestments, etc).

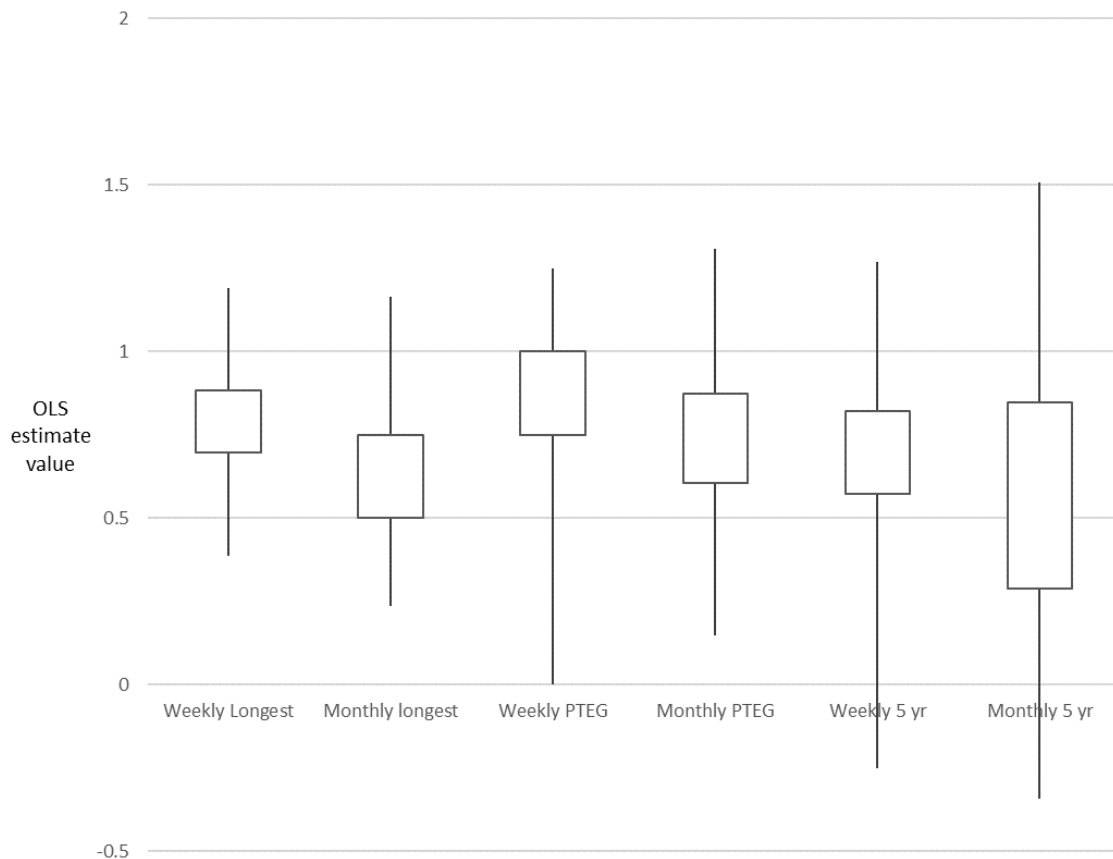
⁵⁶⁸ Frontier, Estimating the equity beta for the benchmark efficient entity, January 2016; Frontier estimated equity beta for 56 US-listed energy network companies over a 20 year period from December 1995 to December 2015. The sample was originally compiled by CEG in 2013 and was based on firms where at least 50 per cent of the revenue was regulated. SFG, Regression-based estimates of risk parameters, June 2013, pp. 15, 19; CEG, Information on equity beta from US companies, June 2013.

The figure below summarises the range of results of our OLS results using quartile estimates.⁵⁶⁹ It uses a box and whiskers chart to present the minimum, 1st quartile, 3rd quartile and maximum from the results.

We make the following observations:

- Estimates, across all estimation periods, cluster below 1.0.
- Estimates for the longest period (which we give most weight to when considering the empirical range) cluster below 1.0.

Figure 15 Summary of international estimates⁵⁷⁰



Source: AER analysis; Bloomberg

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

⁵⁶⁹ Quartiles are the values that divides a list of numbers into quarters. The first quartile is the data point in a data set that separates the bottom 25 per cent of data points from the top 75 per cent. The second quartile is the data point in a data set that separates the data in half. The third quartile is the data point in a data set that separates the bottom 75 per cent of data points from the top 25 per cent.

⁵⁷⁰ This figure shows the quartile distribution of estimates. The top of the top line indicate 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 is represents the third quartile.

bottom line indicate the minimum. The bottom of the rectangle represents the first quartile. The top of the rectangle represents the third quartile.

PTEG is Scenario 2 which is post tech boom excluding GFC.

7.13 Range and point estimate

7.13.1 Final Decision

Our view is that a point estimate of 0.6 (selected from a range of 0.42–0.88) is appropriate for the equity beta of an efficient firm in the supply of Australian regulated energy network services. Our range is consistent with information from conceptual analysis and international estimates that the equity beta for a firm in the supply of Australian regulated energy network services would likely be below 1.0.

We consider a point estimate of 0.6 (selected from a range of 0.42–0.88) is appropriate at this time because it is based on the empirical evidence upon which we make our equity beta point estimate and reflects stakeholders' and expert views about short term estimates. We do not adjust for the low beta bias or the Black CAPM because they relate to the overall return on equity and not the equity beta parameter (as discussed in section 8).

7.13.2 Draft decision

The draft decision adopted an empirical range of 0.4–0.8 based on our update of Henry's study.⁵⁷¹ This was supported by our conceptual analysis, international empirical estimates and consideration of the systematic risks of different types of network we regulate.

We considered a point estimate of 0.6 is reasonable because it reflects:

- the result of our empirical analysis which we give most weight and in particular the longest estimation periods
- longest estimation period data clustering around 0.5-0.6
- conceptual analysis and international estimates support an equity beta below 1.0
- other information we identified as relevant including empirical data for SKI and AST which have a relatively high proportion regulated activities which showed that:
 - recent 5 year average range of 0.68-0.7 and movements in short term empirical estimates
 - longest estimation period average of 0.41

⁵⁷¹ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 297

- our gradual approach to changing parameter values consistent with empirical evidence which gives due consideration for stability and predictability that stakeholders value.⁵⁷²

7.13.3 Independent panel review

The Independent Panel stated that the explanatory statement should explain why limiting the change in beta from that selected in the 2013 Guidelines is justified, given that the 2013 beta as materially influenced by the Black model in which the AER has diminished confidence.⁵⁷³

The panel also noted that the concern with stability regarding beta also seemed inconsistent with other aspects of the draft decision.⁵⁷⁴

7.13.4 Stakeholder submissions

Origin, AGL, Red, Lumo Energy and CCP16 expressed support for the draft decision.⁵⁷⁵ Although they noted that an equity beta of 0.6 is still conservative⁵⁷⁶ and less regard should be given to investor confidence, stability and predictability.⁵⁷⁷ The AEC also supported the draft decision.⁵⁷⁸

The ECA submitted that regulation's impact on beta provides compelling evidence to favour a beta on the lower end of the estimated range.⁵⁷⁹

Origin submitted that most weight should be given empirical estimates of relevant Australian energy networks businesses and less weight to other relevant evidence.⁵⁸⁰

The CCP16 submitted support for the Independent Panel's recommendations that the AER should explain why it limits the reduction in the equity beta to 0.6, when the data suggests a lower figure.⁵⁸¹

⁵⁷² AER, Draft rate of return guidelines explanatory statement, July 2018, p. 298.

⁵⁷³ Independent panel, Review of the Australian Energy Regulator's rate of return draft guidelines, 7 September 2018, p. 41.

⁵⁷⁴ Independent panel, Review of the Australian Energy Regulator's rate of return draft guidelines, 7 September 2018, p. 40.

⁵⁷⁵ AGL, Re: Draft rate of return guidelines, 25 September 2018; Red and Lumo Energy, Re: Draft rate of return guideline, 25 September 2018; CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 90; Origin, AER rate of return guideline, 18 September 2018.

⁵⁷⁶ AGL, Re: Draft rate of return guidelines, 25 September 2018; CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 18; ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 17; CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 93-94; Origin, AER rate of return guideline, 18 September 2018.

⁵⁷⁷ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 21, 44; Energy Australia, AER-Draft rate of return guideline, 25 September 2018.

⁵⁷⁸ AEC, Draft rate of return guideline response, September 2018, p. 13–14

⁵⁷⁹ ECA, Response to the AER Draft Guideline, September 2018, p. 17

⁵⁸⁰ Origin, AER rate of return guideline, 18 September 2018.

⁵⁸¹ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 93-94.

The CRG submitted that the AER should reconcile the Independent Panel's concerns about the conflict between the approach to the Black CAPM and investor confidence by having less regard for the need for investor confidence.⁵⁸²

Energy Australia submitted that it is less useful to focus on insignificant changes to the promotion of stability and predictability that arise from small changes in the value of equity beta.⁵⁸³

Evoenergy submitted that the relevant material support an equity beta of at least 0.7.⁵⁸⁴ NSG also noted that the reduction to a value of 0.6 is inconsistent with general expectation that the equity beta should not change materially over time.⁵⁸⁵

The NSG and AusNet Services submitted that the AER has changed its approach^{586 587}

APA, APGA and HoustonKemp submitted that beta of 0.6 is too low for a gas pipeline company which should warrant a beta of at least 0.7^{588 589}

The NSG submitted that risk has increased for regulated energy network firms:⁵⁹⁰

- The equity beta estimates for the remaining 'live' listed firms and for the most recent period have increased.
- All experts except one agreed that NSPs have not become less risky since the 2013 RORG and the updated empirical analysis supports an increase in equity beta. The AER has, however, reduced the estimate of equity beta.
- The directional movement in equity beta benchmarks suggest that systematic risk has increased. However, this has not been taken in to account in the reduced estimate of equity beta.

Evoenergy submitted a February 2018 report from Frontier titled 'An equity beta estimate for Australian energy network businesses' reports.⁵⁹¹ Frontier submitted that empirical estimates for comparator firms have increased since the 2013 Guidelines, and warrants an equity beta of at least 0.7.⁵⁹² It noted that the AER has evidence of

⁵⁸² CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 21

⁵⁸³ Energy Australia, AER-Draft rate of return guideline, 25 September 2018.

⁵⁸⁴ Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4

⁵⁸⁵ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13

⁵⁸⁶ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 14

⁵⁸⁷ AusNet Services, Submission on the AER's draft rate of return guideline, 24 September 2018, p. 2

⁵⁸⁸ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. iii, 6–8; APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 8.

⁵⁸⁹ HoustonKemp, Australian estimates of the equity beta of a gas business, September 2018, p. 5-6

⁵⁹⁰ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 10, 13.

⁵⁹¹ Evoenergy, *Regulatory Proposal for the ACT electricity distribution network 2019–24 Attachment 8: rate of return, imputation credits and forecast inflation*, January 2018, p. 8–5; Frontier, *An equity beta estimate for Australian energy network businesses*, February 2018 (A January 2018 version of this report was also submitted).

⁵⁹² Frontier, Estimation of certain aspects of the allowed rate of return, April 2018, pp. 14–27; Frontier, *An equity beta estimate for Australian energy network businesses*, February 2018, p. 15–23.

increase in the beta of Australian energy networks but this is muted by the inclusion of de-listed comparators.⁵⁹³

7.13.5 AER consideration

We have reconsidered the range and point estimate for equity beta following divergent submissions.

Our updated empirical analysis yields an empirical range of 0.42–0.88 (see section 7.12). This is consistent with the expectation that an equity beta for a firm in the provision of Australian regulated energy network services would likely be below 1.0:

- Our conceptual analysis supports an equity beta for a provider of regulated energy services would be below 1.0 (see section 7.2).
- International empirical estimates support an equity beta estimate below 1.0 (see section 7.12.2).
- This range is different to our draft decision because we updated the data up to September 2018. In particular, the top of the range moved due to the recent 5 years data for the still listed firms (P7).

Consumers, retailers, networks and investors had divergent views about our draft decision point estimate of 0.6. Consumers and retailers generally supported our draft decision, but considered a lower value should be set; networks and investor proposed a beta of at least 0.7.

We have reconsidered our decision in light of these submissions. However, in exercising our judgment to derive the point estimate we recognise the need to balance a number of aspects of the empirical data. This is because our data is from multiple scenarios and yields a range of estimates.

We consider the longest term data is most reflective of the equity beta value. Estimates from this period incorporate information about the riskiness of our comparator set across the most comprehensive range of market conditions. Using the longest available period is consistent with the expert opinion that equity beta is relatively stable over long periods.⁵⁹⁴ Most experts also agreed long periods of data are likely to produce the most statistically reliable results.

However, they also noted that both long and short term data should be considered. They could provide indications of movements in beta since the last review which could lead to further investigations.⁵⁹⁵ Whilst we rely most on the data from the longest

⁵⁹³ Frontier, *An equity beta estimate for Australian energy network businesses*, February 2018, p. 35; Frontier, *Estimation of certain aspects of the allowed rate of return*, April 2018,

⁵⁹⁴ Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, section 2.10, p.17.

⁵⁹⁵ Joint Expert Report, RORG review – Facilitation of concurrent evidence sessions, CEPA, 21 April 2018, p.17 and section 5.16, p.50.

available period, we recognise there is no precise/robust method to apportion weight, rather it is an exercise of judgement.

Specifically, we rely less on estimates from the recent five years. This period spans a more limited range of market conditions and is less representative of full business or market. In particular, it is a period of low and falling interest rates.

In considering the comparator set, we agree with the CRG submission that equity beta estimates are lower for firms with a high proportion of their revenue derived from regulated activities. As such, we consider relatively more weight should be placed on estimates from firms that are (majority) regulated (under our framework) such as Spark and AusNet. These firms would better match an efficient firm in the supply of Australian regulated energy network services. APA has around 90 per cent unregulated revenue so its inclusion may be less representative of the risks involved in providing regulated services. We note some of the portfolios do not have recent 5 year data and those that do (P5 and P6) largely consists of APA, AST and SKI. Further, ENV and DUET have progressively dropped off over the past five years.

Table 13 sets out estimates from all comparator sets separated based on the three time periods we evaluated:

- The longest term estimates, to which we give most weight to, indicates a range of 0.42–0.67
- Recent 5-year estimates, to which we give some consideration to, indicate a range of 0.49–0.88
- Portfolio estimates for SKI and AST, which are still listed and have majority regulated revenues, range from 0.42⁵⁹⁶ (for the longest period) to 0.72⁵⁹⁷ (for the recent five years). If we include APA (P7), which is still listed but with a low proportion of regulated revenues, then the estimate range from 0.52⁵⁹⁸ (the longest period) to 0.88 (for the recent 5 years).⁵⁹⁹
- Focusing on the averages of individual firm estimates for the longest period and recent five years produces estimates of 0.57 and 0.72 respectively.

We also analysed all estimates under the different portfolios, firm averages and all three scenarios (longest, five-years and PTEG) are clustered. As shown in Figure 16, most of the estimates cluster around 0.5–0.6.

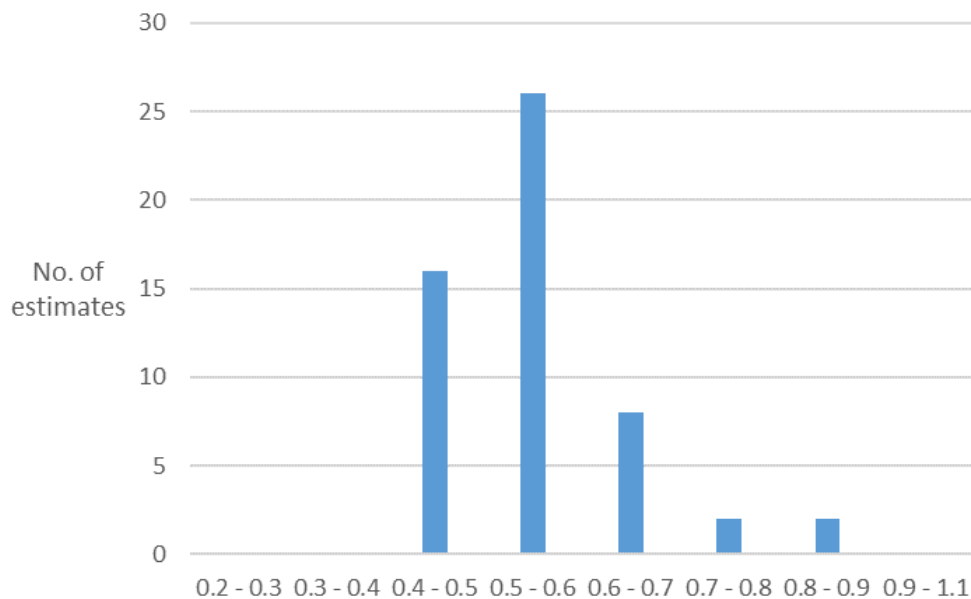
Figure 16 Distribution of 2018 re-levered weekly beta by range (OLS, all periods)

⁵⁹⁶ Equal weighted portfolio

⁵⁹⁷ Value weighted portfolio

⁵⁹⁸ Equal weighted portfolio

⁵⁹⁹ Value weighted portfolio



Source: Bloomberg, AER analysis

Based on the empirical evidence upon which we make our equity beta point estimate and stakeholders' and expert views about short term estimates, we consider an equity beta of 0.6 is appropriate at this time:

- 0.6 sits within the range derived from the longest period and the recent five years.
- Estimates for all 3 scenarios cluster around 0.5–0.6.
- 0.6 is above the long run estimates for SKI and AST of 0.42, but below their estimates for the most recent five years of 0.72.
- 0.6 is consistent with our international estimates which indicates that the equity beta would likely be below 1.0 for an efficient firm in the supply of Australian regulated energy network services

Overall, we consider using an equity beta of 0.6 is reflective of the data before us taking into account its strengths and weaknesses. A point estimate of 0.6 is also consistent with our conceptual analysis which indicates that the equity beta would likely be below 1.0 for an efficient firm in the supply of Australian regulated energy network services.

In our draft decision we concluded that the Black CAPM was for a factor in selecting an equity beta towards the upper end of our range in 2013. Our assessment of information since the 2013 Guidelines led to diminished confidence in the model. Hence, we were not persuaded to use it to select an equity beta point estimate.⁶⁰⁰

The Independent Panel stated 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. In this final decision, for the reasons stated in our draft decision and further assessment of submissions on our draft, we do not consider this bias and model relevant to the estimation of equity beta.

We are confident that our equity beta estimate of 0.6 will or will most likely contribute to the achievement of legislative objectives.

We consider a single beta should apply for regulated gas and electricity firms.

Our conceptual analysis suggests that the equity beta for regulated gas and electricity firms is likely to be similar due to the similar regulatory framework. Both face limited systematic risk by virtue of being regulated natural monopolies (as discussed in section 7.2 and 2.4). Sadeh and Gray also stated differences between gas and electricity service providers may be reflected through operating expenditure and not the rate of return.^{601 602}

Applying HoustonKemp's classification to our firm-level equity beta estimates yields a range of 0.33–0.79 for mixed/electricity-dominant firms and 0.32–1.06 for gas firms. The estimates' wide-range and the (relatively) small number of comparators do not provide robust information on a different beta for regulated gas firms, a point estimate of 0.6 falls into both ranges and the substantial overlap between the two suggests a value of 0.6 is not unreasonable.

We note energy network businesses, network associations and investors have submitted for an equity beta of at least 0.7 as the 2013 Guidelines set 0.7 and empirical estimates have increased.

However, this argument ignores the 2013 Guidelines set a beta point estimate that was some distance above the empirical estimates for our comparator firms. We did so to promote stability and caution. The point estimate in the 2013 Guidelines was a decrease from the beta value of 0.8 used in previous regulatory determinations and we did not want to move a large increment. We also accounted for the theory of the Black CAPM. Further consideration of the Black CAPM and international estimates in this review demonstrated we should not use these factors to select an equity beta point estimate.

The AEC also submitted that arguments from precedent are highly circular in nature and should not carry strong weight. In other words, it considered that 'the AER is entitled to exercise its judgment to set beta at a lower value than in previous decisions without being obliged to "prove" that the systematic risk faced by the [benchmark efficient entity] is lower than at the time of those previous decisions'.⁶⁰³ It concluded

⁶⁰¹ AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p.63.

⁶⁰² AER Concurrent Evidence Session 1 – Proofed Transcript, April 2018, p. 58

⁶⁰³ AEC, Draft rate of return guideline response, September 2018, p. 13.

that given that the previous decision was also an exercise of judgement, it is legitimate for the AER to arrive at a different judgment for this decision.⁶⁰⁴

It is not clear to us that the movements since 2013 support an increase in the systematic risk of an efficient firm supplying Australian regulated energy services and an equity beta to at least 0.7:

- APA, NSG, ENA and APGA's submissions supporting increased risk generally focused on technological risks, natural disasters and policy risk. We consider the sort of risks submitted are non-systematic and do not warrant compensation through the rate of return in section 7.2 and 2.4.
- Other Australian regulators do not make adjustments for technology risk, regulatory risk or sovereign risk.
- Some firms have undertaken transactions that would increase their exposure to systematic risk from unregulated assets and/or assets that are different from the risk of providing the Australian regulated energy network services.⁶⁰⁵
- We give most weight to estimates from the longest estimation period. They have increased marginally since the 2013 Guidelines and support a point estimate less than 0.7 (see section 7.12.1).
- Frontier's observations were based on five-year estimates when it supported using longer term data. Frontier also acknowledged that five-year estimates are insufficient to provide statistically reliable estimates.

We disagree with claims we changed our approach. In setting the equity beta point parameter, we consistently:

- give most weight to the results of our empirical analysis of domestic energy network firms
- use other relevant evidence such as conceptual analysis and international estimates to complement our empirical analysis

While this approach may not necessarily lead to the same result, it provides stability and certainty with regard to our approach which are desirable to attract and retain funds which will contribute to achievement of our legislative objectives and the efficient investment in and operation of networks. We acknowledge empirical estimates have increased since 2013. However, the increase over the longest estimation period to which we give the most weight has been small. We compare weekly re-levered equity beta estimates from Henry's results with the September 2018 update.

⁶⁰⁴ AEC, Draft rate of return guideline response, September 2018, p. 14.

⁶⁰⁵ <https://www.apa.com.au/about-apa/our-history/>; <http://www.duet.net.au/getattachment/ASX-releases/2015/DUET-Completes-Acquisition-of-Energy-Developments/DUET-Completes-Acquisition-of-Energy-Developments-L/DUET-Completes-Acquisition-of-Energy-Developments-Limited.pdf.aspx>

Table 15 Comparison of re-levered weekly average firm equity beta estimates (OLS)

	Average of firm-level estimates	
	Henry	Sep 2018 update
Longest period	0.52	0.57
PTEG	0.56	0.61
5 years	0.46	0.72

Source: AER analysis, Bloomberg

Note: PTEG is Scenario 2 which is post tech boom excluding GFC

Table 16 Comparison of re-levered weekly portfolio equity beta estimates - longest period (OLS)

	Equal weighted portfolio estimates - Longest period		Value weighted portfolio estimates - Longest period	
	Henry	Sep 2018 update	Henry	Sep 2018 update
P1	0.46	0.48	0.50	0.53
P2	0.52	0.50	0.70	0.67
P3	0.50	0.54	0.44	0.47
P4	0.48	0.53	0.42	0.47
P5	0.39	0.43	0.39	0.44

Source: AER analysis, Bloomberg

Table 17 Comparison of re-levered weekly portfolio equity beta estimates - PTEG (OLS)

	Equal weighted portfolio estimates - PTEG		Value weighted portfolio estimates - PTEG	
	Henry	2018 update	Henry	2018 update
P1	0.49	0.52	0.54	0.57
P2	0.52	0.51	0.70	0.67
P3	0.55	0.59	0.52	0.55
P4	0.53	0.59	0.50	0.55
P5	0.45	0.50	0.48	0.52

Source: AER analysis, Bloomberg

Note: PTEG is Scenario 2 which is post tech boom excluding GFC

We do observe some increase since 2013:

- The average of firm level estimates increased since Henry's report with the largest increase for the recent five-year period (0.46 to 0.72).
- Most portfolio-level estimates rose with the increase being less than 0.05.

However, these results still support an equity beta less than 0.7 because all updated estimates (except one) remain below 0.7. Further, estimates from the longest estimation period showed marginal increases and are consistent with a point estimate of 0.6. We give most weight to the longest estimation period because short term estimates may be influenced by one-off events, market volatilities and interest rate movements. Section 7.7 discusses how interest rate movements impact empirical beta estimates for our comparator firms.

The ECA appears to suggest estimating systematic risk by comparing actual annual returns (from cashflow before interest) to the annual movement in the market returns.⁶⁰⁶ Experts previously raised concerns about such an approach due to insufficient data frequency, potential for data manipulation and a high degree of subjectivity.⁶⁰⁷ This approach would also depart from our foundation model approach for estimating the return on equity.

⁶⁰⁶ ECA, Review of the rate of return guideline: response to the AER draft guideline, September 2018, p. 12.

⁶⁰⁷ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 48.

8 Low beta bias and the Black CAPM

The Black CAPM and the low beta bias are two different concepts:

- The low beta bias is an observation that ex-post returns from low beta stocks tend to outperform expected returns implied by the Sharpe-Lintner CAPM.
- The Black CAPM is an alternative model to the Sharpe-Lintner CAPM. The key theoretical difference between the two models relates to borrowing and lending assumptions.⁶⁰⁸ As a result of assuming investors can engage in unlimited short selling and relaxing the Sharpe-Lintner CAPM's assumption of unlimited borrowing and lending at the risk free rate, the Black CAPM predicts a slope of estimated returns that can be flatter than for the Sharpe-Lintner CAPM.⁶⁰⁹

Both relate to the return on equity and effectively imply a flatter relationship between the equity beta and the expected return on equity from the Sharpe-Lintner CAPM.⁶¹⁰ The Black CAPM is a theoretical model that provides one possible explanation for the flatter relationship between beta and expected return (or 'low beta bias') observed in ex-post empirical tests of the Sharpe-Lintner CAPM. However, other explanations have also been considered in the academic literature.

8.1 Final decision

We have considered the low beta bias and Black CAPM. We note both were considered extensively in the 2013 Guidelines and previous regulatory determinations. Our review of the submissions show a lack of substantively new information as networks and investors continue to rely on actual returns in support of adjusting the Sharpe-Lintner CAPM estimate for the low beta bias and Black CAPM.

⁶⁰⁸ The Sharpe-Lintner CAPM assumes that investors can access unlimited borrowing and lending at the risk free rate. The Black CAPM relaxes this assumption, and instead assumes that investors can access unlimited short selling of stocks, with the proceeds immediately available for investment. Either of these assumptions might correctly be criticised as being unrealistic, and it is not clear which assumption is preferable.

⁶⁰⁹ Fischer Black's 1972 paper on the Black CAPM develops two model specifications. The base specification assumes no risk free asset exists (no risk free borrowing or lending). The second specification assumes that the representative investor can lend but not borrow at the risk free rate. In the base specification, the return on the zero beta portfolio can be above the risk free rate. In the second specification, the return on the zero beta portfolio must be above the risk free rate. See: Black, *Capital market equilibrium with restricted borrowing*, Journal of Business 45(3), July 1972, pp. 452–454.

⁶¹⁰ We recognised this in the 2013 Guidelines and the draft decision (AER, Better regulation explanatory statement rate of return guideline (appendices), December 2013, p. 11, 16, 71). Submissions from networks, network associations also appear to acknowledge this point (ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 83-84; Evoenergy. Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, Public forum presentation: Initial network sector perspectives, 2 August 2018, p. 24; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16).

Based on these considerations, our final decision is to not adjust our Sharpe-Lintner CAPM return on equity estimate for the low beta bias and the Black CAPM. We consider that:

- The Sharpe-Lintner CAPM remains the standard and most widely-used model in practice.
- We received no evidence of Australian market practitioners considering low beta bias or using the Black CAPM
- Experts and submissions did not provide sufficient evidence that the low beta bias is factored in or that investors and market practitioners account for it on an ex-ante basis
- The Black CAPM has empirical issues including instability, sensitivity to the choice of inputs, lack of consensus, and nonsensical and counter-intuitive results
- Observations of higher actual returns than the Sharpe-Lintner 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.

8.2 Draft decision

In our draft decision, we concluded that no weight should be given to the low beta bias. Key considerations were:⁶¹¹

- Many of the tests and exercises that indicate low beta bias are still the subject of ongoing academic debate⁶¹² and carry limitations⁶¹³. This throws doubt on their results and suitability for our regulatory task.⁶¹⁴
- There are a number of explanations (for example, economic conditions, interest rate movements) that do not imply a bias in equity beta.⁶¹⁵
- It is not clear that the low beta bias exists on an ex-ante basis or is accounted for by investors and market practitioners on the same ex-ante basis⁶¹⁶

⁶¹¹ AER, Draft rate of return guidelines explanatory statement, July 2018, pp. 277.

⁶¹² For example, see: AER, 2013 Guidelines appendices, December 2013, pp. 11–12;

⁶¹³ For example, see: Partington & Satchell, *Report to the AER: Analysis of criticism of 2015 determinations*, October 2015, p. 20, 23–24.

⁶¹⁴ AER, Draft rate of return guidelines explanatory statement, July 2018, pp. 277; AER, 2013 Guidelines appendices, December 2013, pp. 11–12; For example, AER, Final decision SA Power Networks determination 2015–16 to 2019–20, October 2015, pp. 451–463, p. 288.

⁶¹⁵ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 277; For example, AER, Final decision SA Power Networks determination 2015–16 to 2019–20, October 2015, pp. 451–463, p. 285; Partington and Satchell, *Report to the AER: Return of equity and comment on submissions in relation to JGN*, May 2015, p. 16; Handley, *Advice on the rate of return for the 2015 AER energy network determination for Jemena Gas Networks*, 20 May 2015, p. 5.

⁶¹⁶ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 277.

- In 2013, the Black CAPM was one reason for selecting an equity beta towards the upper end of our range. Our assessment of information since the 2013 Guidelines led us to have diminished confidence in the model. Hence, we were not persuaded to use it to select an equity beta point estimate.⁶¹⁷

8.3 Independent panel review

The Independent Panel stated that the Black CAPM and the 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. If the model or bias was relied on in estimating the cost of equity, the remedy would be to use a flatter relationship between beta and cost of equity.⁶¹⁸

It made the following recommendations:⁶¹⁹

- Clarify, whether, in estimating beta, there is any relevance of the Black CAPM and the low beta bias
- Consider whether the discussion of the Black CAPM and low beta bias should be moved to the section on the Sharpe-Lintner CAPM or another part of the explanatory statement
- In the section on Sharpe-Lintner CAPM, consider whether any adjustments to the return on equity are justified based on the Black CAPM and low beta bias

We note that the first recommendation is discussed in section 7.3 as part of equity beta. We consider the other recommendation in the sections below.

8.4 Stakeholder submissions

We received divergent submissions on the Black CAPM and low beta bias. Evoenergy, ENA, APGA, APA and NSG submitted that we should give weight to the low beta bias and the Black CAPM.⁶²⁰ CRG, CCP16 and Energy Australia supported our draft decision to not use the low beta bias or Black CAPM to adjust the equity beta point estimate.⁶²¹

⁶¹⁷ AER, Draft rate of return guidelines explanatory statement, July 2018, p. 282.

⁶¹⁸ Independent panel, Review of the Australian Energy Regulator's rate of return draft guidelines, 7 September 2018, p. 39.

⁶¹⁹ Independent panel, Review of the Australian Energy Regulator's rate of return draft guidelines, 7 September 2018, p. vii, vi.

⁶²⁰ Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, Public forum presentation: Initial network sector perspectives, 2 August 2018, p. 24; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16; APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 23; NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 10, 13.

⁶²¹ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 21; Energy Australia, AER-Draft rate of return guideline, 25 September 2018; CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

8.4.1 Low beta bias

Evoenergy, ENA, APGA, APA and NSG submitted that we should give weight to the low beta bias:

- Evoenergy, ENA and APA submitted that the AER has ignored market evidence of low beta bias.⁶²² APA added the observations that actual returns from low beta assets tend to be higher than the expected returns predicted by the SL CAPM was accepted by the AER's panel of experts.⁶²³
- The ENA submitted that the evidence that the observed returns on low-beta stocks are higher than the SL-CAPM suggests is beyond dispute. The suggestion that this empirical evidence may not be settled raises questions about the robustness and symmetry of the analytical approach taken to the assessment of evidence.⁶²⁴ The reasons that have been proposed for disregarding low-beta bias are weak when weighed against the compelling evidence. They are based on conjecture and supposition and are inconsistent with the relevant evidence.
- The APGA submitted that the AER must make an adjustment to account for the imperfections in the model it uses. It recognised the imperfections of the SL CAPM in 2013 and made a necessary adjustment to the model, though we accept that the AER did not adjust for low beta bias.⁶²⁵ The AER should not retreat from the position it held in 2013, which took account of these imperfections.⁶²⁶
- APA and ENA submitted that issues with asset model tests should be no reason to disregard the low beta bias.⁶²⁷ APA explained that the low beta bias is not an issue arising from asset model testing but of comparing actual returns with Sharpe-Lintner CAPM predictions.⁶²⁸ ENA noted that evidence of low beta bias is long standing and well accepted.⁶²⁹ They noted Frontier has observed low beta bias in ex-ante estimates for Australian returns (using analyst forecasts to proxy expected returns).⁶³⁰

⁶²² Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, Public forum presentation: Initial network sector perspectives, 2 August 2018, p. 24; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16

⁶²³ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16

⁶²⁴ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 83-84

⁶²⁵ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 23

⁶²⁶ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 26

⁶²⁷ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16-17; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 98;

⁶²⁸ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16-17

⁶²⁹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 98;

⁶³⁰ Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, p. 37; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16-20, 22; ENA, AER review of the rate of return guideline response to

- ENA and Frontier noted that empirical evidence of low beta bias supports using observed returns to estimate required returns.⁶³¹ Frontier added that this would seem to be consistent with regulatory reliance on observed market data to estimate parameters such as the beta and MRP.
- The APGA submitted that actual returns affect expected returns.⁶³² Frontier noted that it is typically used as a proxy for expected/required returns.⁶³³ If actual returns cannot be relied upon to reflect investors' required/expected returns for the purposes of assessing low-beta bias, they cannot be relied upon for any other purpose such as estimating equity beta and market risk premium.^{634 635}
- The ENA and Frontier submitted that market practitioners account for the low beta bias by selecting an intercept above the prevailing government bond rate.⁶³⁶
- NERA noted that a comparison of AER's return on equity allowances with actual returns from 3 comparator sets indicate that actual returns exceed the AER's allowances.⁶³⁷
- ENA, APGA and APA submitted that selecting an equity beta estimate towards the upper end of empirical range (from the 2013 Guidelines) can account for the low beta bias.⁶³⁸ An alpha adjustment can also work.
- The NSG submitted that risk has increased for regulated energy network firms as the AER has not adjusted the allowed return for the forecast underestimation bias of the Sharpe-Lintner CAPM.⁶³⁹

draft guideline, 25 September 2018, p. 102; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018, p. 3, 10–14.

⁶³¹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 101-102; Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, p. 8, 24–25; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018, p. 2.

⁶³² APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 22

⁶³³ Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, September 2018, p. 17; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018, p. 8.

⁶³⁴ Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, September 2018, p. 18; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018, p. 3, 24.

⁶³⁵ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 102

⁶³⁶ Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, September 2018, p. 35–36; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 99; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018, p. 21.

⁶³⁷ NERA, RAB growth since the AER's 2013 rate of return guideline, 25 September 2018, p. 42–46

⁶³⁸ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 97; APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 27; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 28

⁶³⁹ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 10, 13.

As part of our 2018 revenue determination process, we received a December 2017 report from Frontier submitted by Evoenergy titled 'Low beta bias'.⁶⁴⁰ Frontier submitted that:

- tests of asset model performance and the Black CAPM show that the 2013 Guidelines does not fully correct for low beta bias.⁶⁴¹
- the Black CAPM should be used to address the low beta bias associated with the Sharpe-Lintner CAPM and the AER has acknowledged in the 2013 Guidelines the bias as a reason for selecting a top of the range point estimate.⁶⁴² Adjusting for low beta bias (using a range of zero beta premiums)⁶⁴³ supports a beta of above 0.7 and at least 0.8.⁶⁴⁴

The CCP16 submitted that it is 'reluctant for the AER to arbitrarily adjust either beta or the overall ROE on the basis of an assumed low beta bias'.⁶⁴⁵ It noted that there are many reasons why returns on low beta stocks may be higher than expected by the Sharpe-Lintner CAPM risk slope, but these do not invalidate the underlying Sharpe-Lintner CAPM approach.⁶⁴⁶ The CCP16 added that the understanding of low beta bias—what it is, what causes the bias and how such a bias could be quantified in a way that is suitable for the ex-ante regulatory determination of the 'average beta' to apply over the longer term—is still lacking. As such, it suffers from the same limitations and subjectivity that limits the use of the Black CAPM.

The CRG stated that if the higher value for the risk free rate imputed from the Black CAPM were used, the value for MRP reduces and the low beta bias argument disappears, ultimately delivering much the same outcome as the present arrangement. However, as the low beta bias cannot be measured, the CRG considers that such an exercise is effectively pointless.⁶⁴⁷

SACES, in a report for the CRG, noted that:⁶⁴⁸

- Much of the evidence that Frontier presents in support of low-beta bias relates to the US.

⁶⁴⁰ Evoenergy, *Regulatory Proposal for the ACT electricity distribution network 2019–24 Attachment 8: rate of return, imputation credits and forecast inflation*, January 2018, p. 8–5; Frontier, *Low-beta bias*, December 2017.

⁶⁴¹ Frontier, *Estimation of certain aspects of the allowed rate of return*, April 2018, p. 37–64; Frontier, *Low beta bias*, December 2017.

⁶⁴² CEG, *WACC parameter estimates for Essential Energy*, November 2017, p. 25.

⁶⁴³ Zero beta premiums are estimated as part of implementing the Black CAPM. This is added to the risk free rate to form the zero beta return which is the intercept in the Black CAPM.

⁶⁴⁴ CEG, *WACC parameter estimates for Essential Energy*, November 2017, p. 33.

⁶⁴⁵ CCP16, *Submission to the AER on its draft rate of return guideline*, September 2018, p. 89.

⁶⁴⁶ CCP16, *Submission to the AER on its draft rate of return guideline*, September 2018, p. 89.

⁶⁴⁷ CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 21

⁶⁴⁸ South Australian Centre for Economic Studies, *Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report*, July 2018, p. 4.

- Two Australian empirical studies it reviewed suggested that the zero-risk premium is greater than zero but do not provide conclusive evidence. There are questions as to the robustness of statistical tests used in the studies.

8.4.2 Black CAPM

The APGA, Evoenergy, ENA and NSG submitted that the Black CAPM's role in the 2013 Guidelines should be retained (that is, select a point estimate towards the upper end of the empirical range):

- The APGA submitted that the theory of the model has not changed since 2013 and the debate has been about the empirical validity of zero beta premium and use.⁶⁴⁹
- Evoenergy, ENA and NSG submitted that the Black CAPM should be used per the 2013 Guidelines.⁶⁵⁰ Evoenergy submitted that the draft decision to not use the theory of the Black CAPM is without evidence or explanation. The NSG noted that it is inconsistent with the NER's requirement to have regard to the relevant estimation methods, financial models, market data and other evidence.
- In using the theory of the Black CAPM, the 2013 Guidelines noted the model is based on unrealistic assumptions, difficult to reliably estimate zero-beta premium, can produce counter-intuitive results, does not meet assessment criteria well and not used in practice. The AER has given the same reasons as in the 2013 Guidelines to now support not using the Black CAPM evidence to inform the selection of a point estimate.⁶⁵¹

The NSG and AusNet submitted that the AER has changed its approach.⁶⁵² ⁶⁵³ AusNet added that there have been no major changes in finance theory and market evidence does not support a change.

The ENA submitted that there has been no changes to finance theory since 2013 to warrant the AER changing its approach.⁶⁵⁴ It noted that the theory of the Black CAPM and theoretical principles underpinning the Black CAPM remain identical to the evidence considered in 2013.⁶⁵⁵

Evoenergy submitted that no change should be made to the 2013 Guidelines' approach without clear evidence to support a change.⁶⁵⁶ It considered that the AER

⁶⁴⁹ APGA, Public forum presentation: AER draft rate of return guidelines APGA early views, 2 August 2018, slide 3.

⁶⁵⁰ Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 38; NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 13

⁶⁵¹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 96

⁶⁵² NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 14

⁶⁵³ AusNet Services, Submission on the AER's draft rate of return guideline, 24 September 2018, p. 2

⁶⁵⁴ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 35, 94.

⁶⁵⁵ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 94.

⁶⁵⁶ Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3

has removed without any evidence or explanation the role of the Black CAPM to inform the selection of the equity beta point estimate⁶⁵⁷

The JEB submitted that the theory of the Black CAPM for equity beta which played a role in and influenced the parameter estimates in the 2013 Guideline now plays no role at all and has no impact on the parameter estimate. They considered that, the foundation model has been abandoned, which is inconsistent with an incremental review on the basis of no change in finance theory⁶⁵⁸

The APGA submitted that the AER should not retreat from the position it held in 2013, which took account of the Sharpe-Lintner CAPM's imperfections.⁶⁵⁹

The CCP16 submitted that the Black CAPM is not suitable for use in the regulatory context.⁶⁶⁰ It noted that Black CAPM zero beta intercept and low beta bias are all assessed on an ex-post basis. However, this does not mean that they are suitable for applying in a regulatory setting to an ex-ante long-term (10-year) forecast of beta for a low beta firm(s).⁶⁶¹ SACES and ECA referred to Professor Kevin Davis' 2011 report which raised questions on the Black CAPM and the model's use over the Sharpe-Lintner CAPM.⁶⁶²

The CRG, CCP16 and ECA also observed implementation issues with the Black CAPM:

- The CCP16 submitted that it requires a construction of an artificial 'risk free asset' on assumptions that are agreed not to be realistic.⁶⁶³ It noted that the estimation of the value of the 'risk-free asset' is excessively complex, and there is a wide range of values calculated by various experts.⁶⁶⁴
- ECA submitted that no one has developed a way to estimate the 'zero beta rate' to substitute for the risk free rate.⁶⁶⁵
- The CRG submitted that the restrictions on financing used in the Black CAPM are unlikely to justify the size of the zero risk premium identified.⁶⁶⁶

8.5 AER consideration

⁶⁵⁷ Evoenergy. Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4

⁶⁵⁸ Joint Energy Businesses, Submission to draft 2018 rate of return guideline, 25 September 2018, p. 6

⁶⁵⁹ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 26

⁶⁶⁰ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

⁶⁶¹ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

⁶⁶² ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 16; South Australian Centre for Economic Studies, Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report, July 2018, p. 4.

⁶⁶³ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

⁶⁶⁴ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

⁶⁶⁵ ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 15-16.

⁶⁶⁶ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 21

An important theme in submissions from networks and investors has been the view that our use of the Sharpe-Lintner CAPM understates the required expected return on equity because of a bias in estimating low risk stocks (that is, those with a beta less than 1.0). This effect is termed low beta bias and the Black CAPM has typically been proposed by networks to address this observation. Both effectively imply a flatter relationship between the equity beta and the expected return on equity from the Sharpe-Lintner CAPM. Energy network businesses also submitted we have changed our approach from the 2013 Guidelines and that this change was unjustified.

In contrast, consumers and retailers submitted no weight should be given to the low beta bias and Black CAPM. They noted that both are based on ex-post data, which seems inconsistent with estimating an ex-ante rate of return. They also noted empirical issues with implementing the Black CAPM which means it should not be used.

Given the extensive submissions on this topic, we have reviewed our approach and conclusion, and considered whether to amend our approach. Much of the support for the low beta bias and the Black CAPM centre around issues and material we have considered extensively in the 2013 Guidelines and in subsequent regulatory decisions. That is, they generally revolve around the poor empirical performance of the Sharpe-Lintner CAPM using realised returns.

Overall, we are not persuaded that we should use the low beta bias or the Black CAPM to adjust our return on equity estimate. Our detailed consideration are set out below. In summary:

- The Sharpe-Lintner CAPM is widely used and has stood the test of time.
- The low beta bias and Black CAPM are not used in practice to estimate a return on equity.
- Actual returns can diverge from expected returns for many reasons, and these reasons do not imply investors expect a higher return for low beta stocks or a bias in equity beta estimates
- We agree with the Independent Panel's view that the low beta bias and Black CAPM relate to the overall return on equity. Diminished confidence in the Black CAPM means we no longer use the model to inform an equity beta point estimate.

A Frontier report (prepared in September 2018 submitted by the APGA, APA and ENA) used one-year analyst forecasts to estimate low beta bias on an ex-ante basis. Having considered this report, we are not persuaded that it warrants adjusting the Sharpe-Lintner CAPM estimate for the low beta bias. Our detailed consideration is in section 8.5.4.

8.5.1 Earlier considerations

The 2013 Guidelines and our subsequent regulatory decisions considered the low beta bias and the Black CAPM extensively before deciding not to adjust the Sharpe-Lintner CAPM return on equity. The key considerations are summarised below.

2013 Guidelines

The 2013 Guidelines considered submissions that that empirical tests of realised returns indicated the Sharpe-Lintner CAPM underestimates returns for low beta stocks.⁶⁶⁷ However, we identified a range of issues with empirical tests of the Sharpe-Lintner CAPM that produce observations of the low beta bias, do not necessarily warrant adjustment:

- Sharpe-Lintner CAPM is the most widely used asset pricing model⁶⁶⁸ which indicates concerns with the model's empirical performance may be overstated.
- The tests' use of market proxy that may not accord with the Sharpe-Lintner CAPM market.⁶⁶⁹
- They consider realised returns, whereas the Sharpe-Lintner CAPM requires expected returns.⁶⁷⁰
- The tests involved inappropriate statistical tests or procedures⁶⁷¹
- Using Black CAPM to inform the equity beta estimate may mitigate possible low beta bias⁶⁷² and the potential for actual returns to depart from expected returns
- Much of evidence uses a short term risk free rate and difference with a long term one (which we use) is considerable.⁶⁷³
- The tests demonstrate reliability and accuracy concerns⁶⁷⁴
- In the 2013 Guidelines, we considered that the Black CAPM was not suitable for estimating the return on equity:⁶⁷⁵
- It is highly sensitive to the choice of implementation ⁶⁷⁶
- It is difficult to estimate the input parameters. The model is sensitive to the choice of proxy for the market portfolio and can lead to parameter estimates that are outside the bounds prescribed by the underlying theoretical model.⁶⁷⁷

⁶⁶⁷ AER, 2013 Guidelines appendices, December 2013, p. 11; NERA, Review of cost of equity models: A report for the Energy Networks Association, June 2013.

⁶⁶⁸ AER, 2013 Guidelines appendices, December 2013, p. 12–13

⁶⁶⁹ AER, 2013 Guidelines appendices, December 2013, p. 11; See, for example: Roll, R., 'A critique of the asset pricing theory's tests; Part I: On past and potential testability of the theory', *Journal of Financial Economics*, 1977, vol. 4, pp. 129–176; and Levy, M. and R. Roll, 'The market portfolio may be mean/variance efficient after all', *Review of Financial Studies*, 2010, vol. 23(6), pp. 2464–2491.

⁶⁷⁰ AER, 2013 Guidelines appendices, December 2013, p. 11; See, for example: Campello, M., L. Chen and L. Zhang, 'Expected returns, yield spreads and asset pricing tests', *Review of Financial Studies*, 2008, vol. 21(3), pp. 1298–1338.

⁶⁷¹ AER, 2013 Guidelines appendices, December 2013, p. 12; See, for example: Ray, S., N. E. Savin and A. Tiwari, 'Testing the CAPM revisited', *Journal of Empirical Finance*, 2009, vol. 16(5), pp. 721–733; Lewellen, J., S. Nagel and J. Shanken, 'A sceptical appraisal of asset pricing tests', *Journal of Financial Economics*, 2010, vol. 96(2), pp. 175–194; and Grauer, R., and J. Janmaat, 'Cross-Sectional tests of the CAPM and Fama–French three-factor model', *Journal of Banking and Finance*, 2010, vol. 34, pp. 457–470.

⁶⁷² AER, Better regulation explanatory statement rate of return guidelines (appendices), December 2013, p. 12.

⁶⁷³ AER, Better regulation explanatory statement rate of return guidelines (appendices), December 2013, p. 12.

⁶⁷⁴ AER, Better regulation explanatory statement rate of return guidelines (appendices), December 2013, p. 71

⁶⁷⁵ AER, Better regulation explanatory statement rate of return guidelines (appendices), December 2013, p. 18.

⁶⁷⁶ AER, Better regulation explanatory statement rate of return guidelines (appendices), December 2013, p. 16.

- Empirical support for the model is inconclusive because there is evidence both for and against the model's empirical outperformance of the Sharpe-Lintner CAPM. Further, both models can be relatively poor predictors of return.⁶⁷⁸
- However, we acknowledged it can provide some information for selecting the equity beta point estimate towards the upper end of our empirical range to account for potential imperfections that may cause actual returns to depart from expected returns.⁶⁷⁹ So we used it to inform a point estimate from within the empirical range of equity beta estimates.

Regulatory decisions since 2013

Regulatory decisions since the 2013 Guidelines considered many submissions on the Sharpe-Lintner CAPM's poor empirical performance and adjustments for the low beta bias. For example:

- Energy network businesses' submissions on the poor empirical performance of the SLCPM⁶⁸⁰
- Consultant reports from networks that aims to correct the low beta bias using ex-post returns via inclusion of an additional 'alpha' term or uplifting the equity beta⁶⁸¹

⁶⁷⁷ AER, Better regulation explanatory statement rate of return guidelines (appendices), December 2013, p. 17

⁶⁷⁸ AER, Better regulation explanatory statement rate of return guidelines (appendices), December 2013, p. 17.

⁶⁷⁹ In the 2013 Guidelines we performed a rough assessment of the reasonableness of the option to select a point estimate towards the upper end of the equity beta range (to reflect the differing predictions of the Black CAPM relative to the Sharpe-Lintner CAPM). We noted for clarity that we do not consider the possible zero beta premiums presented in table C.11 of the explanatory statement to the Guideline are accurate or reliable as empirical estimates because we do not consider that there is any reliable empirical estimate for this parameter. However, in light of the available evidence, if the Black CAPM captured the 'true' state of the world better than any other asset pricing model (although we are not implying that it does), selecting a point estimate towards the upper end of the equity beta range appeared open to us. See: AER, Explanatory statement to the rate of return guideline (appendices), December 2013, pp. 70–71.

⁶⁸⁰ CitiPower, Revised regulatory proposal 2016–2020, January 2016, pp. 281–289; Powercor, Revised regulatory proposal 2016–2020, January 2016, pp. 275–283; ActewAGL, Revised 2016–21 access arrangement proposal Response to the AER's draft decision, Appendix 5.01 Detailed response to rate of return, gamma and inflation, January 2016, pp. 57–72; United Energy, Response to AER preliminary determination–Re: rate of return and gamma, 6 January 2016, pp.41–45; AGN, 2016–17 to 2020/21 Access Arrangement information response to draft decision: Attachment 10.26 Response to draft decision: rate of return, January 2016, pp. 46–49; JEN (Vic), 2016–20 Electricity distribution price review regulatory proposal revocation and substitution submission: Attachment 6–1 Rate of return, gamma, forecast inflation, and debt and equity raising costs, 6 January 2016, pp. 46–49; AusNet Services, Electricity distribution price review 2016–20 Revised regulatory proposal: Chapter 7 Rate of return & gamma, 6 January 2016, pp. 41–49; APTNT, Amadeus Gas Pipeline Access arrangement revised proposal: response to Draft Decision, January 2016, pp. 68–73; APTNT, Amadeus Gas Pipeline access arrangement revision proposal, August 2015, p. 110–130. AusNet Services, AusNet Transmission Group Pty Ltd transmission revenue review 2017–2022, 30 October 2015, pp. 214, 250–260.

⁶⁸¹ HoustonKemp, The Cost of Equity and the Low-Beta Bias, November 2016, pp. 3–17, 35–51. See for example Frontier, The required return on equity under a foundation model approach, January 2016, p. 55. Both HoustonKemp and Frontier use a return on equity that is deemed absent of low-beta bias to estimate an adjustment to the equity beta in the Sharpe-Lintner CAPM. HoustonKemp appears to use ex-post return on equity. Frontier uses a return on equity from its Black CAPM (which is derived using ex-post data). HoustonKemp also uses ex-post return on equity to estimate an 'alpha' term to include in the Sharpe-Lintner CAPM.

Our view was that the Sharpe-Lintner CAPM should be used to estimate the return on equity without adjusting for the low beta bias.⁶⁸²

- It is not clear that low beta bias is a priced risk not already captured by the Sharpe-Lintner CAPM.⁶⁸³ Handley noted that our understanding of the low beta bias was not clear.⁶⁸⁴ There was also considerable difference in CAPM estimates of the return required on a low-beta asset being lower than subsequent returns and a downward bias in CAPM estimates of required returns.⁶⁸⁵
- 'Low beta bias' represents a tendency for low beta stocks to out perform and high beta stocks to underperform relative to the CAPM. However, empirical work attempts to examine how well the asset pricing model explains ex-post realised returns which 'may not be a particularly good test'.⁶⁸⁶ Many factors can contribute to the under and over performance of a stock such as economic shocks, changing equilibrium and individual investor preferences. Further barriers to arbitrage can prevent expected and required returns equalising.⁶⁸⁷ Partington and Satchell noted that the question of whether any of these variables determine equilibrium expected returns is currently unresolved.⁶⁸⁸ They also advised against using realised returns to measure expected returns because 'even if expected and required returns are equal, there can be persistent differences between realised returns and equilibrium expected returns'.⁶⁸⁹
- Tests of asset model performance depend on the method used and can be 'spurious'.⁶⁹⁰ Partington and Satchell advised the choice of methodology (such as the method of portfolio formation) influences whether or not the CAPM is rejected and there are substantial problems in conducting tests of asset pricing models correctly.⁶⁹¹
- Expected returns could diverge from realised returns over a persistent period of time, markets could be in disequilibrium and expectations are not always realised even on average.⁶⁹²

⁶⁸² For example, see: AER, Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3 - rate of return, November 2017, pp. 162–164.

⁶⁸³ Handley, Advice on return on equity, 16 October 2014, p. 11

⁶⁸⁴ Handley, Report prepared for the AER: Further advice on the return on equity, April 2015, p. 6

⁶⁸⁵ Partington and Satchell, Report to the AER: Discussion of submissions on the cost of equity, 8 June 2017, p. 19

⁶⁸⁶ Partington & Satchell, *Report to the AER: Analysis of criticism of 2015 determinations*, October 2015, p. 20.

⁶⁸⁷ Partington and Satchell, Report to the AER: Discussion of submissions on the cost of equity, 8 June 2017, pp. 27–29

⁶⁸⁸ Partington and Satchell, Report to the AER: Cost of equity issues—2016 electricity and gas determinations, April 2016, p. 51.

⁶⁸⁹ Partington and Satchell, Report to the AER: Discussion of submissions on the cost of equity, 8 June 2017, pp. 27–29

⁶⁹⁰ Partington and Satchell, Report to the AER: Discussion of submissions on the cost of equity, 8 June 2017, p. 18.

⁶⁹¹ Partington and Satchell, Report to the AER: Discussion of submissions on the cost of equity, 8 June 2017, p. 18.

⁶⁹² Partington and Satchell, Report to the AER: Discussion of submissions on the cost of equity, 8 June 2017, p. 30

- It is equivalent to perfect foresight from the regulator about the expected market risk premium and also assumes the regulator's ability to generate unbiased estimators of the time-varying beta.⁶⁹³

We also disagreed with using an alpha adjustment:⁶⁹⁴

- It can capture a range of factors such as outperformance and may not be bias with respect to the CAPM's estimation of equilibrium returns
- Estimates of alpha and beta are negatively correlated.⁶⁹⁵ In other words in CAPM tests the results for low beta stocks would be biased towards positive alphas.

Service providers have previously proposed the Black CAPM to 'correct' the low-beta bias by adjusting certain Sharpe-Lintner CAPM parameters using ex-post data.⁶⁹⁶ They also submitted consultant reports supporting use of the Black CAPM either by adjusting the return on equity or uplifting the equity beta.⁶⁹⁷ Our detailed considerations can be found in the relevant revenue determinations. In summary, we did not use the Black CAPM to estimate the return on equity.⁶⁹⁸

- The empirical implementation is unreliable
- There was little evidence that other regulators, academics or market practitioners use the Black CAPM to estimate the return on equity
- Implementing the Black CAPM typically results in estimates of the zero beta return being less reflective of prevailing market conditions than risk free rate estimates

⁶⁹³ Partington and Satchell, Report to the AER: Discussion of submissions on the cost of equity, 8 June 2017, p. 23

⁶⁹⁴ AER, Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3 - rate of return, November 2017, p. 163.

⁶⁹⁵ AER, Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3 - rate of return, November 2017, p. 163.

⁶⁹⁶ See for example Frontier, The required return on equity under a foundation model approach, January 2016, p. 55. Both HoustonKemp and Frontier use a return on equity that is deemed absent of low-beta bias to estimate an adjustment to the equity beta in the Sharpe-Lintner CAPM. HoustonKemp appears to use ex-post return on equity. Frontier uses a return on equity from its Black CAPM (which is derived using ex-post data). HoustonKemp also uses ex-post return on equity to estimate an 'alpha' term to include in the Sharpe-Lintner CAPM; For example, see: CitiPower, Regulatory proposal 2016-2020, April 2015, p. 205–212; CitiPower, Revised regulatory proposal 2016-2020, January 2016, p. 325–326; APTNT, Amadeus Gas Pipeline Access arrangement revised proposal: response to Draft Decision, January 2016, pp. 73, 75–77. AusNet Services, AusNet Transmission Group Pty Ltd transmission revenue review 2017–2022, 30 October 2015, pp. 263–266

⁶⁹⁷ For example, see NERA, Return on Capital of a Regulated Electricity Network: A report for Ashurst, May 2014, p. 91; NERA, The Black CAPM: A report for APA Group, Envestra, Multinet and SP AusNet, March 2012; SFG, Cost of Equity in the Black Capital Asset Pricing Model, 22 May 2014; SFG, Beta and the Black CAPM, February 2015; HoustonKemp, The cost of equity: response to the AER's draft decisions for the Victorian electricity distributors, ActewAGL Distribution and Australian Gas Networks, January 2016,

⁶⁹⁸ For example, see AER Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3 - rate of return, November 2017, p. 167.

We used the theory of the Black CAPM to inform an equity beta point estimate when applying the 2013 Guidelines⁶⁹⁹ despite Partington and Satchell advising against adjusting the equity beta for the Black CAPM or the low beta bias:

- Beta for a given portfolio remains remarkably constant which suggest that it may not be bias in beta that explains non-zero alphas, but rather economic conditions.⁷⁰⁰
- There are a number of explanations (for example, economic conditions) that do not imply a bias in beta. These explanations were noted by Partington and Satchell as well as Handley.⁷⁰¹ For example, Mujisson, Fishwick and Satchell (2014) found beta for a given portfolio remains relatively constant despite changes in the interest rate and market movements.

8.5.2 Evidence considered in this review

We observe that the proposals to adjust the overall Sharpe-Lintner CAPM return on equity for the low beta bias and the Black CAPM are not new as seen from the section above. We received similar type of material as those considered in the 2013 Guidelines and previous regulatory determinations for this review:

- Our draft decision noted submissions revolve around observations of the low beta bias on an ex-post basis⁷⁰² which should be factored into the ex-ante rate of return via an adjustment of some sort.⁷⁰³ Gray also stated the adjustment should offset the low beta bias.⁷⁰⁴
- Submissions to the draft decision pointed to actual returns in support of an adjustment to the Sharpe-Lintner CAPM for the low beta bias^{705 706 707 708 709}

⁶⁹⁹ For example, see AER, Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3 - rate of return, November 2017, p. 64.

⁷⁰⁰ Partington and Satchell, *Report to the AER: Return of equity and comment on submissions in relation to JGN*, May 2015, p. 16

⁷⁰¹ Partington and Satchell, *Report to the AER: Return of equity and comment on submissions in relation to JGN*, May 2015, p. 16; Handley, *Advice on the rate of return for the 2015 AER energy network determination for Jemena Gas Networks*, 20 May 2015, p. 5.

⁷⁰² By comparing actual realised returns against expected returns.

⁷⁰³ For example, APGA, Submission to the AER review of rate of return guideline, 4 May 2018, p. 9; APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, p. 27; Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 52.

⁷⁰⁴ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 53.

⁷⁰⁵ Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, Public forum presentation: Initial network sector perspectives, 2 August 2018, p. 24; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16

⁷⁰⁶ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16

⁷⁰⁷ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 23

⁷⁰⁸ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 101-102; Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA

Having reviewed these submissions, the absence of substantively new information and the extensive consideration in previous settings, we are not persuaded that the Sharpe-Lintner CAPM should be adjusted for the low beta bias or the Black CAPM. We consider:

- The Sharpe-Lintner CAPM remains the standard and most widely-used model in practice. McKenzie and Partington noted the Sharpe-Lintner CAPM 'has been around for in excess of half a century and has become the standard workhorse model of modern finance both in theory and practice'.⁷¹⁰ Burns, Mason, and Pickford found that a majority of CFOs use the CAPM⁷¹¹ (this appears to be based on a survey of US CFOs) and that investor success is measured against CAPM benchmarks (based on US data).⁷¹² The Australian Competition Tribunal has also upheld use of the Sharpe-Lintner CAPM in 2016 and more recently in 2018.⁷¹³
- We found no evidence of Australian market practitioners considering low beta bias or using the Black CAPM.⁷¹⁴ Our analysis of broker reports and expert valuation reports shows that none adjust the rate of return for the low beta bias or use the Black CAPM.
- Experts and submissions to this review in support of including the low beta bias generally noted it is observed in ex-post data, textbooks and academic research.⁷¹⁵ However, they did not advance evidence that the low beta bias is factored in or that investors and market practitioners account for it on an ex-ante basis. We discuss Frontier's report where it found ex-ante existence of the low beta bias in section 8.5.4.
- APA acknowledged the observed low beta bias may be a consequence of the model correctly estimating expected returns which are then being compared against – different – realised returns⁷¹⁶

Group, September 2018, p. 8, 24–25; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018, p. 2.

⁷⁰⁹ NERA, RAB growth since the AER's 2013 rate of return guideline, 25 September 2018, p. 42–46

⁷¹⁰ McKenzie and Partington, *Report to the AER part A: Return on equity*, October 2014, pp. 9–10.

⁷¹¹ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), p. 19.

⁷¹² Alpha is used as a metric of success by investors which is indirect testimony to the CAPM and the opportunity cost of a particular equity is its CAPM expected return. This indicates that the required return on equity is provided by the Sharpe-Lintner CAPM and is not adjusted for the low beta bias. [Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), pp. 18, 97]

⁷¹³ Australian Competition Tribunal, Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, 26 February 2016, para 813; Australian Competition Tribunal, Application by DBNGP (WA) Transmission Pty Ltd [2018] ACompT1, July 2018, para 289, 295.

⁷¹⁴ Based on our review of broker reports and independent valuation reports.

⁷¹⁵ For example, see: APGA, Submission to the AER review of rate of return guideline, 4 May 2018, p.9.; Energy Networks Australia, AER review of the rate of return guideline response to Discussion Papers and concurrent expert evidence sessions 4 May 2018, p. 58.

⁷¹⁶ APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, p. 26.

- The Black CAPM is typically submitted in the context of adjusting for the low beta bias because both imply a flatter relationship between the beta and return on equity.⁷¹⁷ In its latest report, Frontier also suggested the Black CAPM is a theoretical model derived to explain the low beta bias of the Sharpe-Lintner CAPM.⁷¹⁸ However, we found the model empirically unstable, sensitive to the choice of inputs, and lacks consensus on methods for determining inputs. The ENA and APA acknowledged the model's empirical issues.^{719 720} Consumer groups and SACES observed implementation issues with the model in terms of reliability, excessive complexity and unreasonable results.^{721 722 723 724}
- The Black CAPM can produce counter-intuitive and nonsensical results. For example, it can produce a zero-beta premium greater than the market risk premium and a negative relationship between returns and beta—which is not consistent with the theory underpinning the Sharpe-Lintner CAPM or the Black CAPM.⁷²⁵ Partington and Satchell also agreed with the SACES that the Black CAPM's restriction on financing 'do not seem large enough to justify the magnitudes of estimates of the zero risk premium'.⁷²⁶
- The Australian Competition Tribunal upheld the ERA's decision to reject the low beta bias when estimating the return on equity. It rejected adjustments both quantitatively (to the return on equity based on historical returns) and qualitatively (to select a top of the range equity beta). It noted that the former would be 'near impossible' and the latter would be arbitrary.⁷²⁷ Advisors to the UK regulators also supported the continued use of the Sharpe-Lintner CAPM⁷²⁸ and no adjustment for the low beta bias or the Black CAPM.

⁷¹⁷ The Black CAPM has previously been submitted in unison with the low beta bias because both indicate a flatter relationship between the return on equity estimate and the equity than the Sharpe-Lintner CAPM would indicate. Network businesses have previously submitted that the Black CAPM can functionally address the low beta bias as the model's zero beta rate is above the risk free rate—resulting in a flatter relationship. For example see: Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, September 2018; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018.

⁷¹⁸ Frontier, Low-beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, p. 25.

⁷¹⁹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, pp. 95–96.

⁷²⁰ APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, p. 25

⁷²¹ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

⁷²² CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

⁷²³ ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 15-16.

⁷²⁴ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 21

⁷²⁵ For example, see: AER, SAPN final decision, October 2015, p. 307, 309.

⁷²⁶ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018

⁷²⁷ Australian Competition Tribunal, Application by DBNGP (WA) Transmission Pty Ltd [2018] ACompT1, July 2018, para 289, 295

⁷²⁸ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), p. 22.

We acknowledge many ex-post empirical tests of the Sharpe-Lintner CAPM observed a flatter relationship between beta and returns. NERA's comparison of AER's return on equity allowances with actual returns from three different comparator sets is the latest example of such tests.⁷²⁹

However, many factors can explain observations of the low beta bias (see Table 18) and it is not clear that investors expect a higher return from low beta stocks.

Therefore, empirical ex-post results do not necessarily imply low beta bias or that the bias should warrant increasing the allowed rate of return.⁷³⁰ Partington and Satchell also noted that observations of low beta bias 'should be not automatically be taken as a compelling argument in favour of increasing the allowed rate of return'.⁷³¹ In any case, we consider that it is not clear that the low beta bias observed from empirical tests of the Sharpe-Lintner CAPM (whether as a result of the Black CAPM or any other explanation) invalidate return on equity estimates from the Sharpe-Lintner CAPM.

Further, many of the tests and exercises that indicate low beta bias are themselves the subject of ongoing academic debate and carry limitations that introduce doubt on their results and suitability for setting an allowed rate of return.⁷³² Partington and Satchell also agreed with the SACES that 'test statistics that are relied on in many studies are not valid, leading to unwarranted rejections of the Sharpe-Lintner CAPM'.⁷³³

Table 18 Issues with low beta bias and ex-post empirical tests of the Sharpe-Lintner CAPM

Issue	Description
Interest rate movements	Interest rate movements can drive observations. ^{734 735} Prospective interest rate environment might play an important role in determining low beta returns. ⁷³⁶
Over-pricing of high beta stocks	Over pricing of high beta stocks can drive observations. ^{737 738}

⁷²⁹ NERA, RAB growth since the AER's 2013 rate of return guideline, 25 September 2018, p. 42–46

⁷³⁰ Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, 25 May 2018, p. 26–28.

⁷³¹ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, p. 11.

⁷³² AER, Draft rate of return guidelines explanatory statement, July 2018, pp. 277; AER, 2013 Guidelines appendices, December 2013, pp. 11–12; For example, AER, Final decision SA Power Networks determination 2015–16 to 2019–20, October 2015, pp. 451–463, p. 288.

⁷³³ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018

⁷³⁴ Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, 25 May 2018, p. 26–28.

⁷³⁵ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 53.

⁷³⁶ Fishwick, Ed, The low beta anomaly, October 2014,

⁷³⁷ Partington and Satchell, Report to the AER: Allowed rate of return 2018 guideline review, 25 May 2018, p. 26–28;

Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018

⁷³⁸ Cambridge Economic Policy Associates, Rate of Return Guideline Review – Facilitation of Concurrent Expert Evidence: Expert Joint Report, 21 April 2018, p. 53.

Historic limitations on leverage may help explain observed low beta bias.⁷³⁹

The combination of irrational investor demand for high volatility and delegated investment management with fixed benchmarks and no leverage flattens the relationship between risk and return.⁷⁴⁰

Impediments to arbitrage via leverage may drive low beta bias⁷⁴¹

Constrained investors (for example, with regard to leverage) bid up high-beta assets.⁷⁴² They may invest in high-beta assets/stocks instead of purchasing low-beta assets/stocks and gearing them up due to leverage limitations. The combination of high price and failure rate⁷⁴³ would depress ex-post return for high-beta assets and lead to a flatter relationship between risk and return than the Sharpe-Lintner CAPM would indicate.

CAPM as an equilibrium model Test of the CAPM are joint tests of equilibrium returns and market efficiency. Premia may be due to market inefficiency and the market portfolio being unidentifiable.⁷⁴⁴

Fischer Black has previously suggested that testing of model performance using ex-post realised returns 'might be telling...more about the shocks to the expected returns (volatility) rather than the equilibrium expected returns'.⁷⁴⁵

Expected returns can diverge from realised returns over a persistent period of time, markets can be in disequilibrium and expectations are not always realised even on average.⁷⁴⁶

Economic factors Exogenous macro factors causing out of equilibrium movements seem to drive observations of the low beta bias.⁷⁴⁷

Contracting difficulties Low beta bias may be a function of contracting difficulties in the market for fund management services⁷⁴⁸

Methodology Results are dependent on the method used to conduct the test (for example the characteristics used in sorting stocks into portfolios when testing model performance), which was also noted by Kan, Robotti and Shanken.⁷⁴⁹

There are issues with the model and/or data used to estimate the empirical security

⁷³⁹ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), p. 22.

⁷⁴⁰ Baker, Bradley, Wurgler, Malcolm, Brendan, Jeffrey, Benchmarks as limits to arbitrage: understanding the low volatility anomaly, January/February 2011, p. 10.

⁷⁴¹ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), p. 22.

⁷⁴² Frazzini, Heje Pedersen, Andrew, Lasse, Betting against beta, Journal of financial economics 111 (2014)1-25

⁷⁴³ Baker, Bradley, Wurgler, Malcolm, Brendan, Jeffrey, Benchmarks as limits to arbitrage: understanding the low volatility anomaly, January/February 2011, p. 5.

⁷⁴⁴ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), p. 101.

⁷⁴⁵ Partington & Satchell, Report to the AER: Analysis of criticism of 2015 determinations, October 2015, p. 20

⁷⁴⁶ Partington and Satchell, *Report to the AER: Discussion of submissions on the cost of equity*, 8 June 2017, p. 30.

⁷⁴⁷ Fishwick, Ed, The low beta anomaly, October 2014,

⁷⁴⁸ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), p. 21.

⁷⁴⁹ Partington & Satchell, Report to the AER: Analysis of criticism of 2015 determinations, October 2015, p. 23–24. They observed that when portfolios are formed by ranking on size and CAPM beta, rather than size and book to market, the superiority of the Fama French three factor model disappears. Kan, Robotii and Shanken also noted that model comparison can be very sensitive to the test assets employed.

market line.⁷⁵⁰

Investor behaviour

CAPM still approximates investor behaviour well ⁷⁵¹

Source: AER analysis

Given the substantial uncertainty about the evidence of low beta bias we would prefer to observe greater application of the concept by market practitioners before placing material weight on this evidence.

Some stakeholders shared our concerns about the Black CAPM' reliability issues. The ENA appears to acknowledge empirical issues with reliability and counter-intuitive results.⁷⁵² APA previously acknowledged the considerable difficulties associated with obtaining reliable estimates of the return on the zero-beta portfolio. Consumer groups and SACES observed implementation issues with the Black CAPM in terms reliability, excessive complexity and unreasonable results.⁷⁵³

We note APA's comment that the assumptions for both the Sharpe-Lintner CAPM and Black CAPM are similarly implausible.⁷⁵⁴ However, the Sharpe-Lintner CAPM's wide use by Australian regulators and market practitioners give additional confidence for estimating the required return on equity. Partington and Satchell also noted 'it seems ill advised to focus on things that seems improbable, relative to the ones that seems reasonably true' and 'assuming the 10 year government bond rate corresponding to a riskless asset 'seems fairly innocuous'.⁷⁵⁵

We disagree with APA's statement that the 'Black CAPM...has been advanced, in regulatory debate...to support the upwards adjustment of rates of return...to recognise the market imperfections reflected in the assumptions about investor borrowing and lending made by Black'.⁷⁵⁶ Rather, the Black CAPM has been used by energy network businesses in the context of the low beta bias because both effectively imply a flatter relationship between the equity beta and the expected return on equity from the Sharpe-Lintner CAPM.

We considered the APGA's proposal to include an 'alpha' term to address the low beta bias.⁷⁵⁷ However, this approach generally entails the use of ex-post data to adjust the

⁷⁵⁰ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018

⁷⁵¹ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), p. 20.

⁷⁵² ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, pp. 95–96.

⁷⁵³ APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, p. 25

⁷⁵⁴ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16

⁷⁵⁵ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, p. 11.

⁷⁵⁶ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16

⁷⁵⁷ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 27

Sharpe-Lintner CAPM return on equity such as that proposed by HoustonKemp's November 2016 report.⁷⁵⁸ We previously considered and rejected such proposals as noted in section 8.5.1. For example this approach can capture a range of factors (see Table 18) such as outperformance and may not be bias with respect to the CAPM's estimation of equilibrium returns

The ENA, referencing Frontier, submitted that market practitioners select an intercept above the prevailing government bond rate to account for the low beta bias.⁷⁵⁹ This proposition has not been supported with evidence showing that regulators' and market practitioners' use of uplifts are motivated by Black CAPM theory or the low beta bias. We are also not aware of any circumstance where this was the motivation. Further, such an approach would be inconsistent with our foundation model approach which uses the Sharpe-Lintner CAPM to estimate the return on equity and has received support from all stakeholders for its continued use.^{760 761}

8.5.3 Validity of adjusting the equity beta

We have considered the validity of adjusting the equity beta parameter for the low beta bias and Black CAPM.

The ENA, APGA and APA submitted that selecting an equity beta estimate towards the upper end of empirical range (from the 2013 Guidelines) can account for the low beta bias.⁷⁶²

We have previously noted that the Black CAPM and low beta bias relate to the return on equity in the 2013 Guidelines and the draft decision.⁷⁶³ The Independent Panel has noted that the Black CAPM (and low beta bias) relates to the overall return on equity and not the equity beta.⁷⁶⁴ APA, ENA and Evoenergy also appear to acknowledge this.^{765 766 767} We considered adjustments to account for the low beta bias extensively in the

⁷⁵⁸ HoustonKemp, The Cost of Equity and the Low-Beta Bias, November 2016

⁷⁵⁹ Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, September 2018, p. 35–36; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 99; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018, p. 21.

⁷⁶⁰ Network shareholders group, Submission on the Rate of Return Guideline review, p.9, Energy Networks Australia, AER Review of the Rate of Return Guideline – Response to Discussion Papers and Concurrent Evidence Sessions, p.8, Australian Pipeline Gas Association, Submission to the AER, Review of rate of return guideline, 4 May 2018, p.2;

⁷⁶¹ Energy Consumers Australia, *Response to the AER draft rate of return guideline*, 25 September 2018, cover letter pp.1-2; CCP16, Submission to the AER on its Draft Rate of Return Guideline, September 2018, p. 5.

⁷⁶² ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 97; APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 27; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 28

⁷⁶³ AER, Better regulation explanatory statement rate of return guideline (appendices), December 2013, p. 11, 16, 71.

⁷⁶⁴ Independent panel, Review of the Australian Energy Regulator's rate of return draft guidelines, 7 September 2018, p. 39.

⁷⁶⁵ APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16

⁷⁶⁶ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 83-84

2013 Guidelines, subsequent regulatory decisions and in this review (as discussed in section 8.5.1 and 8.5.2). We disagree with adjusting the Sharpe-Lintner CAPM for the low beta bias.

There are also a number of reasons that do not indicate a bias in equity beta:

- There are a number of explanations for empirical observations of the low beta bias that do not imply a bias in equity beta (see Table 18).
- Experts have observed stability in beta estimates that do not support a bias in beta estimates:
 - Beta for a given portfolio remains remarkably constant which suggest that it may not be bias in beta that explains non-zero alphas, but that it has more to do with economic conditions.⁷⁶⁸
 - To the extent there is evidence for bias it would be in alpha not beta⁷⁶⁹
 - Beta estimates are remarkably stable across all model specifications⁷⁷⁰
- The ERA also concluded that there 'is no justification for changing the value of beta in the Sharpe-Lintner CAPM' for the low beta bias.⁷⁷¹ The Australian Competition Tribunal upheld this view and noted such adjustments would be arbitrary.⁷⁷²

Energy network businesses and investors have submitted that the Black CAPM should be retained in its 2013 role to inform the equity beta point estimate for the following reasons:

- There has been no change in finance theory
- The AER has previously recognised potential imperfections in the Sharpe-Lintner CAPM
- Changing the role of the Black CAPM would represent a change in the AER's approach and there has been no evidence to support a change
- The ENA also submitted the qualitative use of the Black CAPM (to select an equity beta point estimate) would alleviate our concerns with the Black CAPM.⁷⁷³

However, material received since 2013 questions the Black CAPM's continued use to inform the equity beta point estimates:

⁷⁶⁷ Evoenergy, Review of rate of return guideline-draft decision, 25 September 2018, p. 3-4; ENA, Public forum presentation: Initial network sector perspectives, 2 August 2018, p. 24; APA, Review of the rate of return guidelines APA submission responding to AER draft guidelines, 25 September 2018, p. 16

⁷⁶⁸ Partington and Satchell, *Report to the AER: Return of equity and comment on submissions in relation to JGN*, May 2015, p. 16

⁷⁶⁹ Partington and Satchell, *Report to the AER: Allowed rate of return 2018 Guideline review*, 25 May 2018, p. 19.

⁷⁷⁰ Fishwick, Ed, *The low beta anomaly*, October 2014

⁷⁷¹ ERA, Final decision on proposed revisions to the access arrangement for the Dampier to Bunbury Natural Gas Pipeline 2016–2020 Appendix 4 Rate of return, 30 June 2016, p. 61

⁷⁷² Australian Competition Tribunal, Application by DBNGP (WA) Transmission Pty Ltd [2018] ACompT1, July 2018, para 289, 295

⁷⁷³ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 96

- We have diminished confidence in using the Black CAPM and the information it provides because shortcomings identified in the 2013 Guidelines have been reinforced:
 - Market practitioners, investors and regulators do not use the Black CAPM to adjust the equity beta parameter (section 8.5.2)
 - It is empirically unstable, sensitive to the choice inputs and lacks consensus (section 8.5.2)
 - The ENA appears to acknowledge the model's empirical issues with reliability, counter-intuitive results.⁷⁷⁴ APA previously acknowledged the considerable difficulties associated with obtaining reliable estimates of the return on the zero-beta portfolio.⁷⁷⁵
 - Consumer groups and SACES observed implementation issues with the Black CAPM in terms of reliability, excessive complexity and unreasonable results.^{776 777 778 779}
- The Black CAPM has typically been submitted in the context of addressing the low beta bias which is related to the overall return on equity. We do not consider it appropriate to adjust the Sharpe-Lintner CAPM for the low beta bias or the Black CAPM at the return on equity level (section 8.5.2 and 8.5.3). There are a number of explanations for empirical observations of actual returns departing from expected returns that do not warrant compensation in the rate of return or imply a bias in equity beta (Table 18).
- Experts observed stability in beta estimates which do not support a bias in beta estimates.
- The APA acknowledged that estimates of beta are not, themselves, biased.⁷⁸⁰
- In a report for the UKRN, experts also supported the continued use of the Sharpe-Lintner CAPM⁷⁸¹ and no adjustment for the low beta bias or the Black CAPM.

We disagree with the view that not using the theory of the Black CAPM represents a change to our approach. We apply the foundation model approach. This uses the Sharpe-Lintner CAPM as the foundation model to estimate the return on equity and a range of relevant information to inform and crosscheck the parameter estimates. We

⁷⁷⁴ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, pp. 95–96.

⁷⁷⁵ APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, p. 25

⁷⁷⁶ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

⁷⁷⁷ CCP16, Submission to the AER on its draft rate of return guideline, September 2018, p. 89.

⁷⁷⁸ ECA, Review of the rate of return guideline response to the AER draft guideline, September 2018, p. 15-16.

⁷⁷⁹ CRG, Submission to the Australian Energy Regulator – response to the rate of return draft decision, September 2018, p. 21

⁷⁸⁰ APA, Review of the rate of return guidelines APA submission responding to discussion papers and expert evidence, 4 May 2018, p. 24.

⁷⁸¹ Burns, Mason, Pickford, Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003), p. 22.

consider all relevant material, including the Black CAPM, on their merit and suitability for our regulatory task. A review that focuses largely on changes in finance theory to drive our exercise of judgement would be a highly theoretical approach to achieving legislative objectives. In exercising our judgement we recognise the potential for parameters to have a range, underlying uncertainty and the need to assess the relative merit of all the material/evidence before us.

In setting the equity beta parameter, we give most weight to empirical Australian estimates and other relevant information in a complementary role (section 7.13).

8.5.4 Frontier's 2018 report

We have reviewed Frontier's September 2018 report ('Low beta bias and the Black CAPM')⁷⁸² which energy network businesses and networks associations used to support low beta bias existing on an ex-ante basis.⁷⁸³ However, we do not agree with the report's conclusions.

Frontier has used analyst forecasts to proxy expected returns. We note shortcomings with analyst forecasts:

- Analyst forecasts can be 'sticky' and upward biased⁷⁸⁴ which can lead to forecast prices (and hence expected returns) that are biased upwards.
- Forecast accuracy decreases over time⁷⁸⁵—the upward bias appears to increase with the time horizon of the forecast as longer forecast horizons are more optimistic.⁷⁸⁶

The observed upward-bias in analyst forecasts (and the resulting expected returns) would yield a flatter relationship between the required return on equity and beta than the Sharpe-Lintner CAPM would indicate (assuming the same equity beta and market risk premium are used). Therefore, Frontier's report provides insufficient evidence to persuade us that analyst forecasts can be used or that low beta bias exists on an ex-ante basis.

⁷⁸² Two versions of this report were submitted: one for the ENA, one for APGA and APA. The two versions appear substantively similar in terms of their key observations and conclusions.

The Black CAPM has typically been submitted in unison with the low beta bias because both indicate a flatter relationship between the return on equity estimate and the equity than the Sharpe-Lintner CAPM would indicate. Network businesses have previously submitted that the Black CAPM can functionally address the low beta bias as the model's zero beta rate is above the risk free rate—resulting in a flatter relationship.

⁷⁸³ Frontier, Low beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, September 2018; Frontier Low beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018.

⁷⁸⁴ For example, stickiness and upward bias. Also see: <https://www.finsia.com/insights/news/news-article/2014/11/18/forecast-bias-are-australian-analysts-overly-optimistic> ; Aiolfi, Rodriguez, Marco, Marius, Do analysts trade off bias and uncertainty? Analyst earnings expectations at different forecast horizons, 23 September 2018, p. 2;

⁷⁸⁵ Hutira, Salvador, Determinants of analyst forecasting accuracy, 2016, p. 21.

⁷⁸⁶ Hutira, Salvador, Determinants of analyst forecasting accuracy, 2016, p. 21; Aiolfi, Rodriguez, Marco, Marius, Do analysts trade off bias and uncertainty? Analyst earnings expectations at different forecast horizons, 23 September 2018, p. 2

Frontier's analysis relies on a model that is similar to a DGM. In both models, the expected returns are estimated from analysts' forecasts of dividend trajectories and analysts' expected dividends are an input to the model. The main difference is that, expected growth rate is an explicit input in the DGM whereas it is implicitly captured in analysts' target price and dividends in Frontier's model. As discussed in section 9.4, we consider some shortcomings of the DGM also apply to Frontier's model.

Frontier considers analyst forecasts, though biased, can be used to proxy expected returns.⁷⁸⁷ We acknowledge that analyst forecasts, in providing targets, incorporate forward-looking information and can affect stock prices. However, its shortcomings (such as upward bias) undermine our confidence in this material for assessing the low beta bias.

While, market practitioners sometimes select an intercept above the prevailing government bond rate, our analysis of market practitioners' material (including broker analyst reports) above shows no evidence of adjustments for the low beta bias or Black CAPM.

Partington and Satchell noted several concerns about using analyst forecasts as an appropriate measure of expected returns.⁷⁸⁸

- Analyst forecasts are slow to respond to new information
- Their upward bias is well recognised
- The evidence against unbiased estimates of expected returns over a one year horizon comes from a very considerable literature in empirical finance and accounting.
- Positive bias is expected to prevail because analysts make more buy recommendations than sell
- The reward structure for analysts did not directly compensate them for producing unbiased forecasts

Frontier noted that if actual returns cannot be used when assessing low beta bias, then they cannot be used for other purposes such as estimating equity beta.

We disagree with this view. Our view to not adjust the Sharpe-Lintner CAPM return on equity for the observations of low beta bias is not analogous to placing no weight on actual returns. We consider actual returns data is the most appropriate data for estimating the return on equity (through the market risk premium, risk free rate and equity beta parameters as discussed in their respective sections). However, the flatter relationship that actual returns show or reflected in the low beta bias do not warrant inclusion in the required return on equity. As noted in Table 18, this is because a range

⁷⁸⁷ Frontier, Low-beta bias and the Black CAPM: report prepared for Energy Networks Australia, September 2018, p. pp. 10–12; Frontier, Low-beta bias and the Black CAPM: report prepared for Australian Gas Infrastructure Group and APA Group, September 2018, p. pp. 22–23.

⁷⁸⁸ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, pp. 6-7.

of reasons can explain divergence between expected and actual returns, including biases in analyst forecast.

Further our use of actual return data to implement the Sharpe-Lintner CAPM via its parameters is consistent with market practice. Partington and Satchell commented that whether actual returns are a reasonable proxy for expected returns depends on how they are employed.⁷⁸⁹ They supported using time-series estimation based on observed returns for estimating beta and indeed the MRP.⁷⁹⁰

⁷⁸⁹ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, p. 8.

⁷⁹⁰ Partington and Satchell, Report to the AER: Discussion of submissions on the draft 2018 guideline, November 2018, p. 8

9 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 or the 'average firm' in the market. Systematic risk is risk that 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 an efficient firm that is in the supply of regulated energy network services commensurate with its efficient financing costs. Because we use an Australian domestic SLCAPM, the relevant MRP is the expected Australian dollar return on the Australian market portfolio less the return on Australian dollar risk free asset.

The MRP estimate we use in the SLCAPM should be a good estimate of the expected Australian domestic MRP. The expected MRP is not directly observable, although realised excess equity returns can be observed after the fact. These returns can then be used to estimate the MRP. Other information that can be used to estimate the MRP includes estimates from dividend growth models and from observed risk premiums on other assets such as debt.

As we are forming an expectation of the market risk premium we consider it is important to use a method that gives an appropriate forward estimate. Dimson, Marsh and Staunton have previously stated that averages of historical excess returns (HER) may produce the best forward looking estimates of MRP.⁷⁹¹ Other methods such as the dividend growth model (DGM) use analyst forecasts and future expectations of growth rates to estimate a forward looking MRP.

9.1 Final decision

Our final decision is to set an MRP of 6.1 per cent per annum over the yield to maturity on Australian Commonwealth Government Bonds with a term to maturity of 10 years (10 year CGS). This decision is based the following key considerations:

- The observed arithmetic MRP (from historical excess returns) since 1988 is 6.1 per cent, and
- In combination with current (relatively low volatility) market conditions and some evidence of a decreasing MRP through time.
- An MRP of 6.1 per cent per annum is a decrease from the 6.5 per cent per annum estimated during the 2013 guideline process and subsequent regulatory determinations. However, we have considered all relevant evidence available from the review, including evidence from historical excess return data and potential

⁷⁹¹ Dimson, Marsh and Staunton, Credit Suisse Global Investment Returns Sourcebook 2012, February 2012, p.37.

methods of forward estimation of the MRP, and are satisfied that an MRP of 6.1 per cent per annum is the best estimate.

- Overall the evidence supports our view that an MRP of 6.1 per cent per annum will give investors an opportunity to recover their efficient costs and contribute to achieving the national gas and electricity objectives and revenue and pricing principles.⁷⁹²
- The higher point estimate (compared to the draft decision) is due to a change in theta (a component of imputation credits).⁷⁹³ This change increased our historical excess returns (which we have most reliance on) and other estimates of the MRP.

We have used the same broad overall approach as that used for estimating the MRP in the 2013 guidelines process. That is, in estimating the MRP we have given the most weight to historical excess returns and less weight to other relevant evidence. We give most weight to historical excess returns because:

- They are directly observable, easily replicable and transparent.
- We expect required risk premiums to change relatively slowly through time.

We gave less weight to other relevant evidence. When exercising our regulatory judgement, we rank the utility of different types of evidence at the time and then qualitatively consider whether to move our initial MRP estimate up or down.⁷⁹⁴

In this review, we continue to give greater weight to HER for informing the market risk premium. This information, along with other relevant evidence, supports a value of 6.1 per cent.

We considered a range of results from DGMs (as submitted through the consultation process), but we are less confident about these estimates. Further, expert advice raised significant concerns with MRP estimates from DGMs as to their reliability and accuracy. Given these concerns we are not persuaded by the DGM evidence to increase the MRP estimate from the point estimate obtained from the HER.

Other reasons supporting our decision include:

- Our current estimate is consistent with decreased volatility in equity markets since 2013 and material reductions in debt risk premiums over the past 5 years.
- It reflects evidence of a declining risk premium over time both domestically and internationally, as shown in submissions.

⁷⁹² And the legislative objectives.

⁷⁹³ We have increased theta from 0.6 (in the draft guidelines) to 0.65.

⁷⁹⁴ In the 2013 review process, we stated 6.0 per cent was an appropriate estimate of the historical excess returns (HER) evidence and the starting point for our determination of a point estimate. Then, we moved our estimate up based on the direction of the other evidence we consider in estimating the MRP, particularly the dividend growth models (DGMs) evidence.

- Stakeholders and experts broadly supported our existing approach to determining the MRP, although they had various views on the merits of different types of evidence and the values that should be derived from each. We considered these different views in arriving at our final decision. Section 9.2 summarises the main points from submissions.

Section 9.3 focuses on HER and issues stakeholders considered as significant, including using geometric and arithmetic returns. Section 9.4 discusses the role of DGMs. Section 9.5 shows our updated estimates of the MRP.

9.2 Overall MRP estimate

This section summarises stakeholders' submissions on our overall MRP estimate. Specific feedback about HER and DGMs is summarised in sections 9.3 and 9.4 respectively.

Some stakeholders compared our draft decision and its evidence with the 2013 Guidelines, drawing different conclusions about the draft decision's MRP estimate (6.0 per cent) and the 2013 estimate (6.5 per cent). For example, the CCP stated a lower MRP was reasonable, given market conditions.⁷⁹⁵ By contrast, the ENA stated the MRP should have remained steady or possibly increased (see section 9.2.1 for details).⁷⁹⁶

In section 9.2.2 we discuss stakeholder views and expert reports on the topic of decisions by other regulators. For example, we consider the Earwaker report on international regulators (commissioned by the ENA), as well as the ENA's submission that the AER's decision conflicts with other Australian regulators in their recent decisions.⁷⁹⁷ Section 9.2.3 deals with how other regulatory measures, such as incentive schemes, may interact with the MRP. This was an issue raised by the CRG who submitted that not considering these schemes could result in a rate of return which was higher than intended.⁷⁹⁸

One of the most debated subjects in this process has been the relationship between the risk free rate and the MRP. Throughout concurrent evidence sessions and over multiple rounds of submissions experts and stakeholders have presented arguments around the existence of a measurable, negative relationship between the MRP and the risk free rate. The CRG and SACES submitted a report detailing that no such relationship can be found in historical data.⁷⁹⁹ The network stakeholders, such as APA and the NSG, submitted that there should be more reliance on such a relationship in

⁷⁹⁵ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.60

⁷⁹⁶ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.109-110

⁷⁹⁷ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.134-135

⁷⁹⁸ CRG, Response to ROR draft decision, 25 September 2018, p.18

⁷⁹⁹ CRG, Response to ROR draft decision, 25 September 2018, p.26

order to provide the forward looking MRP estimate.⁸⁰⁰ In section 9.2.4 we set out the submissions and extend our consideration of the discussion from the draft decision.

The last three sections cover our consideration of the MRP as a parameter, and the use of survey and conditioning variable evidence. Section 9.2.5 considers the submission of the Australia Institute who indicate the MRP should not be directly estimated.⁸⁰¹ When considering the use of survey evidence in section 9.2.6 and conditioning variables in section 9.2.7 we discuss the ENA's view that surveys support an increase in the MRP as well as APA and the CCP's opposing views on the use of conditioning variables in our estimation process.⁸⁰²

9.2.1 Overall estimate and supporting evidence

Final Decision

We have considered all evidence as it appears to us now in 2018 in estimating the forward looking MRP. Having considered all data, evidence sources, potential biases in the evidence and relative strengths and weaknesses we have arrived at a point estimate for the MRP. We consider this review has been conducted transparently and openly in a manner that reflects the process we have outlined to stakeholders throughout. It has focused on key areas raised in submissions prior to and during the review process. Ultimately, our obligation is to meet the legislative requirements and we consider the results from our review meet these objectives.

We consider that the overall evidence suggests an MRP of 6.1 per cent. Whilst some evidence indicates an increase since our 2013 guidelines the overall evidence when considered with appropriate significance leads us to an estimate of 6.1 per cent. When considering estimates from different methods fluctuations over short time periods, such as month to month or year to year, may not reflect the best estimate for a forward looking 10 year MRP.

The MRP estimate has increased since the draft decision from 6.0 to 6.1 per cent. Consistent with our draft decision, when estimating the MRP we take into account the value investors receive from dividend payouts as explained in section 9.5.1. In the draft decision we adopted our utilisation rate (theta) value of 0.6 whereas in this final decision we use our updated theta value of 0.65 leading to the increase in the estimated MRP adopted in this instrument.

Draft Decision

⁸⁰⁰ APA, Submission on Draft Guideline, 25 September 2018, p.42; NSG, Submission to the draft Rate of Return Guideline, p.15

⁸⁰¹ Australia Institute, Rate of Return guideline, 25 September 2018

⁸⁰² APA, Submission on Draft Guideline, 25 September 2018, pp.40-41; CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, pp.68-70

Our draft decision stated an MRP estimate of 6 per cent. This was based on considering various estimates from different sources according to their reliability and appropriateness for use in a regulatory framework. For some models, such as the DGM and the Wright approach, this meant applying less weight than we had previously under the 2013 guidelines, or no weight.

Independent Panel review

The Independent Panel found the draft decision adequately considered available information relevant to estimating the MRP. We clearly explained our data and logic, including data and logic that received lesser or no weight.⁸⁰³

Stakeholder submissions

A number of submissions by network operators and industry groups stated that we have not considered evidence correctly in the context of what should be an incremental review.

The ENA produced a graph which showed evidence considered in the 2018 draft decision against their level in the 2013 guidelines, highlighting that most evidence has increased over that time.⁸⁰⁴ As such it submitted it is incorrect to say the evidence supports a lower MRP than the 2013 guidelines, and the evidence presented should support an MRP of at least 6.5 per cent.⁸⁰⁵ The APGA submit that we have not considered the evidence correctly according to finance theory and the MRP should not have fallen since the 2013 guidelines.⁸⁰⁶ It suggested an appropriate approach would have been to start with the 6.5 per cent estimate from the 2013 guidelines and consider whether that is still applicable rather than starting completely from scratch.⁸⁰⁷ The Joint Energy Business submission supported this, stating we have not delivered an incremental review as intended.⁸⁰⁸ APA and the NSG also submitted that the evidence does not support an MRP of 6 per cent or a change from 6.5 per cent to 6 per cent and that we did not correctly balance the evidence before us.⁸⁰⁹

The CCP put forward that we should adopt a value of no greater than 6 per cent for MRP, as that is consistent with the evidence put forward by the AER in July's Draft decision.⁸¹⁰ They submit that despite certain evidence increasing, such as the DGM, it is reasonable to conclude that the MRP has declined.⁸¹¹ The AEC submitted that whilst

⁸⁰³ Independent Panel, Report to the AER, September 2018, p.33

⁸⁰⁴ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, p109

⁸⁰⁵ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.109-110

⁸⁰⁶ APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018, p.14

⁸⁰⁷ APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018, p.18

⁸⁰⁸ Joint Energy Businesses, Final Rate of Return Submission, 25 September 2018, pp.6-8

⁸⁰⁹ APA, APA, Submission on Draft Guideline, 25 September 2018, pp.42-43; NSG, Submission to the draft Rate of Return Guideline, p.16

⁸¹⁰ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.56

⁸¹¹ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.60

the estimate of 6 per cent is not as generous as it could be, it does not appear to be an unreasonable estimate on the evidence provided.⁸¹²

The CRG and ECA put forward that the selected point estimate of 6.0 per cent is too high based on the evidence considered in the draft decision. They submit that upward bias in many forms of data collection is not accounted for especially in the presence of long term trends which point to a downward trend in the MRP.⁸¹³

AER consideration

In our October 2017 issues paper we noted that our primary goal in conducting a review is to achieve the legislative objectives.⁸¹⁴ Following initial feedback from stakeholders, and consistent with that overall feedback, we considered it would be appropriate to adopt a targeted approach to our review, with the 2013 guidelines as our starting reference, in order to arrive at a decision which achieves the necessary objectives.

In our October 2017 issues paper we listed particular "priority issues" with our 2013 guidelines that we intended to examine more closely in the review. This included "considering the weighting of information used to estimate the equity beta and the MRP".⁸¹⁵ Some stakeholders had raised concerns in the September 2017 stakeholder forum about the value attributed to the MRP when applying the approach in our 2013 Guidelines. For example, the Major Energy Users Association had raised concerns that the values of the equity beta and MRP adopted in the 2013 guidelines were overly conservative and that this "conservatism", being applied at each stage, "is both additive and in some cases geometric."⁸¹⁶

While we noted specifically that we would consider the weighting of information used to estimate the MRP, we also stated that "while we have provided our initial views on the priority issues, we are open to assessing other issues. We will assess the merits of all issues stakeholders identify as important."⁸¹⁷ This is an inherently necessary aspect of our review in which we have due regard to stakeholder submissions in reaching a final decision that we are satisfied will achieve the legislative objectives.

We explained that we would update market data and consider updated academic theory during the review.⁸¹⁸ While we stated our starting point for estimating the return on equity would be the foundation model approach in the 2013 guidelines, we did not state that we would start with the values obtained from the 2013 rate of return guidelines for MRP and beta and only consider recent directional changes from those

⁸¹² AEC, Draft Rate of Return Guideline Response, 25 September 2018, p.18

⁸¹³ CRG, Response to ROR draft decision, 25 September 2018, p.24; ECA, Response to AER Draft Guideline, 25 September 2018, p.14

⁸¹⁴ AER, Rate of Return issues paper, November 2017, pp.7, 14-15

⁸¹⁵ AER, Rate of Return issues paper, November 2017, pp.7-8

⁸¹⁶ Development of WACC guideline: A consumer view, AER forum 18 September 2017

⁸¹⁷ AER, Rate of Return issues paper, November 2017, pp.7-8

⁸¹⁸ AER, Rate of Return issues paper, November 2017, pp.7-8

values. Using the 2013 value of 6.5 per cent as a "starting point" in that manner could lead to bias in our decision rather than arriving at the best estimate presented by the evidence in front of us.⁸¹⁹

In order to arrive at the estimate for a forward looking MRP we have to look at the evidence presented at the current time. For example we have placed relatively less weight on DGM results in making our final decision than we did in making the 2013 Guidelines, as discussed in detail in section 9.4. We disagree with submissions that our approach is in opposition to financial theory and advice. However, in response to submissions we have reviewed the academic and finance literature to inform us on the relative weights to place on different pieces of evidence.

We have received significant advice and a large number of submissions on the MRP since 2013. These have provided evidence on a number of important areas including, but not limited to, the use of DGMs, averaging methods in excess returns and the choice of data set for use in the HER. We have detailed what evidence we have considered and used when examining evidence throughout our decision.

We agree that when comparing single points it appears that some evidence has increased since the 2013 guidelines. However to conclude that this means the MRP must increase oversimplifies the process of estimating the MRP. We do not apply a mathematical function when estimating the MRP so we cannot conclude necessarily that increases in some evidence should lead to a higher MRP estimate. When considering the evidence we take account of the evidence as a whole, considering a range where appropriate and arriving at a point estimate using expert advice and financial theory to assist. We explain at each stage how we have reached this decision and why the point estimate best reflects the evidence presented.

In respect of the final point estimate, we do not agree that an estimate of 6.5 per cent (or above) is a better fit to the evidence than 6.1 per cent. Submissions that suggest a higher MRP is more appropriate place greater weight on the DGM, or the theory that the MRP and risk free rate are negatively correlated, than we have. We have discussed in detail in the relevant sections of this final decision how we have considered different pieces of evidence.

The CRG has stated that the upward bias of the arithmetic average is significant in deciding upon a final estimate for the MRP.⁸²⁰ We agree that there is a potential for upward bias in results produced from historic excess returns and we have further discussed our view in Section 9.3.5. We note that the apparent bias highlighted by the CRG is accounted for in our consideration of the HER results.

9.2.2 Other Regulator's Decisions

⁸¹⁹

⁸²⁰ CRG, Response to ROR draft decision, 25 September 2018, p.24

In this section we discuss the use of other regulator's decisions, both international and domestic, in estimating our MRP. Again, we set out from the starting point of providing a robust and transparent methodology by which we estimate the forward looking MRP.

Final Decision

We consider that our MRP estimate of 6.1 per cent is not inconsistent with other regulators' decisions.

We acknowledge that other regulators can provide a point of reference for our estimates and it is prudent to monitor other regulators and the methods they use when estimating the MRP. However they may use evidence or methods we do not deem appropriate for use in our own decisions which are made under different regulatory provisions and may be for different industries.

Therefore, we avoid comparing final estimates without appropriate context and instead consider the evidence discussed in the decisions. This ensures we consider relative merits and assign appropriate weights to the evidence. For example, when comparable evidence and assumptions are used, IPART's material suggests an MRP of 6.0 per cent and ERA's suggests 6.2 per cent.⁸²¹

We also consider advice and evidence from regulators in other comparable nations. However we cannot compare numbers directly due to differences in country risk and regulatory frameworks in place. We have also considered relative, historical MRPs from other nations in section 9.5.5. Overall we are not persuaded that we should alter our MRP estimate based on comparison with other regulators, both domestically and internationally.

Draft Decision

Our draft decision acknowledged the evidence used by the other regulators in Australia.⁸²² However, we did not give weight to the end estimates if regulators use processes/methods that we found unsuitable for our method.⁸²³

Independent Panel review

The Independent Panel did not comment directly on other domestic regulators but stated our reluctance to use data from international regulators as a comparison was acceptable. It suggested we consider MRPs from other economies to compare with our estimate for Australia.⁸²⁴

⁸²¹ ERA, Draft Decision on Proposed Revisions for the Western Power Network, 2 May 2018, p. 63; IPART, IPART Review of our WACC Methodology, February 2018, p.47

⁸²² AER, Draft Rate of Return Guidelines, July 2018, pp.231-232

⁸²³ AER, Draft Rate of Return Guidelines, July 2018, p. 232

⁸²⁴ Independent Panel, Independent Panel Report, September 2018, p.35

Stakeholder submissions

The APGA stated that we did not consider how the decision sits with respect to decisions of other regulators around the world. It submitted that the evidence put forward by the ENA in the Earwaker report is highly significant as investors consider global options when choosing where to invest their money.⁸²⁵ The Earwaker report from the ENA focused on how the ERP and overall return on equity vary from country to country. It concluded that other regulators give more weight to the Wright approach. As such the AER should consider at least its underlying theory that the MRP and the risk free rate are inversely correlated.⁸²⁶ The ENA also commented that MRP estimates from other domestic regulators are higher than the AER's estimate. The ENA further submitted that just comparing selected parts of other regulators' methodology is not appropriate. It also stated that other regulators have shown an increase in their MRP estimates since 2013, and so the AER should follow this trend.⁸²⁷

AER consideration

We consider evidence other regulators used to determine MRP estimates, rather than the final MRP estimates themselves. This is because checking estimates against other regulators can be circular.⁸²⁸ The evidence submitted by the ENA (which indicated a higher MRP) is based largely on DGM estimates. Our approach have most regard to HER evidence and our confidence in the DGM has diminished following further analysis of information since the 2013 Guidelines (section 9.4). Our overall conclusion is that we have significant reservation about using information from the DGM to adjust the value of the MRP.

The Earwaker report (which compared risk premiums from several countries) found our proposed equity risk premium to be one of the lowest internationally. We note this finding, but reject suggestions to amend our MRP estimate based on this evidence. First, the Earwaker report does not consider the risks of the country or markets or the other regulatory conditions imposed on firms in the supply of Australian regulated energy network services. We set an MRP for Australia, so the MRP of another market is likely to be different due to different risks. Second, other regulators may employ methods we do not find suitable for estimating the MRP. For example, Ofgem uses the Wright approach which we disagree with.⁸²⁹ We consider the Wright approach in section 9.2.4 and conclude it is of no value in our context. Further, we have been advised by Lally that the higher ERP's shown internationally in the report are largely due to higher beta values, not the MRP.⁸³⁰ We are therefore not inclined to raise our MRP based on the report which shows our MRP estimation is consistent with

⁸²⁵ APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018 p.30

⁸²⁶ Earwaker, International WACC comparisons, 25 September 2018, p.10

⁸²⁷ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.139,134

⁸²⁸ Frontier, The Market Risk Premium, September 2016, p.32; AER, Draft Rate of Return guidelines, July 2018, p.232

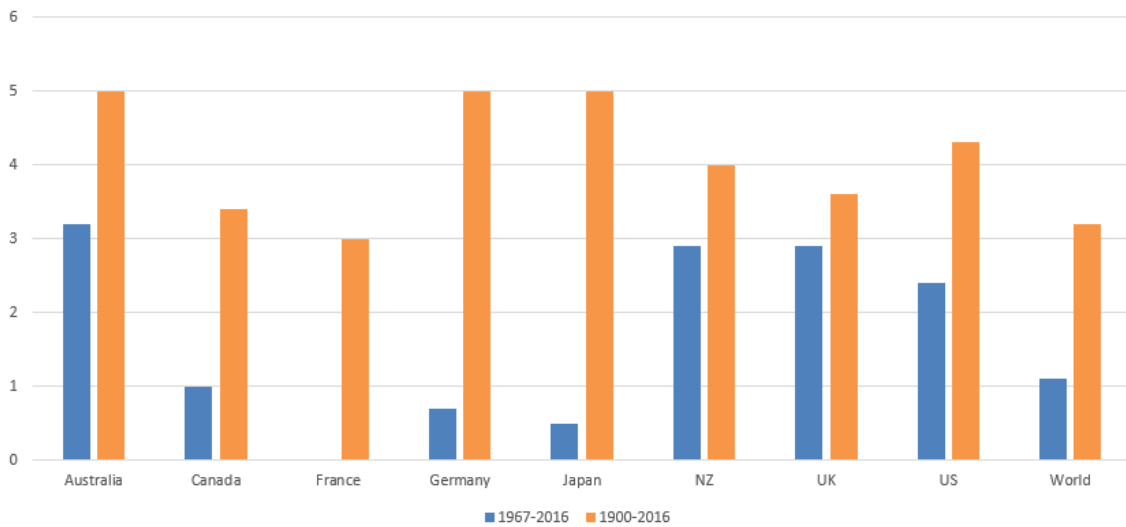
⁸²⁹ Ofgem, RIIO-2 Framework Consultation, March 2018

⁸³⁰ Lally, Review of Earwaker Report, November 2018, p.9

independent, historic excess return estimation. Historical risk premiums of other nations are summarised below and found in section 9.5.5.

As recommended by the Independent Panel, we have compared historical MRPs from different countries using Credit Suisse's Investment Handbook.⁸³¹ The results show that the historic MRP of Australia is one of the highest of similar nations and that MRPs are lower in recent periods than they are historically. If we were to compare our MRP estimates with international estimates this could lead to a lower MRP estimate. The results displayed in Figure 17 are real (inflation adjusted) risk premiums above bonds.

Figure 17 Comparison of historical MRPs from multiple nations over two periods



Source: Credit Suisse Global Investment Yearbook 2017 summary edition, AER Analysis.

9.2.3 Relationship between other regulatory measures and the MRP

This section considers the submission that regulatory schemes and frameworks may be impacting the rate of return when applied to firms in the supply of Australian regulated energy network services. We consider whether this creates an issue for us when estimating the MRP for the rate of return process.

Final Decision

We do not take account of other regulatory incentive schemes or frameworks which may alter the ex-post rate of return when estimating the forward looking MRP.

Draft Decision

⁸³¹ Independent Panel, Independent Panel Report, September 2018, p.35

We did not consider other regulatory measures, including incentive schemes, and their relevance in estimating a forward looking MRP as part of our draft decision.

Independent Panel review

The Independent Panel did not comment on the influence of other regulatory schemes impacting the market risk premium.

Stakeholder submissions

The CRG stated that due to incentive schemes networks are able to outperform the allowed rate of return and as such the MRP should be adjusted accordingly.⁸³² They stated that whilst the MRP is a market parameter, the networks are able to outperform the market with these schemes and so should not receive the full MRP in their allowed rate of return.

AER consideration

The MRP is a market wide parameter, so factors that affect a business would not change our estimation process.

Different incentive schemes may impact businesses differently and there is generally symmetrical payoff with no guarantee that businesses will benefit. The incentive schemes mentioned by the CRG may cause firms in the supply of Australian regulated energy network services to outperform the stated rate of return, but adjusting for these potential impacts is not consistent with our aim of estimating a market wide MRP.

9.2.4 Relationship with the Risk Free Rate

This section discusses the potential relationship between the MRP and the risk free rate. This largely comes from the Wright approach to estimating the MRP, which states the MRP should not be directly estimated but is simply the difference between the estimate of return on equity and the prevailing risk free rate. Therefore this implies a perfectly negative correlation between the risk free rate and the MRP as well as a largely stable return on equity.⁸³³

Some submissions stated that the Wright approach should be used in its entirety. However, there is debate as to how much weight can be placed on its underlying assumption. In this section we also consider the best way to deal with a relationship, should it exist, when estimating a forward looking MRP.

Final Decision

⁸³² CRG, Response to ROR draft decision, 25 September 2018, p.18

⁸³³ Frontier, An updated estimate of the MRP, September 2017, p.32-33

Our final decision is to reject the Wright approach to estimating the MRP, which estimates the MRP as the difference between the estimate of return on equity and the prevailing risk free rate. This approach implies a perfectly negative correlation between the risk free rate and the MRP as well as a largely stable return on equity.

We did not receive sufficient evidence during this review to persuade us to employ the Wright approach. Nor do we consider it inconsistent with our legislative objectives to fix the MRP until the next review of the Instrument in four years. Our estimate incorporates current market evidence and uses methods to estimate a forward looking MRP. An approach that stabilises the return on equity is less likely to reflect market conditions over time.

Some submissions argued for using the Wright approach in its entirety. However, there is debate about its underlying assumption. We did not find significant evidence to support an estimable relationship between the MRP and the risk free rate. Given our regulatory framework, we consider a fixed MRP based on a relevant risk free rate, determined at the beginning of the regulatory period, provides a more appropriate reflection of the risks businesses face over the regulatory period.

Draft Decision

We stated in the draft decision that we see no strong evidence that the MRP and the risk free rate are inversely related.⁸³⁴ We also stated that if there is such a relationship, it is not estimable with sufficient precision for use in a regulatory decision.⁸³⁵

Independent Panel review

The Independent Panel requested we clarify our discussion of the possible correlation between the MRP and the level of risk free rates. In particular, we should explain times when a relationship could appear but there was no causality.⁸³⁶

It requested we clarify our position that the relationship between the risk free rate and the MRP is neither one of lock step or one susceptible to a robust, predictive methodology. We must also clarify the basis for criteria used to choose between a fixed methodology and fixed value.⁸³⁷

Stakeholder submissions

There were many submissions commenting on the relationship between the risk free rate and the MRP, including those which commented on the use of the Wright approach. This methodology relies on a one for one, inverse correlation between the risk free rate and the MRP

⁸³⁴ AER, Draft Rate of Return Guidelines, July 2018, p. 205

⁸³⁵ AER, Draft Rate of Return Guidelines, July 2018, p. 205

⁸³⁶ Independent Panel, Independent Panel Report, September 2018, p.36

⁸³⁷ Independent Panel, Independent Panel Report, September 2018, p.11

The CRG, supported by SACES, suggested that there is no theory or evidence that MRP varies inversely with bond rates.⁸³⁸ They stated that there is no sign of a relationship between long term bond rates and excess return data, although the test they implemented is one with very weak statistical power.⁸³⁹ The CCP noted that they agree with the Panel's judgement on the Wright approach.⁸⁴⁰

The ENA submitted a detailed section on the Wright Approach and the assumptions that underpin it, and claimed that whilst it is unlikely the relationship is perfectly inverse it is equally unlikely that the MRP is fixed regardless of market conditions. As such it is likely the movements in the MRP are going to at least partially offset movements in the risk-free rate.⁸⁴¹ The ENA highlighted that throughout key points over the last 10 years there are times the Wright approach to setting the MRP arrives at more plausible results than a fixed MRP, whilst also pointing to independent valuations which maintain a more stable required return on equity by either increasing the MRP or risk free rate.⁸⁴²

APA submitted that our lack of explanation about how the MRP could be changing means that we hold the MRP is stable as the risk free rate moves.⁸⁴³ The NSG commented that the AER's position on this relationship is at odds with other regulators, such as those in the UK, and puts us at an extreme end of the scale.⁸⁴⁴ The Earwaker report on international equity comparisons also remarks that other regulators have taken approaches closer to the Wright approach, and the AER could do so to avoid dramatic changes in the allowed return on equity.⁸⁴⁵ Lally, in his review of the Earwaker report, also suggested some weight be placed upon the Wright methodology consistent with the plausibility of a relationship between the MRP and the risk free rate.⁸⁴⁶

AER consideration

Our draft decision considered there was no conclusive evidence of an estimable, inverse relationship between the risk free rate and the MRP.⁸⁴⁷ We observe that submissions to the draft decision do not appear to have provided substantial new evidence on the existence of a relationship strong enough to be accounted for in a regulatory framework.⁸⁴⁸

⁸³⁸ CRG, Response to ROR draft decision, 25 September 2018, p.26; SACES, Comments on Ausgrid submission, 25 September 2018, p.12

⁸³⁹ SACES, Comments on Ausgrid submission, 25 September 2018, p.12

⁸⁴⁰ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, pp.42,44

⁸⁴¹ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.117-119

⁸⁴² ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.117-119

⁸⁴³ APA, Submission on Draft Guideline, 25 September 2018, p.42

⁸⁴⁴ NSG, Submission to the draft Rate of Return Guideline, p.15

⁸⁴⁵ Earwaker, International WACC Comparisons, September 2017

⁸⁴⁶ Lally, Review of Earwaker Report, December 2018, p.7

⁸⁴⁷ AER, Draft rate of Return Guidelines, July 2018, p. 234

⁸⁴⁸ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.117-119; APA, Submission on Draft Guideline, 25 September 2018, p.42; Earwaker. International WACC Comparisons, September 2017

The ENA's suggestion that its use by other regulators, both domestically and internationally, should make it applicable for the AER is an argument which we have discussed before and covered in section 9.2.2. This argument is also put forward by the Earwaker report and the NSG. We accept that other regulators may adjust their estimate of the MRP to account for a change in the risk free rate. Despite this, we must consider whether the evidence for such a relationship, or adjustment, is sufficiently robust as to improve the estimation process for a forward looking MRP, capable of meeting the legislative objectives.

In previous regulatory decisions and the draft decision we have noted that the MRP could vary over time.⁸⁴⁹ In the draft decision we discussed the argument that the MRP must lie within two bounds:

- It is fixed and will fall or rise in lock step with movements in the risk free rate
- It has a negative and perfect correlation with the risk free rate, causing the MRP to offset changes in the risk free rate and leave the market with a constant return on equity.

APA submits that because we reject the latter we must accept the former. However we have not assumed that the MRP is fixed or it will necessarily fall or rise in lock step with the risk free rate over long periods of time. Rather we consider that the MRP may vary, but its movement over time is not clearly linked to the risk free rate.

Our estimation of the MRP is made independently of movements in the prevailing risk free rate, and uses forward looking methods incorporating historical data and current market conditions. Historical excess returns are calculated in relation to the risk free rate in the respective year. As we have previously cited, Dimson Marsh and Staunton stated that there is no better forecast of expected excess returns than the historical average.⁸⁵⁰

As noted in the concurrent evidence sessions by Sadeh, the MRP is a market wide parameter and may change slowly.⁸⁵¹ Fixing a forward looking MRP estimate for four years, with a current risk free rate selected close to the start of the regulatory period (each time the Instrument is applied), is likely to reflect the risks faced by firms in the supply of Australian regulated energy network services in an unbiased manner. Because the risk free rate can move up or down, a return on equity based on this approach is likely to be unbiased over the five-year regulatory period. As noted in our draft decision, we consider an approach which promotes a stable return on equity may not be suitable for a regulatory model which resets every 5 years.⁸⁵² In the absence of robust evidence suggesting otherwise, we consider movements in the Sharpe–Lintner

⁸⁴⁹ Australian Energy Regulator, Explanatory Statement: Rate of Return Guideline, December 2013, page 91; AER, AusNet Services Transmission Determination - Final Decision - Attachment 3, April 2017, p.89

⁸⁵⁰ Dimson, Marsh and Staunton, Credit Suisse Global Investment Returns Sourcebook 2012, February 2012, p.37

⁸⁵¹ AER, Concurrent Evidence Session 2 – Proofed Transcript, April 2018, p. 65

⁸⁵² AER, Draft Rate of Return Guidelines, July 2018, p.205.

CAPM parameters are independent, so both the risk free rate and the MRP could fall or rise.

In addressing the ENA's statement that the Wright approach appears to more accurately track movements in the return on equity, such correlation is not observed consistently throughout history, and the relationship between the two parameters can change between positive and negative.⁸⁵³ Whilst there are times the MRP and risk free rate may show a negative correlation, this does not prove a causal relationship. For example during the GFC there was a decrease in interest rates, and an increase in the MRP. However, this was two separate events caused by different market forces. Firstly, the GFC led monetary authorities to expand credit and reduce interest rates in order to try and ease the crisis. Secondly, due to increased risk in the market investors demanded an increased MRP. The second effect was not causally related to the first, but were both effects of the GFC. We do not consider these separate impacts would apply in the current economic climate. Work by Abel expands upon the general theory of the equity risk premium and states that the risk free rate and the MRP are both jointly determined, rather than there being a necessary causal link between them.⁸⁵⁴

Results from independent valuation reports were used by some stakeholders to support use of the Wright approach, however we have noted before that independent valuation processes can cause the return on equity to appear more stable.⁸⁵⁵ In the draft decision we stated, having regard to expert advice, that the adjustments made to either the risk free rate or market risk premium are too ad-hoc for use in a regulatory framework⁸⁵⁶. Whilst the ENA has submitted this point again, they have not provided substantively new evidence as to why it should be used in a regulatory context. Uplifts may reflect non-systematic risks, or be designed to account for risks not addressed in cash flow forecasts, or (to the extent there is any) the expectation of outperformance of regulatory allowances. They may also reflect the relevant investment period exceeding the term of our regulatory control period. It is relevant that we are estimating a required return on capital to be applied in regulatory determinations applying for five years and which will be subsequently reset (including we expect for adjustment of the risk free rate) in the next regulatory control period.

Our draft decision rejected arguments that the overall return on equity should remain stable over time. Stakeholders previously argued the return should remain stable because the overall debt yield has remained stable. But, we found debt premiums can fall over time, as the risk free rate falls, suggesting a potential fall in equity could happen over the same time period. We discussed this issue as part of our cross-checks on the overall return on equity (section 5.4).

⁸⁵³ Li, Time-varying risk aversion and asset prices, *Journal of Banking and Finance*, 2007; Kim & Lee, Stock returns, asymmetric volatility, risk aversion and business cycle: Some new evidence, July 2007; Rankin and Idil, A century of Stock-Bond Correlations, September 2014; Antti Ilmanen, Expected Returns on Stocks and Bonds, *Journal of Portfolio Management*, Winter 2003

⁸⁵⁴ Partington & Satchell, Report to the AER, November 2018, p.35

⁸⁵⁵ AER, AusNet Services Transmission Determination - Final Decision - Attachment 3, April 2017, p.89

⁸⁵⁶ AER, Draft Rate of Return Guidelines, July 2018, pp.207-208

We have considered developing a mathematical model for estimating how the MRP depends upon the risk-free rate. But we do not think such a model can be developed that is accurate and reliable over time. Moreover, the results of such a model are unlikely to be easily replicable or transparent, and would imply a level of precision that we do not have the evidence to support. Partington and Satchell commented on the finding of SACES in their recent report, and state that whilst the report could not conclusively dispel any relationship between the MRP and the risk free rate it lent weight to evidence that the relationship cannot be reliably determined for use in estimating a forward looking MRP.⁸⁵⁷

Without applying such a mathematical model of the relationship between the MRP and the risk free rate, we do not deem it appropriate to use movements in the risk free rate to alter our estimate of the MRP. In the concurrent evidence sessions it was suggested we may give weight to ad-hoc uplifts of the MRP when the risk free rate fell outside pre-determined values.⁸⁵⁸ We do not adopt this approach because it is largely subjective and cannot be applied consistently. The uplift, in the context considered in the concurrent evidence session, would need strong supporting evidence in order to be applied.

9.2.5 Directly Estimating the MRP

Final Decision

We estimate the MRP as an independent parameter for use in the Sharpe–Lintner CAPM..

Draft Decision

Our draft decision stated directly estimating the MRP is the most appropriate way to set a regulated return using the Sharpe–Lintner CAPM.⁸⁵⁹

Independent Panel review

The Panel did not comment on the validity of directly estimating the MRP in reference to setting a regulated rate of return.

Stakeholder submissions

Most stakeholders did not comment on the validity of the MRP as a concept, but the Australia Institute have noted their concern with the process. It submitted that the standard differential between the market return and the risk free rate (conventionally the MRP) is far too high and could not be explained with standard economic theory.

⁸⁵⁷ Partington & Satchell, Report to the AER, November 2018, p.35

⁸⁵⁸ Mr Sadeh, Concurrent Evidence Session 2 - Proofed transcript, April 2018, p.73

⁸⁵⁹ Australian Energy Regulator, Explanatory Statement: Rate of Return Guideline, December 2013, page 90

They highlighted that the premium between the A and BBB-rated bonds is much smaller than you would expect when comparing to the equity risk premium.⁸⁶⁰ As such they considered that the MRP is formed largely of statistical noise, and the AER should account for that.

AER consideration

We have previously considered submissions that the MRP should not be estimated and we should focus on the overall return on equity. However we have noted in previous decisions that the MRP is estimated by market practitioners and regulators throughout the world.⁸⁶¹ The paper from the Australia Institute also appears to acknowledge the use of ex post data for estimating equity risk premium is widespread.⁸⁶² As stated earlier there is statistical evidence that using historical evidence can produce a forward looking estimate of returns.⁸⁶³

The Australia Institute did not suggest a robust methodology for estimating the forward looking cost of equity for firms in the supply of Australian regulated energy network services outside of natural growth of the economy. They provided recommendations to us to avoid what they perceive as errors in the estimation process, but not a methodology we could use to arrive at a risk premium for use in our regulatory process. As a regulator we have to use a replicable and transparent method in our rate of return calculation as well as ensuring fulfilment of the NEO/NGO. We would need substantial evidence to diverge from the established foundation model in this review.

9.2.6 Consideration of survey evidence

Final Decision

Surveys are taken by various academics and market practitioners. These surveys can vary in many ways including type of responses allowed, questions asked and timing. Raw results are very rarely produced, however in published results modes, means or medians are often included and it's from here where we draw our observations.

There has not been any significant change in evidence regarding surveys. Therefore we apply surveys in the same role as in the 2013 Guidelines.

The survey evidence supports a broad range of MRP values, with surveys since 2015 supporting MRP estimates between 4.9 and 7.6 per cent. Most of these survey centred on an MRP of 6 per cent, with the updated table showing it is the most common value for Mode, Mean and Median of these surveys over the past 5 years. We consider that survey evidence supports an MRP estimate within the range of 5.5 to 6.5 per cent.

⁸⁶⁰ Australia Institute, Rate of Return Guideline Comments, 25 September 2018

⁸⁶¹ AER, Final Decision for APA VTS Attachment 3 - Rate of Return, November 2017, pp.78-80

⁸⁶² Australia Institute, Rate of Return Guideline Comments, 25 September 2018, p.3

⁸⁶³ Dimson, Marsh and Staunton, Credit Suisse Global Investment Returns Sourcebook 2012, February 2012, p.37; ENA, Response to draft AER Rate of Return Guideline, 25 September 2018, p.115

Draft Decision

The draft decision considered market surveys supported an MRP between 5.5 and 6.5 per cent.⁸⁶⁴

Independent Panel Review

The Panel did not comment on the use of surveys except to acknowledge the AER had considered them as part of the decision.

Stakeholder Submissions

The ENA stated that because survey evidence suggested the MRP had increased since 2013 it could not be considered that surveys support an MRP of 6.0 per cent.⁸⁶⁵ They highlight data from KPMG reports that state that due to uplifts applied to the risk free rate, not accounted for by the AER, surveys supported a much higher MRP in the current low risk free rate environment.

AER Consideration

When considering survey results we do not give weight to any single survey over others due to the fact that surveys take on different forms and can vary in different ways, including questions asked, type of participants and number of participants.

We acknowledge that two recent surveys indicate an MRP of 7 per cent or higher. However we note that some survey respondents are likely to uplift their MRP or risk free rate estimates in times of low risk free rates.⁸⁶⁶ We discuss in section 9.2.4 why we do not consider this appropriate for our context. We also note that the Fernandez 2017 survey, one of those supporting a higher MRP estimate, had significantly fewer respondents than other years which could lead to a skewed sample.⁸⁶⁷ This survey is therefore less likely to be representative than the Fernandez surveys of the years either side which support lower MRP estimates. It is important to view each piece of evidence in the context it is presented. When considered as a body of evidence we consider surveys from recent years support a range of MRPs from 5.5 per cent to 6.5 per cent.

We recognise that surveys have limitations and are not at a level of reliability as to give it weight as a direct estimation method of the MRP. However, we consider that it has some value and use it to inform us of investor expectations.

9.2.7 Conditioning Variables

⁸⁶⁴ AER, Draft Review of Rate of Return Guidelines, July 2018, p.223

⁸⁶⁵ ENA, Response to draft AER Rate of Return Guideline, 25 September 2018, pp.136-137

⁸⁶⁶ ENA, Response to draft AER Rate of Return Guideline, 25 September 2018, pp.136-137

⁸⁶⁷ Fernandez, Linares, Acín, Discount Rate (Risk-Free Rate and Market Risk Premium) used for 41 Countries in 2017: a survey, April 2017

Conditioning variables are market data and indicators that provide information on the potential risk in the market.

Final Decision

We use conditioning variables to inform our point estimate derived from HER because they can indicate changes in market conditions. We consider conditioning variables do not support any adjustment to our MRP estimate.

Current low volatility, tight credit spreads, and dividend yields near the long-term average suggest low risk in the market, which in turn supports an MRP lower than the historical long-run average.

Draft Decision

Our draft decision considered that conditioning variables should be used to inform our point estimate derived from HER.⁸⁶⁸

Independent Panel Review

The Panel did not comment on the use of conditioning variables in its report.

Stakeholder Submissions

APA submitted they were concerned about the use of conditioning variables as part of the MRP estimation.⁸⁶⁹ Whilst they stated these concerns were lessened by the position taken by the AER, namely that they are used to inform an initial point estimate and not making an estimate directly from the variables themselves, there were still issues surrounding their use. Firstly APA submit that without a well-defined relationship between the variables and the MRP it is unlikely that the variables can provide any useful information on the MRP.⁸⁷⁰ Secondly, as the MRP is an average formed over a longer period of time than the variables then short term moves in the given variables are unlikely to give an indication as to a change in the excess returns.⁸⁷¹

The CCP stated that economic conditions since 2013, and especially since 2016, support the view of a stable growing economy with less risk than seen in the market at the time of making the 2013 guidelines.⁸⁷² They highlighted that the RBA statements in 2013 and 2018 paint very different pictures of the state of the Australian economy and outcomes for Australian businesses and investors. They follow this with other market data and state it is likely the MRP has decreased since 2013.⁸⁷³

⁸⁶⁸ AER, Draft Rate of Return guidelines - Explanatory Statement, July 2018, p.227

⁸⁶⁹ APA, Submission on draft guidelines, 25 September 2018, p.40-41

⁸⁷⁰ APA, Submission on draft guidelines, 25 September 2018, p.40

⁸⁷¹ APA, Submission on draft guidelines, 25 September 2018, p.41

⁸⁷² CCP16, Submission to the AER Draft Rate of Return Guideline, September 2018, p.69

⁸⁷³ CCP16, Submission to the AER Draft Rate of Return Guideline, September 2018, pp.67-69

AER Consideration

APA's submissions appears materially similar to those we considered in our draft decision.⁸⁷⁴

We consider the conditioning variables— implied volatility, dividend yields and credit spreads— can inform (or 'condition') our initial MRP estimate. We take these into account when estimating the MRP because they provide an indication of changes in market conditions.⁸⁷⁵ We are cautious on how we use this evidence given their limitations but consider these are relevant and give them some consideration.

Conditioning variables do not provide reliable estimates on their own. Further, establishing a well-defined relationship to a point estimate is not a prerequisite. Rather, we use conditioning variables symmetrically through time to avoid bias. That is, irrespective of whether each conditioning variable indicates a higher or lower MRP at any given time, we will consider them consistently over time to inform our estimate.

As noted by the CCP there is significant evidence provided by conditioning variables and market commentary stating that the market is currently more stable and is presenting less risk than 2013. Low volatility and tight credit spreads, as shown in section 9.5.4, give us a strong indication that current market risk is lower than historical levels.

9.3 Historical stock returns

Historical excess returns (HER) are one of the main components in MRP estimation, and received strong support from other market practitioners such as Dimson, Marsh and Staunton.⁸⁷⁶ We received a large number of submissions on this estimation method and the decisions which shape the estimate it provides. This continues from the concurrent evidence sessions which focused on the excess returns as one of the more contentious points of the review.

In section 9.3.1 we detail the ongoing discussion around sample periods for use in the HER as well as long term trends in the data. Stakeholders have submitted varying opinions on the matter with some stating only long data periods should be used in order to provide the best estimate mathematically, whilst others wanted to rely on recent trends to avoid the older, constructed data which is less likely to be relevant.

Section 9.3.2 discusses the issue of investment horizon. Network businesses have submitted that in order to be consistent with the PTRM only a single year estimate will work⁸⁷⁷ whereas consumer groups have stated that estimates over longer periods must

⁸⁷⁴ AER, Draft Rate of Return guidelines - Explanatory Statement, July 2018, pp.227-8

⁸⁷⁵ AER, Draft Rate of Return guidelines - Explanatory Statement, July 2018, p.227

⁸⁷⁶ Dimson, Marsh and Staunton, Credit Suisse Global Investment Returns Sourcebook 2012, February 2012, p.37

⁸⁷⁷ APGA, Submission on AER 2018 Draft ROR Guideline, 25 September 2018, pp.14-16

be accounted for in order to estimate a 10 year rate of return.⁸⁷⁸ This was also discussed at length in the Draft decision.

We also consider the CRG's newly proposed methods of arithmetically averaging the geometric averages of longer return series.⁸⁷⁹ This method tries to account for the compounding of returns seen by businesses with the geometric averages and combines that with the arithmetic averages forward looking properties. This is a new consideration for the AER and is discussed in section 9.3.3.

Sections 9.3.4 and 9.3.5 cover the two longest running disputes regarding HER, the data set of choice and the role of geometric and arithmetic averages. In these sections we detail and expand upon the submissions made by stakeholders as well referencing previous work covering the issues and the arguments supporting each side of the discussions. Only network businesses submitted on the choice of data series for use, favouring the NERA corrections over the BHM data.⁸⁸⁰ Most submissions to the process commented on the use of geometric and arithmetic averages in excess returns, with consumer groups pushing for increased weight to be given to the geometric average⁸⁸¹ and networks stating only the arithmetic average should be used.⁸⁸²

9.3.1 Sample periods and long term trends

Final Decision

We estimate historical excess returns based on the following to inform our MRP estimate:

- Arithmetic and geometric averages
- BHM return data
- Five separate periods
- Adjustment to include the effect of theta (dividend imputation)

We consider that the five sample periods provide useful information in estimating a forward looking MRP.

We do not give mathematical weight to each period in this method, instead forming a range from the results. This approach is in line with our decision to not mathematically weight different evidence about the MRP, because that approach involves a level of

⁸⁷⁸ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.60; CRG, Response to ROR draft decision, 25 September 2018, p.22

⁸⁷⁹ CRG, Response to ROR draft decision, 25 September 2018, pp.23-25

⁸⁸⁰ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.111-113; APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018 p.14

⁸⁸¹ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.60

⁸⁸² APA, Submission on Draft Guideline, 25 September 2018, p.31;

precision that is not possible.⁸⁸³ Of these periods we consider the 1988-2017 period is most likely to be most relevant to estimating the expected MRP.

The two longest sample periods provide arithmetic averages of 6.3 and 6.0 per cent. The shortest period, from 1987 onward, provides an arithmetic average of 6.1 per cent. We consider that this, combined with evidence of a falling MRP over time, supports a forward looking MRP estimate of 6.1 per cent.

Considering the evidence before us, it is likely the prevailing MRP is lower than the long term historical average. Data shows that there is a slight downward trend in the Australian market and this is supported by theory that as global investing becomes simpler for investors market risk premiums are likely to fall.

Draft Decision

Our draft decision considered five different sample periods when looking at historical returns: 1883 onwards, 1937 onwards, 1950 onwards, 1980 onwards and finally 1987 onwards. Underlying theory and the arithmetic averages suggest a slight long-term downward trend when estimating the MRP from historical returns.

Independent Panel review

The Independent Panel did not comment on the different sample periods of the HERs method.

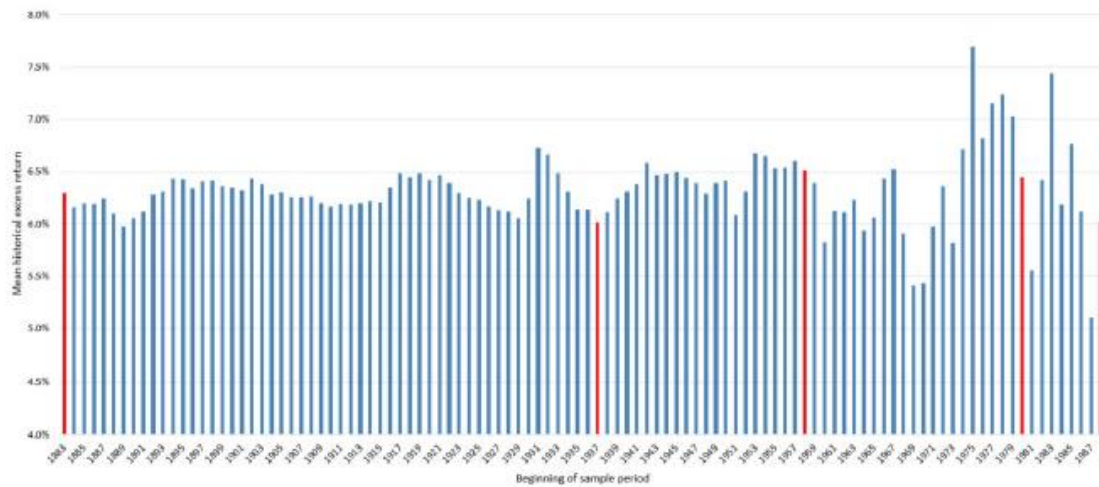
Stakeholder submissions

Network stakeholders argued we should give more weight to longer data series, because they have lower standard deviations than more recent series. They argued the volatility in the shorter series makes it hard to judge whether results are valid or the result of year-to-year fluctuations.⁸⁸⁴ The ENA highlighted that more than 90 per cent of estimates are above 6 per cent, as highlighted in Figure 18. They further submit that the most recent period is not commensurate with prevailing market conditions, and that it just reflects the conditions over the previous 30 years' data.

⁸⁸³ AER, Draft rate of return guidelines - explanatory statement, July 2018, p.44 footnote 75

⁸⁸⁴ ENA, Response to AER Rate of Return Guideline, 25 September 2018, pp. 109-111

Figure 18 ENA Graph on mean historical excess return by start of period



Source: ENA, Response to Draft AER Rate of Return Guideline, 25 September 2018, p.111

By contrast, consumer groups stated the longer term data (pre-1950) is 'created' rather than natural, and should not be used in the AER's considerations.⁸⁸⁵ They also stated that evidence shows the MRP is decreasing over time, which suggests the AER should pick an estimate which is below the midpoint of any range selected.

AER consideration

Estimates from all five periods should be considered. While the longer periods are likely to be more statistically robust the most recent period of 1987 onwards is most likely to provide an estimate commensurate to the current market. Evidence also supports a falling MRP over time in the Australian market.

There has also been contrasting discussions on the use of sampling periods:

- In the draft decision we discussed suggestions that we should remove more recent sample periods from consideration. This was due to questions over the statistical relevance of shorter periods. The longest series has the lowest standard deviation, but there is much debate about the veracity of the numbers and which series to use. If low standard deviation is a key aspect of series choice the most recent series, 1988 onwards, has a standard deviation 16.9 per cent compared to the longest series of 16.3 per cent. This lower standard deviation for the longer time series may be a consequence of the 'constructed' nature of pre 1937 data.
- Pink Lake Analytics previously suggested removing pre-1937 data for this reason.⁸⁸⁶ It is in the older data where the conflict between the BHM and NERA data series arrive, as is discussed in section 9.3.4. At the time there was no

⁸⁸⁵ CRG, Response to ROR draft decision, 25 September 2018, p.25;

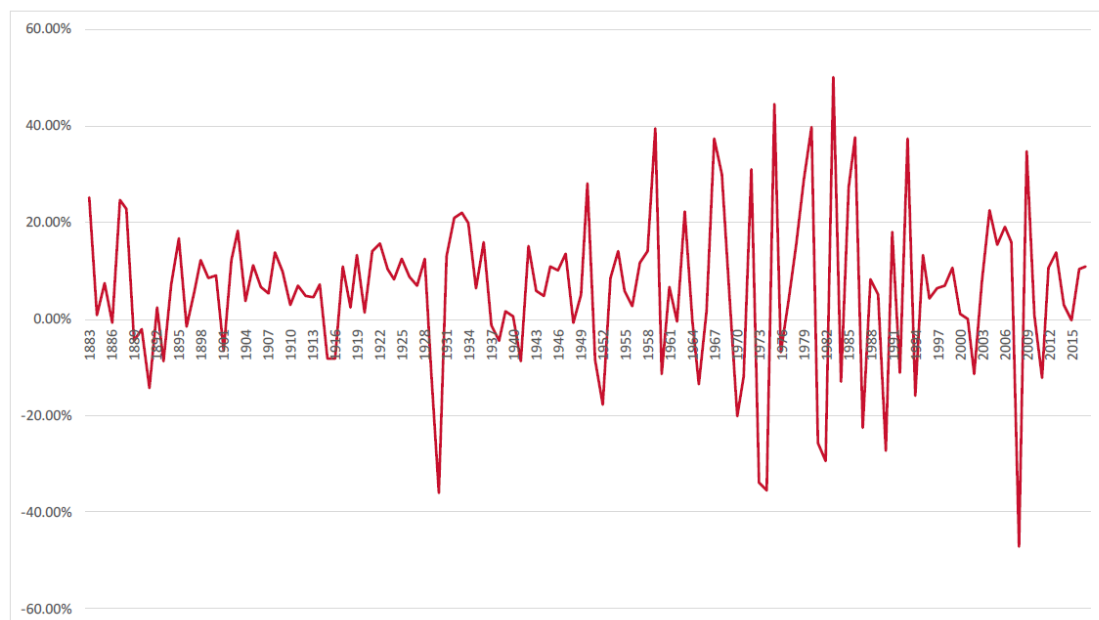
⁸⁸⁶ Pink Lake Analytics, *Estimation of the Market Risk Premium*, December 2017, p.9

exchange data and so the data was compiled using information from newspapers and other available data sources.

These arguments highlight the issues associated with accepting an estimate from any one of the time periods, without considering its advantages and disadvantages. For this reason, we consider data from all five periods.

The ENA stated that the starting point of the series is more significant in later periods, and we accept it would not be useful to base our MRP estimate on extreme results. However, it is possible the volatility seen in some of the shorter periods (comparing Figure 18 and Figure 19) is not the result of short averaging periods. Rather, it may reflect the actual, high volatility in the data from 1960 to 1995. The 1988 starting point reflects the introduction of imputation credits, and is also more likely to represent current market conditions.

Figure 19 Historic excess returns: 1883-2017



Source: APA, Submission on draft decision, 25 September 2018, p.31

We consider the most recent time period is the most relevant to our estimation of a forward looking MRP. Data from the last 30 years is more commensurate with current data than that from 1890-1920. As such it is producing an estimate based on more relevant data. We also acknowledge that as it is a shorter data set so more recent years have more impact on the estimate. Volatility in recent years has been lower than the historic market average, as shown by the changes in standard deviation over the 5 sample periods in Table 19, which implies that the distribution of expected returns may be different from those viewed over certain sample periods.

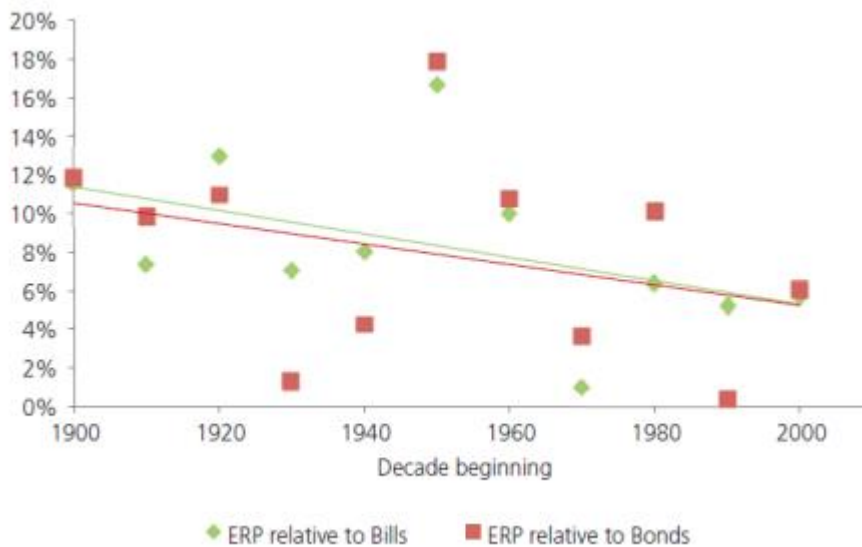
Table 19 Standard Deviation of Historic Excess Return Series

	1883-2017	1937-2017	1958-2017	1980-2017	1988-2017
Standard Dev	16.28%	19.14%	21.49%	20.95%	16.90%

Source: AER Analysis

With this potential change in distribution and expectation, the long term arithmetic average may be less likely an unbiased estimator of a forward looking MRP. More recent data, which is closer to current conditions, is more likely to provide a distribution similar to that of expected returns. Long term trends are important if they can be substantiated with financial theory and data from a range of sources. As discussed in the draft decision there is evidence that excess returns are trending down over time. This is shown in Figure 20. The theory supporting this trend is that as investing in a global portfolio becomes easier and investors are able to achieve greater diversification, the risk premium is likely to fall as systematic risk is diversified away.⁸⁸⁷ We give some weight to the theory that the equity risk premium is likely to be lower now than the long run historic average.

Figure 20 Trend in Equity Risk Premium in Australia



Source: Dimson, Marsh and Staunton (2015); Calculations from Bianchi, Drew and Walk, The Unpredictable Risk Premium, November 2015

9.3.2 Investment Horizon

Final Decision

⁸⁸⁷ AER, Draft Rate of Return Guidelines, July 2018, pp.208-209;

The investment horizon refers to the period over which an investor will be estimating their returns. These can be very diverse depending on the investor and could differ from less than a year to more than 20 years. The investment horizon can alter what returns an investor deems acceptable and which methods appropriately estimate a robust, forward looking MRP. We use HER, based on a 10 year risk free rate, to estimate the MRP. This is a method widely used by regulators and market practitioners with a strong foundation. We do not consider this excludes either the use of either geometric or arithmetic averages in the HER. We consider results from multiple years of market returns could help our estimation process, but estimates formed using single year returns are the given the most weight.

Draft Decision

In the draft decision we concluded there were multiple investment horizons to be considered in estimating the MRP.

Stakeholder submissions

Network businesses and other stakeholders submitted the AER should form a single year estimate of the MRP, because the WACC estimate used in the PTRM is over a single year and not compounding.⁸⁸⁸ Further, while some investors may decide to value their investment over longer periods, this should not affect the estimated required return for a single year period.⁸⁸⁹ They state this would remove the geometric average from consideration when estimating the MRP.

By contrast, the CRG stated the AER should consider a longer time period than one year as standard. It argued the PTRM smooths returns over a five year period and the rate of return is based on a 10 year risk free rate and 10 year return on debt.⁸⁹⁰ Without consistency across the rate of return, the AER's estimate is likely to overcompensate businesses because it does not accurately reflect the risks faced. The CRG submits that this would remove the use of arithmetic averages of single year periods in estimating the MRP.

AER consideration

We considered points materially similar to this in the draft decision. We accept the PTRM is a single year model, and calculates the allowed revenue based on yearly estimates. However the return on equity, and the MRP, is implicitly estimated over a 10-year forward looking holding period, given our anchor for the Security Market Line is the yield to maturity on 10-year CGS. Further, Hancock stated a single year arithmetic

⁸⁸⁸ ENA, Response to AER Rate of Return Guideline, 25 September 2018, p. 116

⁸⁸⁹ APGA, Submission on AER 2018 Draft ROR Guideline, 25 September 2018, pp.14-16; ENA, Response to AER Rate of Return Guideline, 25 September 2018, pp. 113-116

⁸⁹⁰ CRG, Response to ROR draft decision, 25 September 2018, pp.22-23;

estimate, without any adjustment for previous return volatility, would not be sufficient. He recommended looking at several time periods.⁸⁹¹

We have also been advised that it is appropriate for us to consider return periods of more than one year as investors holding periods are more than one year.⁸⁹² However in estimating the MRP we are arriving at a market expectation. As such we must avoid making assumptions tailored to the businesses we are regulating when forming our estimation. Inferring that investors always have long holding periods is not representative of a varied market. In recent advice to the AER Partington and Satchell state that the use of the PTRM and whether we compound in our method is not as relevant to estimating the MRP as investor expectations, and as they compound it is right that this be given weight.⁸⁹³

9.3.3 Arithmetic Averages of Geometric Averages

Final Decision

We understand the CRG's attempt to estimate a forward looking MRP based on longer holding periods using the arithmetic averages of geometric averages. However, our consideration of the CRG's suggestion is that it is not reliable or accurate enough to be given weight in our decision.

Draft Decision

We did not consider averages of averages as part of the draft decision.

Stakeholder submissions

The CRG submitted that because investors look at longer period returns the AER should consider the arithmetic average of the geometric averages of longer periods, showing results for multiple year periods in their submission.⁸⁹⁴ This is supported by the ECA, who state that this method would be more representative of the returns received by investors in the networks.⁸⁹⁵ The CRG continues that Figure 21 shows the geometric averages presented by the AER are more representative of longer holding periods and as such should be given more weight.

⁸⁹¹ Hancock, AER second concurrent evidence session, 5 April 2018

⁸⁹² Partington and Satchell, Report to the AER: Allowed Rate of Return Guideline Review, 21 May 2018, p. 34; Partington & Satchell, Report to the AER, May 2018, p.33

⁸⁹³ Partington & Satchell, Report to the AER, November 2018, pp.91-31; CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, pp.62-63

⁸⁹⁴ CRG, Response to ROR draft decision, 25 September 2018, pp.23-25

⁸⁹⁵ ECA, Response to AER Draft Guideline, 25 September 2018, p.14;

Figure 21 CRG MRP comparison

Period	AER MRP (Geo)	AER MRP (Arith)	CRG MRP (Arith of 2 year Geo)	CRG MRP (Arith of 5 year Geo)	CRG MRP (Arith of 10 year Geo)
1883-2017	0.050	0.063	0.055	0.050	0.048
1937-2017	0.042	0.060	0.049	0.045	0.044
1958-2017	0.042	0.065	0.051	0.044	0.041
1980-2017	0.043	0.064	0.052	0.047	0.041
1988-2017	0.045	0.060	0.054	0.048	0.044
2000-2017	0.044	0.061	0.050	0.046	0.045

Source: CRG, Response to ROR draft decision, 25 September 2018, p.24

AER consideration

We agree that geometrically averaging consecutive years will estimate returns that have already been received by the businesses. However this implies that this set of returns is likely to happen again, over the assumption that the returns are independent and identically distributed. Given that this method still relies on the geometric average to arrive at its conclusions it is unlikely to have fewer issues in its current use in the HER. We detail the discussion over geometric and arithmetic averages in section 9.3.5 and further explain biases which can be attributed to both estimators.

Partington and Satchell stated it is unclear how the CRG reach its results, but were unconvinced that they empirically show the MRP must be lower than 6.0 per cent.⁸⁹⁶ From the results produced by the CRG Partington and Satchell indicate it is likely that the estimates produced are by downwardly biased and subject to a large standard error which may well encompass the 6 per cent estimate at the 95 per cent confidence interval. If the CRG used a rolling window to estimate the multiple year returns it is likely to be less efficient than the simple geometric or arithmetic average. They continue that whilst there are ways of adapting the method in order to produce more viable results, the results are likely to be downwardly biased or have a large standard error, leading them to conclude that there is little merit in the estimates provided by the CRG.⁸⁹⁷

9.3.4 BHM vs NERA data

Final Decision

⁸⁹⁶ Partington & Satchell, Report to the AER, November 2018 p.32-34

⁸⁹⁷ Partington & Satchell, Report to the AER, November 2018, p.33

The use of BHM or NERA data has long been an area of disagreement between some stakeholders and the AER. We recognise the data we base our excess returns on must be reliable and robust to provide the best estimate possible. So we reconsidered this matter for our final decision.

Our final decision is to use the historical returns data specified in the BHM data set. There would be no material improvement from switching to the NERA adjustment of the historical data.

Draft Decision

Our draft decision used BHM data to estimate the HER data. We explained why in the 2013 guidelines, previous regulatory decisions and the July draft decision.⁸⁹⁸

Independent Panel review

The Independent Panel did not comment on data series used for HER calculations.

Stakeholder submissions

The ENA again submitted NERA data should be used to estimate HER, because adjustments are made on multiple points (unlike the BHM data) and it is used by market leading practitioners.⁸⁹⁹ It also states the AER did not consider the joint expert session arguing it considers that session agreed the NERA data was the best series to use.⁹⁰⁰ The APGA also supported using the NERA data, which identifies and corrects inaccuracies with the BHM data and is recognised by leading experts.⁹⁰¹

AER consideration

We considered most of the ENA's points previously in other regulatory contexts and we consider that those previous statements remain relevant⁹⁰². We acknowledge the joint expert report notes no disagreement with using the NERA data, however there was not unanimous agreement.⁹⁰³ We also acknowledge that the NERA data, as presented by the ENA is used by some independent practitioners for use in their estimation of the historic MRP. However there are a number of issues with the ENA's arguments for using the NERA data over the BHM data.

First, it is important to note that the referenced BHM dataset is not one of the author's own creation, but uses data obtained from the ASX. The adjustments referenced by

⁸⁹⁸ AER, Draft Rate of Return guidelines, July 2018, pp.209-211

⁸⁹⁹ ENA, Response to the Draft AER Rate of Return Guideline, 25 September 2018, pp.112-113

⁹⁰⁰ ENA, Response to the Draft AER Rate of Return Guideline, 25 September 2018, p.112

⁹⁰¹ APGA, Submission on AER 2018 Draft ROR Guideline, 25 September 2018, p.16

⁹⁰² AER, Final Decision on Jemena distribution determination, May 2016, pp. 220-223

⁹⁰³ Expert Joint Report, 21 April 2018, p.59

the ENA are from the ASX directly and were checked by Brailsford et al. We are confident in the source of the data.

Data in our 2016 Victorian electricity distribution determinations shows that the NERA adjustment only materially alters the estimates obtained in the longest data set, 1883–2015. In that decision, we also detail why the NERA adjustment to the data is not warranted or a clear, material improvement on the quality of the data.⁹⁰⁴

Second, the ENA claim that the BHM/ASX adjustment itself is based on one data point is not correct. Brailsford et al. uses one data point as one method (of several) to check the reasonableness of the ASX adjustment. This does not mean the ASX adjustment itself is based on one data point. Handley responded to this point on multiple occasions.

In his October 2014 report, Handley stated:⁹⁰⁵

Before addressing NERA’s analysis, it is appropriate to clarify a very important misconception concerning the adjustment. Contrary to the claim by SFG – and it is not clear whether this view is also shared by NERA – the adjustment was not something which BHM took upon themselves to apply to the Lamberton data. Rather, the data that the ASX provided to BHM had already had been adjusted by the ASX. In other words, the ASX had many years earlier decided in their knowledge and wisdom that some adjustment was necessary and it was the ASX who determined the amount and adjusted the data accordingly. BHM simply sought to confirm their understanding of the data series provided by the ASX by reconciling it back to original sources.

In his May 2015 report, Handley stated:⁹⁰⁶

The inference in the first statement that the stock and dividend data underlying the Brailsford, Handley and Maheswaran (2008) – BHM – dataset is not genuine is incorrect and troubling. The claim (by NERA) in the second statement that BHM, rather than the ASX, made the adjustment to the dividend data is incorrect.

9.3.5 Geometric and Arithmetic Averages

There are two forms of averaging historical returns. The arithmetic average, also referred to as the simple mean, is the simplest and most common form of averaging. It takes the form:

$$\bar{x} = \frac{1}{n} \left(\sum_{i=1}^n x_i \right) = \frac{x_1 + x_2 + \dots + x_i}{n}$$

⁹⁰⁴ AER, Final Decision on Jemena distribution determination, May 2016, p221

⁹⁰⁵ Handley, Advice on the return on equity, October 2014, p. 19

⁹⁰⁶ Handley, Advice on the rate of return for the 2015 AER energy network determination for Jemena Gas Networks, May 2015, p. 27.

The geometric average arrives at a value using the product of the values and not their sum. We use this average for inflation calculations. It takes the form:

$$\bar{x} = \left(\prod_{i=1}^n x_i \right)^{\frac{1}{n}} = (x_1 * x_2 * \dots * x_n)^{\frac{1}{n}}$$

The geometric mean will always be less than or equal to the arithmetic average, and can be used only for positive numbers.

This section discusses the merits of each method and stakeholder submissions. We also consider how they may be used in conjunction with each other and expert opinions on the matter.

Final Decision

We have regard to both arithmetic and geometric averages when considering HER.

Due to the mathematical principles underpinning the two methods we give more weight to the arithmetic average than the geometric, but use the geometric average to highlight when high returns over certain periods may be driven primarily by high volatility and to set a floor when viewing the range of potential results from the HER.

As shown by academic work giving weight to both, with more weight on the arithmetic average, is more likely to arrive at an unbiased estimate than exclusively using one.⁹⁰⁷

We consider using both together is more likely to lead to an unbiased estimate of the MRP than exclusive use of either method. The geometric range given by updated results is 4.2 to 5 percent, and the arithmetic average range is 6 to 6.6 per cent. We consider the best estimate from this data is 6.1 per cent.

Draft Decision

In previous regulatory decisions and the draft decision we had regard to both geometric averages and arithmetic averages in order to arrive at an estimate for the MRP⁹⁰⁸.

Independent Panel review

The Independent Panel requested we clarify the suitability of arithmetic averages in setting regulatory returns, as well as the information provided by the geometric average.

Stakeholder submissions

⁹⁰⁷ Partington & Satchell, Report to the AER, November 2018, pp.29-31

⁹⁰⁸ AER, Draft Rate of Return Guidelines, July 2018, p.209; AER, AusNet Services transmission determination - Final Decision - Attachment 3, p.77

Several stakeholder submissions stated that geometric averages should not be used by the AER in determining the MRP for use in the rate of return. Network businesses stated that because of its known downward bias and the fact that the WACC prescribed by the AER is not expressly compounded it is simply not a useful tool⁹⁰⁹. The ENA and APA state that there is mathematical proof the arithmetic average must be used when calculating the expectation from previous results.⁹¹⁰ The ENA also submit that the geometric mean is an estimate of annual return that has been received already by an investor, not as an estimate of the expected return over the forthcoming year. They submitted that the arithmetic mean could only be biased if compounding occurred in the AER's WACC process, and even if it does occur the bias is not material at 5 or 10 year horizons. There is further comment from the ENA stating we have increased the weight applied to the geometric mean by not setting the lower bound of the excess returns 20 basis points above the maximum geometric mean estimate as we did in 2013.⁹¹¹

Other stakeholders took an opposing view, stating in submissions that the Geometric average should be the main tool of use when evaluating HERs.⁹¹² They propose that because investors have long term investment horizons, a measure which compounds return should be the main method of estimation. The ECA and CRG say that the fact the PTRM is not compounding is irrelevant, as it should be how the regulated entity deals with returns that matters. If earnings are retained and invested in part of the business (regulated or un-regulated) then the returns are compounded, and if they are distributed to shareholders they are available for re-investment.⁹¹³ The CCP submit that not only is the arithmetic average upwardly biased, but does not give weight to the compounding that networks acknowledge exist in presentations to their shareholders.⁹¹⁴ The CCP also pointed out that the approach to rely solely on arithmetic returns cannot be accepted as the tribunal has previously rejected such a method.⁹¹⁵

APA submitted that it is not an issue of bias when it comes to using either the arithmetic or geometric averages in historic returns series, but the fact that the AER has not submitted a model which links the historical excess returns with the mean of the excess returns distribution one period ahead. Without that explanation they state it

⁹⁰⁹ APA, Submission on Draft Guideline, 25 September 2018, pp.36-40; ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.113-116; NSG, Submission to the draft Rate of Return Guideline, p.16; APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018 pp.14-16; Frontier, Estimation of certain aspects of the allowed rate of return, April 2018, p.121-123

⁹¹⁰ ENA, Response to AER Rate of Return Guideline, 25 September 2018, pp. 113-116; APA, Submission on Draft Guideline, 25 September 2018, pp.36-40

⁹¹¹ ENA, Response to AER Rate of Return Guideline, 25 September 2018, p. 113

⁹¹² CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.60; CRG, Response to ROR draft decision, 25 September 2018, p.22; ECA, Response to AER Draft Guideline, 25 September 2018, p.14; EnergyAustralia, Submission on AER Draft rate of return guidelines, 25 September 2018, p.1;

⁹¹³ ECA, Response to AER Draft Guideline, 25 September 2018, p.14; CRG, Response to ROR draft decision, 25 September 2018, pp.23-25

⁹¹⁴ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, pp.61-63

⁹¹⁵ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.61

is difficult to proceed further with MRP estimation by either the geometric or arithmetic average, but that if the AER proceeds with the method then only arithmetic averages should be used.⁹¹⁶

AER consideration

We previously considered most of the points raised in submissions.⁹¹⁷

We are aware of the downward bias of the geometric returns and have previously considered that the geometric average is both useful and implemented by market practitioners.⁹¹⁸ The geometric average is useful when considering returns over a longer period. It can also highlight when there are differences in volatility between the historical sample periods the results are obtained over and the future prediction period.

When there is no volatility in the market the geometric and arithmetic averages will be equal, but diverge with increasing volatility. As such consistent geometric averages and fluctuating arithmetic averages could indicate potentially significant variations in volatility. Academic results have shown that as the investment horizon increases, results from the geometric average become closer to the unbiased estimator than the arithmetic average.⁹¹⁹ Recent advice also highlights that with shorter sample periods we should be placing increasing weight on the geometric results in order to reach an unbiased estimate.⁹²⁰

We acknowledge that the arithmetic average also has strengths in setting the HER point estimate, and have previously stated that the arithmetic average should be given more weight than the geometric when conducting analysis on the HER.⁹²¹ If previous years excess returns are independently and identically distributed (IID) and future returns are expected to have the same distribution then an unbiased expectation is achieved by the arithmetic average. This is shown in the submissions from the ENA and APA as well as other academic work.

However there is debate as to the independence of returns from year to year or the uniformity of the distribution over time, as shown by trends in the long term data and raised in recent advice.⁹²² Changes in volatility, alongside the issue of autocorrelation in historic returns, could also affect the arithmetic average's quality as an un-biased

⁹¹⁶ APA, Submission on Draft Guideline, 25 September 2018, pp.32-33

⁹¹⁷ AER, Draft Rate of Return Guidelines, July 2018, pp.211-213;

⁹¹⁸ AER, AusNet Services transmission decision - Final Decision - Attachment 3, April 2017, pp.217-221

⁹¹⁹ Blume ME, *Unbiased Estimators of Long-Run Expected Rates of Return*, Journal of the American Statistical Association, vol. 69, 1974, pp. 634–638; Jacquier E, Kane A, Marcus AJ, *Geometric or Arithmetic Mean: A Reconsideration*, Financial Analysts Journal, 59, pp.46- 53.

⁹²⁰ Partington & Satchell, Report to the AER, November 2018, p.31

⁹²¹ AER, AusNet Services transmission decision - Final Decision - Attachment 3, April 2017, pp.217-221

⁹²² Bianchi, Drew & Walk, *The Unpredictable Equity Risk Premium*, November 2015; Partington & Satchell, Report to the AER, November 2018, p.29

estimator.⁹²³ It is therefore not clear that the arithmetic average of historic results will provide an unbiased estimation of future excess returns

In the concurrent evidence session Satchell stated that he was disinclined to remove the use of either method entirely given the information available.⁹²⁴ Blume and Jacquier et al also show that where the holding period is more than one year, then the arithmetic mean of one year returns is an upward biased measure.⁹²⁵ In his most recent advice to the AER Partington also details that the autocorrelation shown in historic returns can increase the biases of both the geometric and arithmetic averages.⁹²⁶ Partington and Satchell also showed that to construct an unbiased estimate using historical returns, most weight should be given to the arithmetic average but with some weight assigned to the geometric average. They showed other academic work highlighting weight assigned to the geometric average should increase as the sample period selected decreases.⁹²⁷

In the 2013 guidelines we applied a small uplift to the highest result of the geometric averages to recognise that the forward looking MRP estimate was likely to be above the geometric average.⁹²⁸ We still hold the view that geometric averages are likely to underestimate the forward looking estimate, but do not believe an uplift is necessary or correct. By taking only the highest of the historic results from the geometric averages as the bottom of our range we acknowledge the potential bias geometric average results provide. We do not have evidence as to the size of such bias, and as such any uplift would likely be ad hoc and subjective.

9.4 Role of the dividend growth model

The Dividend Growth Model is arguably the most divisive of topics among stakeholders and their views on the MRP. Some stakeholders have submitted that it is the most reliable forward looking method available and should be given weight alongside the HER result, whereas others contend there are such severe issues with the model and its theory that it should be given no weight at all in the estimation process.

In Section 9.4.1 we deal with the issue of the DGM's similarity to the Wright approach, and as such its assumption of a stable return on equity. We detail the arguments supporting and opposing a stable return on equity in section 9.2.4. If there are issues with the theory surrounding such an assumption, we discuss whether it is right to hold the same issue with the DGM or if the DGM's display of such a relationship increases the model's validity and usefulness in a regulatory context. The network submissions

⁹²³ Partington & Satchell, Report to the AER, November 2018, p.29

⁹²⁴ AER, Concurrent evidence session 05 April 2018 transcript, April 2018, p. 57

⁹²⁵ Blume ME, Unbiased Estimators of Long-Run Expected Rates of Return, *Journal of the American Statistical Association*, vol. 69, 1974, pp. 634–638; Jacquier E, Kane A, Marcus AJ, Geometric or Arithmetic Mean: A Reconsideration, *Financial Analysts Journal*, 59, pp.46- 53

⁹²⁶ Partington & Satchell, Report to the AER, November 2018, p.29

⁹²⁷ Partington & Satchell, Report to the AER, November 2018, p.31

⁹²⁸ AER, Rate of Return Guidelines - Explanatory Statement, December 2013, p.93

stated the DGM's apparent reliance on the risk free rate was reflective of the market's view of the cost of equity and not a flaw in the model.⁹²⁹

A significant issue surrounding DGMs and their use over this process has been the estimation of future growth rates which underpin the model's results. We have considered, over this review process, that the use of the DGM in our MRP estimation process is inherently tied to the reliability of the inputs it requires. In Section 9.4.2 we consider the findings of HoustonKemp's detailed report on the matter as well as other stakeholder submissions which present varying opinions on how the growth rates should be estimated.⁹³⁰

In section 9.4.3 we detail the long standing, theoretical issues which have been raised by experts and stakeholders regarding the DGM. These submissions largely fall into two separate groups. Consumer advocates have stated the issues are more pronounced now than they have been before⁹³¹, whilst network businesses state that due to current economic conditions the DGM has fewer issues than previously considered.⁹³² We consider all submissions on the issue, as well as linking to previous discussions around the model and its theoretical underpinning.

In the final section on the DGM we look at results from other constructions of the DGM and whether any issues we have found in them should impact our consideration of the model as a whole in our estimation process. Explanation and examination of the discussion surrounding other constructions of the DGM can be found in section 9.4.4.

Dividend Growth Models (DGMs) can use analyst forecasts of current dividends combined with estimate of dividend growth and the current price to estimate an implied MRP. A basic constant growth dividend growth model is algebraically expressed as follows:

$$P = \frac{D_1}{r - g}$$

Where:

- P is the share price
- D1 is expected dividend in the next period
- r is cost of equity
- g is expected growth rate

⁹²⁹ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.131-132

⁹³⁰ HustonKemp, DGM Memorandum, September 2018.

⁹³¹ CRG, Response to ROR draft decision, 25 September 2018, p.26;

⁹³² ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, p.120-124; NSG, Submission to the draft Rate of Return Guideline, p.3

DGMs can take multiple forms. Each uses the inputs differently to estimate the MRP. There is no 'correct' model and all DGMs seem likely to suffer from the same general limitations.

Given DGMs come in different forms, there is an issue of which configuration is likely to produce the best estimate of the MRP. For example, IPART uses five separate DGMs, because it considers this approach will lead to the best result.

Our 2013 Guidelines detailed a version of the DGM that best suited our regulatory task:

$$P_c = \frac{m \times E(D_c)}{(1+k)^{m/2}} + \sum_{t=1}^N \frac{E(D_t)}{(1+k)^{m+t-0.5}} + \frac{E(D_N)(1+g)}{(1+k)^{m+N-0.5}}$$

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 year⁹³³
- $E(D_t)$ 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 two stage model, $N = 2$, for the three 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 apply this construction of the DGM as submissions did not raise issues. So unless otherwise specified, all results are from this model.

9.4.1 Correlation with the risk free rate

Final Decision

As with the Wright approach in section 9.2.4, there is no evidence that a stable return on equity accurately reflects the risks faced by firms in the supply of Australian regulated energy network services during the 5 year regulatory period and therefore by extension are less confident in the DGM's results.

⁹³³ 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.

The DGM assumes that market participants expect a stable return on equity, and then solves for the expected return on equity. We do not consider this a realistic set of assumptions. We see no reason to change our previous position that the DGM's reliance on the risk free rate makes it a less relevant estimation tool for a regulatory MRP.

Draft Decision

We stated in the Draft decision that the DGM's correlation with the risk free rate, despite lack of material evidence supporting such a correlation, reduced our confidence in the model's predictive ability.⁹³⁴

Independent Panel review

The Independent Panel commented that the AER's current mistrust of DGM's is clearly explained, however they did not comment specifically on the model's correlation with the risk free rate.

Stakeholder submissions

Stakeholders have suggested that the DGM's similarity to the Wright approach should not discredit the DGM, rather it should validate the view that the return on equity may be more stable than the AER allows.⁹³⁵ They state that not all evidence should be discredited because it does not support a stable return on equity when compared to the risk free rate. As other market practitioners and regulators use the technique in valuation processes, some stakeholders submit we should also be applying the DGM.⁹³⁶

Stakeholders highlighted that the DGM has results which appear to make more sense than the AER's fixed MRP estimate at important times over the past 10 years, and submit that the AER has rejected the DGM because it does not fit with the initial proposition that the MRP is not fixed.⁹³⁷ The NSG submitted that the inverse relationship is supported by the DGM and should be acknowledged, as to do otherwise would put the AER at odds with global regulators such as those in the UK.⁹³⁸

Other submissions supported the AER's draft decision position and stated that for a regulatory process which resets every 5 years it is not appropriate to assume a stable

⁹³⁴ AER, Draft Rate of Return Guidelines Review, July 2018, p.221

⁹³⁵ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.131-132

⁹³⁶ APA, Submission on Draft Guideline, 25 September 2018, pp.35-36; ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, p.120-124; NSG, Submission to the draft Rate of Return Guideline, p.3; APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018 p.18; AusNet, WACC Guideline, 24 September 2018, p.2; EvoEnergy, Submission on Draft Rate of Return Guideline, 25 September 2018, p.4;

⁹³⁷ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.131-132

⁹³⁸ NSG, Submission to the draft Rate of Return Guideline, p.11

return on equity because it does not reflect the risks faced by businesses.⁹³⁹ The submission from CCP16 stated that it is unlikely that the MRP has increased in the current economic conditions, which makes the more stable return on equity supported by the DGM highly improbable.⁹⁴⁰ The CCP continued that the DGM assumes the current share prices reflect only long-term expected returns in its forecasts, which does not match up with the variability in share prices. The CRG and SACES submitted that the DGM, when applied conventionally, solves for a stable-through-time cost of equity, causing an MRP estimate from the model to fluctuate inversely with the bond rate.⁹⁴¹ They argued that there is neither theory nor empirical evidence to support the assumption that the MRP behaves in this manner.

AER consideration

The DGM's similarity to the Wright Approach reduces our confidence in the model as a forward looking, predictive model because its results depends on the risk free rate at the time as well as analysts' dividend forecasts.

We have considered the DGM in this review. However the model's construction and its reliance on a relationship which does not have significant evidence to support it means we place less weight on the estimates it produces.

9.4.2 Growth rate estimates

The growth rate plays a key part in the MRP estimates produced by the DGM. As we are searching for a robust estimate of the MRP for use in our rate of return we consider it is important that all assumptions and inputs require a strong level of confidence. Different stakeholders have submitted multiple estimates of the dividend growth rate over time and we discuss the merits of various inputs below.

Final Decision

Our final decision is to use three growth rates in our DGM—3.78 per cent, 4.6 per cent and 5.1 per cent. Current market data suggested the correct growth rate may be towards the bottom of our current range of growth rates, but we found no conclusive evidence to decrease our current range.

Academics and regulators use a wide range of dividend growth rates, suggesting subjectivity. This subjectivity flows through to the DGM MRP estimates because a 2 per cent range (such as that considered in the 2013 Guidelines) on growth rates

⁹³⁹ CRG, Response to ROR draft decision, 25 September 2018, p.26; EnergyAustralia, Submission on AER Draft rate of return guidelines, 25 September 2018, p.2; CCP16, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.63-71

⁹⁴⁰ CCP16, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.63-71

⁹⁴¹ CRG, Response to ROR draft decision, 25 September 2018, p.26; SACES, Comments on Ausgrid submission, 2 September 2018, p.7;

leads to an almost 2 per cent range on the MRP estimates. This result is wider than the range of the combined arithmetic and geometric averages we consider.

There was much debate in 2013 about selecting DPS growth rates.⁹⁴² We were not convinced by HoustonKemp's argument to use GDP growth rates to estimate the DPS growth rates. Multiple GDP growth rate forecasts are available, as well as different potential adjustments. And with large confidence intervals, basing the dividend growth rate on a GDP forecast would not necessarily improve the range of potential growth rates we could use to construct the DGM.

Draft Decision

Our draft decision noted growth rate selection was a significant issue relating to the DGM. The growth rate affects outputs significantly, and we must select from a wide range used by experts to obtain MRP estimates.⁹⁴³

Independent Panel review

The Independent Panel commented that the AER's current mistrust of DGM's is clearly explained, however they did not comment specifically on the selection of the growth rate for the DGM.

Stakeholder submissions

Some submissions stated that the range of dividend growth rates used by the AER when considering the DGM has increased without explanation, combining nominal and real rates.⁹⁴⁴ Other submissions stated that the AER had dismissed previously accepted dividend growth rates without reason in the draft decision.⁹⁴⁵

The ENA and HoustonKemp submitted a detailed report stating that the growth rate for use in the DGM can be reliably estimated using a model which forecasts GDP growth, because there is statistical evidence that real DPS growth and real GDP growth have been correlated throughout time.⁹⁴⁶ They also provided working which they state rules out any growth rate which uses geometric averages as part of its formulation. The ENA put forward that this should alleviate any concerns the AER has regarding forecasting dividend growth rates in future decisions.

⁹⁴² AER, 2013 Rate of Return Guidelines - Explanatory Statements Appendices, December 2013, pp. 84–86.

⁹⁴³ AER, Draft Rate of Return Guidelines Review, July 2018, pp.218-219

⁹⁴⁴ APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018 p.15; ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, p.126;

⁹⁴⁵ APA, Submission on Draft Guideline, 25 September 2018, pp.35-36; ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, p.120-124; NSG, Submission to the draft Rate of Return Guideline, p.3; APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018 p.18; AusNet, WACC Guideline, 24 September 2018, p.2; EvoEnergy, Submission on Draft Rate of Return Guideline, 25 September 2018, p.4;

⁹⁴⁶ HoustonKemp, DGM Memorandum, 25 September 2018

CCP16 submitted that there was not consensus on DGM growth rates amongst analysts, with current levels unsustainable and potentially inflated due to short term effects.⁹⁴⁷ The CRG submission highlighted that the assumptions which have to be made on the inputs, of which the growth rate is one, means that the DGM has little success in convincingly outperforming simple averages of historic data.⁹⁴⁸ The CCP also claimed that given that there is potential diversification to a global portfolio global DPS growth rates should be considered by the AER.⁹⁴⁹

AER consideration

The CCP's claim that the AER should be considering DPS growth internationally may have merit if we use international evidence to estimate parameters. However we are focused on estimating a rate of return for an efficient firm in the supply of Australian regulated energy services in the Australian market and use the domestic SLCAPM. In addition, given the issues with estimating DPS growth in a single market there is likely to be more debate over global growth rates rather than less.

In the draft decision we stated that there was academic support for a range of long term dividend growth rates.⁹⁵⁰ However we did not change the growth rates applied to our construction of the DGM. We consider it reasonable to acknowledge the potential range of dividend growth rates supported by academic reports in the current Australian market in order to assist our estimation process. We agree that the range of dividend growth rates applied to our construction captures a large proportion of the rates in consideration. However there is no indication as to which of the growth rates is most appropriate and where within our range of results we should select a point estimate. In our updated estimates of the DGM results we can see there is a range of 2.6 per cent when sensitivity analysis is taken into account. This is a large range and provides us with different MRP estimates.

There are a number of potential issues with HoustonKemp's report and its conclusions. Firstly it appears as though the time period is not reflective of the general relationship between the GDP growth and DPS growth. The series seems to cover either a statistically preferable longer series or a shorter series from the introduction of imputation credits. Advice received has informed us that over two thirds of this period is covered by a world record run of consecutive growth years for a developed economy. The DPS growth rate for use in the DGM is one that is estimated into perpetuity, and as such it is difficult to claim that this short period reflects the long run norm.⁹⁵¹ It is highly likely that there was an increase in the dividend payout once the imputation credit scheme was introduced in 1987, potentially inflating annual growth seen in a series starting just before that time. This was also highlighted in advice from

⁹⁴⁷ CCP16, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.63-66

⁹⁴⁸ CRG, Response to ROR draft decision, 25 September 2018, pp.25-26

⁹⁴⁹ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, p.66

⁹⁵⁰ AER, Draft Rate of Return Guidelines Review, July 2018, p.218

⁹⁵¹ Partington & Satchell, Report to the AER, November 2018, p.21

Partington, who stated this introduction would have caused an increase in dividend payments of around 10 to 20 percent in a short period of time.⁹⁵² Our current growth rates are based on recommendations from Lally and Partington.⁹⁵³ These were formed using longer term sets of data and we are confident they better reflect the long term growth seen in DPS.

Whilst the series constructed is likely a good estimator of the raw DPS, Partington advised there were a multitude issues around the estimation process due to the composition of indices and multiple adjustments, including stock splits, capitalisation changes and rights offerings, which are not accounted for by HoustonKemp.⁹⁵⁴ Previous work from Chu and Partington has shown that choice of method for computing rights dilution factors can lead to significant differences in rates of return that arise from use their application.⁹⁵⁵ Partington noted that this could also lead to our current growth rate estimates being 'generous' in their current form.

Advice from Partington also sets out that results reached by HoustonKemp are unlikely to be statistically significant as reported.⁹⁵⁶ The advice sets out that the means of DPS growth rates are smaller than the means of the GDP growth rates and are much more volatile. This volatility would likely result in low power statistical tests, and the 95 per cent confidence interval is likely to include negative real growth in DPS meaning the value for real DPS growth stated by HoustonKemp is likely to be imprecise. We considered the statistical findings of the paper and found that that although HoustonKemp found that the second null hypothesis, that the difference between the DPS and GDP growth does not trend through time, cannot be rejected it does not necessarily infer statistical significance. This may be due an issue with the data set size, and not a statistically significant sign that there is no trend over time. When testing the relationship there is persistent evidence in the results that the difference between the DPS and GDP increases over time.

The HoustonKemp report states that its conclusion also excludes the use of geometric averages when estimating the long run growth rate for DPS.⁹⁵⁷ This is based on a similar argument the ENA put forward regarding arithmetic averages and their use in estimating the MRP from historical excess returns. However when considering long run DPS growth, we are considering a period beyond 10 years and, in theory, in perpetuity. Partington, in advice to the AER, agrees with our view and sets out that as the forward horizon will generally be greater than the sample period we use, both the geometric and arithmetic averages are likely to be upwardly biased.⁹⁵⁸ However, using results from Jacquier, Kane and Marcus, Partington concludes that the geometric mean is

⁹⁵² Partington & Satchell, Report to the AER, November 2018, p.22

⁹⁵³ Michael McKenzie and Graham Partington, Report to the AER: The Dividend Growth Model (DGM), December, 2013; Lally, Review of the AER's Proposed Dividend Growth Model, December, 2013.

⁹⁵⁴ Partington & Satchell, Report to the AER, November 2018, p.22

⁹⁵⁵ Partington & Satchell, Report to the AER, November 2018, p.23

⁹⁵⁶ Partington & Satchell, Report to the AER, November 2018, p.23

⁹⁵⁷ HoustonKemp, DGM Memorandum, 25 September 2018

⁹⁵⁸ Partington & Satchell, Report to the AER, November 2018, pp.25-26

preferable to the arithmetic mean as an estimate of the long term dividend growth as it avoids the high lack of precision of the arithmetic mean.⁹⁵⁹ Partington and Lally used long term, geometric growth rates for the GDP when estimating the growth rates we currently use.⁹⁶⁰ Whilst there are still issues with the use of geometric averages for this, it is more accurate and reliable than using arithmetic averages.

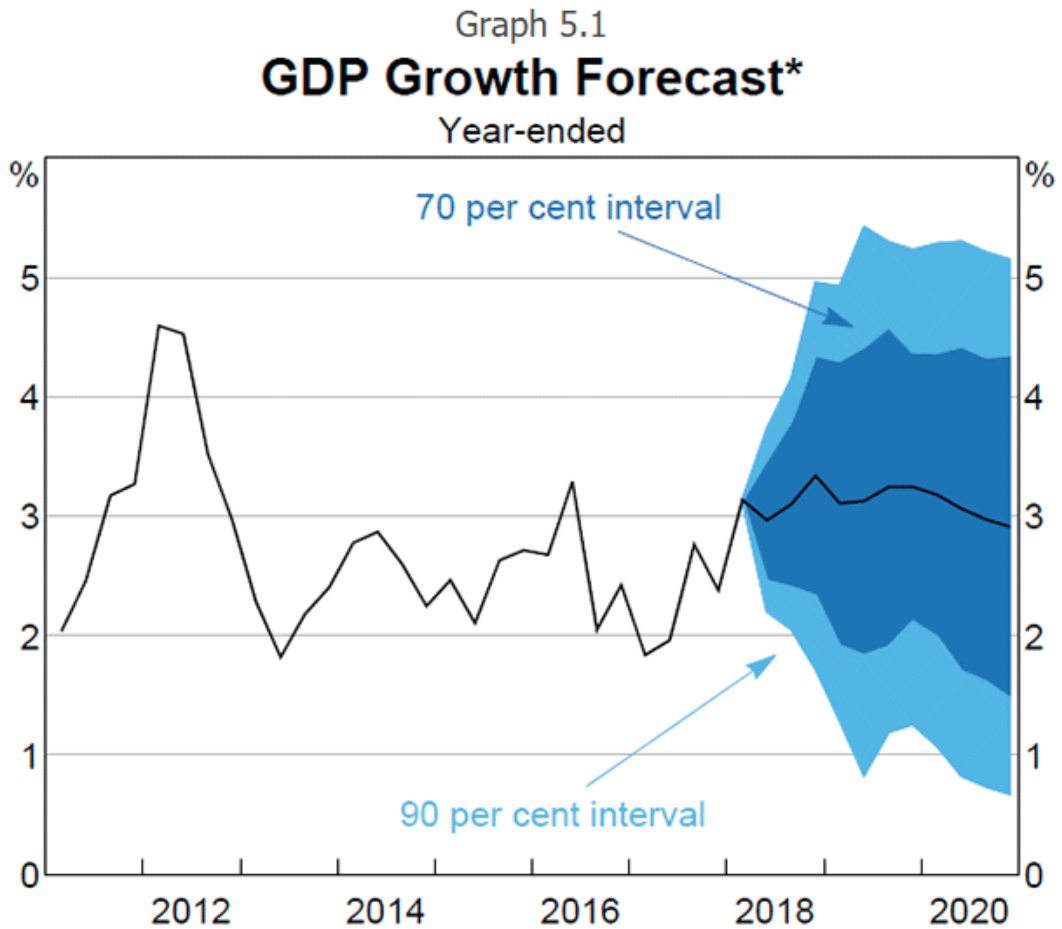
If we assume that the data, and conclusion, provided by HoustonKemp is correct, then over time the GDP growth and growth in DPS is correlated. HoustonKemp then relies on a simple estimator of GDP growth, one which uses a constant as its sole regressor. HoustonKemp states its estimator of GDP growth is reasonable because it comes close to matching GDP growth forecasts from the RBA.⁹⁶¹ However, similarity to the RBA's forecast does not necessarily lead to the DGM being suitable for directly estimating the MRP. The RBA's forecasts (Figure 22) shows wide confidence intervals which is much wider than the band suggested by HoustonKemp's model. This raises questions regarding the suitability of using GDP growth rates (as an input to the DGM) and the robustness of MRP estimates from DGMs using DGP growth rates.

⁹⁵⁹ Partington & Satchell, Report to the AER, November 2018, p.26

⁹⁶⁰ Michael McKenzie and Graham Partington, Report to the AER: The Dividend Growth Model (DGM), December, 2013; Lally, Review of the AER's Proposed Dividend Growth Model, December, 2013.

⁹⁶¹ HoustonKemp, DGM Memorandum, September 2018, p.7;
<https://www.rba.gov.au/publications/smp/2018/aug/economic-outlook.html>

Figure 22 Confidence intervals for RBA GDP growth forecast



Source: RBA Economic Analysis, August 2018

We note there are a range of different GDP forecasts for Australia.⁹⁶² Partington's advice to the AER also highlights there are many unknowns surrounding long run GDP forecasts, and forecasts of GDP growth based on historical results should use the geometric average to form the better estimate than arithmetic averages.⁹⁶³

We have received advice that the estimates for DPS growth should not be considered "definitive estimates" but just another set of estimates to add to the multiple estimates previously proposed.⁹⁶⁴ Partington goes on to state that the estimates should be

⁹⁶² RBA, May Statements on Macroeconomic Policy - Economics Outlook, May 2018 states growth will be above 3%; The IMF forecasts Australian growth will fall to 2.6% in 2023 <http://www.imf.org/en/Countries/AUS> ; Economist Intelligence Unit puts long term growth between 2018 and 2030 as 2.2% and between 2018 and 2050 as 2.1%. <http://country.eiu.com/article.aspx?articleid=156657399&Country=Australia&topic=Economy&subtopic=Longterm+outlook&subsubtopic=Summary> ; the OECD forecasts growth around 2.7% between now and 2060 <https://data.oecd.org/gdp/gdp-long-term-forecast.htm>

⁹⁶³ Partington & Satchell, Report to the AER, November 2018, p.28

⁹⁶⁴ Partington & Satchell, Report to the AER, November 2018, p.21

considered alongside those from other sources such as Fenebris, whose estimates have the advantage of having no underlying self interest in relation to the regulatory outcome.⁹⁶⁵ Previous advice to the AER has also stated that adjustments must be made to the GDP growth rate in order to accurately estimate DPS growth rate, and this is a point made again by Partington in his most recent advice.⁹⁶⁶ The growth rates we are currently using are formed from varying adjustments on the GDP growth rates.

In discussion papers and the draft decision we considered a variable growth rate for use in the DGM, but have not given the model weight in our estimations.⁹⁶⁷ The CCP had previously pushed for the consideration of these growth rates⁹⁶⁸, on the back of work by Fenebris and Damodaran. However advice from Partington has shown whilst these variable rates can track GDP growth at times it is unlikely to reflect a long term growth rate.⁹⁶⁹ We will not consider results from a variable growth rate version of our model in this review.

We acknowledge that on page 219 of our draft decision we erroneously compared nominal and real growth rates.⁹⁷⁰ This exacerbated the potential spread of growth rates considered in the Australian market. We have not given any weight to the erroneous growth rates in our consideration of the DGM.

9.4.3 Issues with the DGM

Final Decision

We consider the issues with the DGM to be material. With potential biases and subjectivity increasing concerns about the model's results, we do not consider there is sufficient evidence to give DGM significant weight in estimating the MRP.

Draft Decision

Our draft decision, and previous decisions, noted multiple issues with the DGM which diminished our confidence in the accuracy of the MRP estimates it produces.⁹⁷¹

Independent Panel review

The Independent Panel stated that the AER's mistrust of the DGM was clearly explained, however the Panel did highlight that the issue raised regarding dividend re-investment should not be considered material going forward.

⁹⁶⁵ Partington & Satchell, Report to the AER, November 2018, p.21

⁹⁶⁶ Partington & Satchell, Report to the AER, November 2018, pp.21-23

⁹⁶⁷ AER, Draft Rate of Return Guidelines Review, July 2018, p.223

⁹⁶⁸ CCP16, Final Submission to the AER Draft Rate of Return Guideline, 25 September 2018, p.56

⁹⁶⁹ Partington & Satchell, Final Report to the AER 2018, 22 May 2018, pp.31-33.

⁹⁷⁰ AER, Draft Rate of Return Guidelines, July 2018, p.219

⁹⁷¹ AER, Draft Rate of Return Guidelines Review, July 2018, pp.220-223

Stakeholder submissions

Networks stated that the problems with the DGM were not as widespread or pronounced as the AER stated in the draft decision. Many network submissions stated the AER had treated the DGM evidence unsymmetrically, and was being dismissed on the same evidence it was accepted under in 2013.⁹⁷²

The ENA responded to the individual issues the AER raises with the DGM. In regards to issues that the AER raised prior to the draft decision the ENA stated that this should not have changed the AER's weight assigned to the model because we had covered these before and been satisfied enough with the DGM to use its results to adjust the MRP estimate from the historical returns.⁹⁷³ This point is also raised by EvoEnergy.⁹⁷⁴ The ENA continued that because the AER use their own inflation estimate, there should be no concern around inflation in the DGM. For the final issue addressed, the ENA stated that dividend reinvestment schemes do not alter the result of the DGM in any way, which was backed up by the Independent Panel.

The APGA stated that although the DGM is not without its flaws it should be used to balance what is otherwise a purely historical approach. They submitted this would contribute to a robust MRP estimate.⁹⁷⁵ They detailed that it should be afforded a weighting of 50 per cent, at least as a starting premise when estimating the MRP. APA submitted that the DGM should receive material weight as forward looking estimates, as agreed in the concurrent evidence sessions.⁹⁷⁶

Other submissions have stated that issues with the DGM are pronounced and more relevant when considering regulatory applications, and the AER should not consider the DGM when estimating the MRP. Energy Australia commented that it is worth considering all issues with a model when forming a view on a decision such as this.⁹⁷⁷ The CCP and CRG submitted that there are multiple issues with the DGM, as raised by the AER, which make it unsuitable for use in a regulatory estimate of the MRP.⁹⁷⁸

AER consideration

⁹⁷² ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.126-131; NSG, Submission to the draft Rate of Return Guideline, p.13; NSG, Submission to the draft Rate of Return Guideline, p.16; APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018 p.14; AusNet, WACC Guideline, 24 September 2018, p.2; EvoEnergy, Submission on Draft Rate of Return Guideline, 25 September 2018, p.3; Final Rate of Return Submission, 25 September 2018, p.6;

⁹⁷³ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.127-129

⁹⁷⁴ EvoEnergy, Submission on Draft Rate of Return Guideline, 25 September 2018, p.3

⁹⁷⁵ APA, Submission on Draft Guideline, 25 September 2018, pp.35-36; ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, p.120-124; NSG, Submission to the draft Rate of Return Guideline, p.3; APGA, Submission on AER 2018 Draft Rate of Return Guideline, 25 September 2018 p.18; AusNet, WACC Guideline, 24 September 2018, p.2; EvoEnergy, Submission on Draft Rate of Return Guideline, 25 September 2018, p.4;

⁹⁷⁶ APA, Submission on Draft Guideline, 25 September 2018, pp.35-36

⁹⁷⁷ EnergyAustralia, Submission on AER Draft rate of return guidelines, 25 September 2018, p.2

⁹⁷⁸ CRG, Response to ROR draft decision, 25 September 2018, p.26; CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, pp.63-66

Our draft decision identified several issues with the DGM, in addition to growth rates, which raised concerns over the reliability and accuracy of its results. As Hathaway noted, the DGM 'is a perpetuity model that has constant assumptions, but it is applied in an ever-changing world.'⁹⁷⁹

We have received advice that common usage of dividend reinvestment plans is likely to lead to overestimation of the MRP by the DGM.⁹⁸⁰ Partington states that without allowance being made for such schemes it would be misleading to use raw DPS values in implied cost of capital models such as the DGM. We do not believe that dividend re-investment schemes as detailed in the draft decision will have a significant impact upon the results from the DGM. DGMs assume only that dividends are received and are not dependent on whether dividends are consumed or reinvested.

We stated in the draft decision that issues with long term inflation are less likely to have an impact because it is consistent throughout our regulatory decision.⁹⁸¹ However there are still a number of issues with the DGM which cause us to have issues with the model.

Analyst forecasts are an essential component of the DGM. However we have previously observed that analyst forecast are upwardly biased.⁹⁸² We have received advice that this is a real and present issue for the DGM, and there has not been any counter argument to this except for some analysis on the ASX 20 submitted by Frontier in its 2016 report to the AER. Frontier submitted the analysis actually showed a downward bias in forecasts, however it was a single survey with a small sample and as such we previously gave the argument little weight as per expert advice.⁹⁸³

Sticky dividends, the idea that firms will be slower to lower their dividends due to poor returns than they will be to raise them due to good returns, was also highlighted during the draft decision and in previous other regulatory decisions.⁹⁸⁴ We consider this to be a relevant issue with the DGM that could cause MRP estimates to be upwardly biased.

The DGM is a forward looking model and in theory could assist in estimating a forward looking MRP, but the precision, accuracy and bias issues detailed in the draft decision (and in this explanatory statement) detract from its potential use in a regulatory setting. We agree we do not want to dismiss evidence just because it is different, but there has been increasing evidence stating that the increasing MRP estimates are driven by factors not aligned to market risk. There is not sufficient evidence around the reliability or precision of the DGM for us to simply accept the numbers it is producing without question.

⁹⁷⁹ Hathaway, Australian Market Risk Premium, January 2005, p.3

⁹⁸⁰ Partington & Satchell, Report to the AER, November 2018, p.22

⁹⁸¹ AER, Draft Rate of Return Guidelines Review, July 2018, p.220

⁹⁸² AER, APA VTS Final Decision, November 2017, p.217

⁹⁸³ AER, APA VTS Final Decision, November 2017, pp.217-218.

⁹⁸⁴ AER, APA VTS Final Decision – Rate of Return, November 2017, pp. 216-217,212; AER, Draft Rate of Returns Guidelines - Explanatory Statement, July 2018, p.221

9.4.4 Other constructions of the DGM

Final Decision

Considering other constructions of the DGM in use can raise or alleviate concerns with the model's theoretical ability to estimate the MRP. We do not consider 'extreme' models, those with a construction or assumptions not supported by empirical work, as part of our MRP estimation. We find the results produced by other constructions of the DGM raise concerns over which model is closest to the true MRP, and whether the model can be relied upon to produce precise and unbiased estimates consistently over time as required in a regulatory environment.

Draft Decision

In the draft decision we highlighted that results from multiple constructions of the DGM had diverged and produced vastly different results, leading us to become more wary of using results from the model in our estimation.⁹⁸⁵

Independent Panel review

The Independent Panel stated that the AER's mistrust of the DGM was clearly explained, but the Panel did not comment directly on the use of other constructions of the DGM in their report.

Stakeholder submissions

There were a number of submissions to the AER that stated we should not be concerned about the results from other constructions of the DGM when we are only using the results of our construction. The ENA specifically stated that those divergent results are from models with extreme long-run dividend growth rates which should be excluded by the AER, and those models with a variable growth rate have no useful role to play in estimating an MRP.⁹⁸⁶

The CCP submitted that the concerns raised by the AER around other constructions of the DGM are valid. They state that it shows the potential pitfalls of the dividend growth model and the potential to get dragged into a 'my expert vs. your expert' surrounding the construction and inputs to the model. With the number of models and potential inputs as high as it is there is no way of knowing which choice represents the actual expected returns.⁹⁸⁷

AER consideration

⁹⁸⁵ AER, Draft Rate of Return Guidelines Review, July 2018, pp.217-223

⁹⁸⁶ ENA, Response - Draft AER Rate of Return Guideline, 25 September 2018, pp.121-122,

⁹⁸⁷ CCP, Final Submission to the AER Draft Rate of Return Guideline, September 2018, pp.63-66

We consider that looking at results generated by other versions of the DGM may be useful in assessing the extent to which the results depend upon the model's assumptions. While we do not use the results from other versions of the DGM in our estimation of the MRP, the sensitivity of the results to the specification of the model would be a concern if the DGM is used to estimate the MRP in the regulatory framework.

We understand that some of the DGMs considered may be viewed as using extreme growth rates, and we are not using the variable growth rate DGM in our estimating of the MRP. Partington however considered that the variable growth rate model put forward by Fenebris demonstrates variation in model construction and has the benefit of the constructor having no underlying self-interest in relation to the regulatory outcome.⁹⁸⁸

The NSW regulator IPART uses five DGMs with the same growth rate (5.5 per cent) for all five models. The ENA supported this rate and did not consider it 'extreme'. However, estimates from the 5 models diverge significantly and are highly variable over different time periods despite the same growth rate. The range in January 2018 was 7.73 per cent to 11.3 per cent and is at 7.8 per cent to 9.5 per cent as of the latest update.⁹⁸⁹ This changing range in a largely stable market does not give us confidence in the DGM's estimate of the MRP.

As stated by the CCP there are multiple assumptions and constructions in use when it comes to the DGM. When there is no significant or deciding evidence to signal which models are appropriate any choice made may be subjective in nature.

9.5 Updated estimates of MRP

9.5.1 Historical Excess Returns

Our Historical Excess Returns is updated annually and accounts for the effect of imputation credits. Since the draft decision there has been a change in theta, a component of imputation credits, from 0.6 to 0.65. This has increased some of the results from HER. Because it impacts the HER estimate only in years which imputation was in effect, it has a greater effect on the most recent periods. We detail the use of imputation credits in HER below Table 20.

⁹⁸⁸ Partington, Submissions on Guidelines, November 2018, p.21

⁹⁸⁹ IPART, WACC Biannual Update, August 2018, p.4

Table 20 Historical excess returns (per cent)

Sampling period	Arithmetic average	Arithmetic return Standard Deviation	Arithmetic average (2013 guidelines)	Geometric average	Geometric average (2013 guidelines)
1883–2017	6.3	0.163	6.3	5.0	4.8
1937–2017	6.0	0.191	5.9	4.2	3.9
1958–2017	6.6	0.214	6.4	4.3	3.8
1980–2017	6.5	0.210	6.3	4.3	3.8
1988–2017	6.1	0.169	5.7	4.6	3.6

Source: Handley, An estimate of the historical equity risk premium for the period 1883 to 2011, April 2012, p. 6. AER update for 2012–2017 market data. The 2013 guidelines values are taken from data up to December 2012.

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

Use of imputation in HER

Whilst the excess returns are observable, we must use our estimate of theta in estimating the MRP to account for the extra value investors receive from dividend payouts. We detail the approach in Attachment 3 to the 2015 SAPN determination:⁹⁹⁰

- Post-imputation (July 1987) returns consist of capital gains, dividends and the value of attached imputation credits. However, stock accumulation indices in Australia only include returns from dividends and capital gains. Therefore, market indices implicitly attribute no value to imputation credits distributed to investors. We estimate investors value distributed franking credits at 60 per cent of their face value (see attachment 4— value of imputation credits). Therefore, we must add back the value of imputation credits to the stock accumulation index. Otherwise, we will underestimate the after-corporate, before-personal tax return on equity.
- We use the methodology applied by Brailsford et al to adjust our historical excess returns estimates for the value of imputation credits. Brailsford et al. estimated a series for the value of imputation credits. This entailed the following:
 - Estimating an annual series of imputation credit yields applicable to the underlying stock index.
 - For the period 1998 to 2005, using the weighted average imputation credit yield on the Australian ASX All Ordinaries index for the 12 months ending December of each year. Brailsford et al. sourced these data from the Australian Taxation Office (ATO).
 - Estimating the weighted average imputation credit yield, ct for each year, t for the period 1988 to 1997. This is because the relevant ATO data are unavailable prior to 1998.

⁹⁹⁰ AER, Attachment 3 - Final decision SA Power Networks distribution determination, October 2015, p398

- Adjusting the series of estimated imputation credit yields for the amount that investors value them (theta). Our adjustment is based on investors valuing distributed franking credits at 65 per cent of their face value.⁹⁹¹
- The methodology applied by Brailsford et al. entails calculating the total value of returns using actual market returns, dividends and imputation credits (adjusted for the amount that investors value them). As such, we have confidence in these estimates. We note that Handley also applied this methodology when he updated the Brailsford et al. study.”

9.5.2 AER's construction of the Dividend Growth Model

Table 21 Dividend Growth Model Results with Sensitivity Analysis

Sensitivity	Two stage model	Three stage model
Baseline		
4.6 per cent long-term growth rate		
2 month average to end Sep 2018	7.54	7.23
unadjusted analysts' forecasts		
5.1 per cent long-term growth rate	8.02	7.64
3.78 per cent long-term growth rate	6.67	6.52
6 months to end Sep 2018	7.45	7.18
12 months to end Sep 2018	7.48	7.33
Analysts' forecast + 10 per cent	8.12	7.78
Analysts' forecast - 10 per cent	6.97	6.77
Combined - low	6.10	5.96
Combined - high	8.59	8.28

Source: Bloomberg, AER analysis.

Notes: All market risk premium estimates are based on an assumed theta of 0.65.

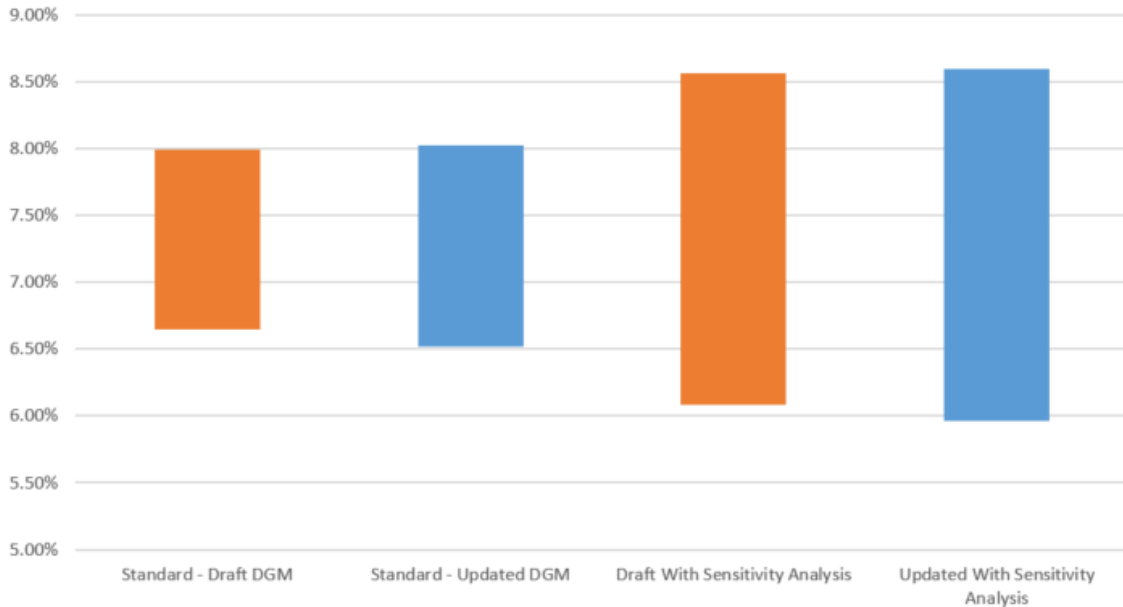
Combined - low is based on 3.78 per cent growth, 6 month averaging, analysts' forecasts - 10 per cent.

Combined - high is based on 5.1 per cent growth, 12 month averaging, analysts' forecasts + 10 per cent.

Results from our construction of the DGM are materially similar to those considered in the draft decision, despite the change in theta from 0.6 to 0.65. Figure 23 below shows the results from the model, as well as the expanded sensitivity analysis detailed above.

⁹⁹¹ Theta was detailed as 0.6 in the SAPN decision, but has been updated to 0.65 for the instrument.

Figure 23 Comparison of latest DGM MRP estimates with those from the draft



Source: Bloomberg, AER analysis.

Notes: All market risk premium estimates are based on an assumed theta of 0.65.

9.5.3 Surveys

We note survey evidence comes from market practitioners who are asked what they expect the MRP to be in the Australian market. These surveys take on different forms and can vary in different ways, including questions asked, type of participants and number of participants. As such it is important to view each piece of evidence in the context it is presented. In the approach to date we have used the survey evidence to inform our MRP estimate. It informs us about investors' and market practitioners' expectations and/or what they apply in practice

We recognise that surveys have limitations and are not at a level of reliability as to give it weight as a direct estimation method of the MRP. However, we consider that it has some value and use it to inform us of investor expectations. There has not been any significant change in evidence regarding surveys which persuade us that we should change our 2013 Guidelines position on the role of survey data.

There have been no new MRP surveys since the draft decision.

Table 22 MRP Survey Results

Survey	Numbers of responses	Mean (per cent)	Median (per cent)	Mode (per cent)
Fernandez et al (2012)	73	5.9	6.0	N/A
KPMG (2013)a	19	N/A	6.0	6.0
Fernandez et al (2013)	17	6.8	5.8	N/A
Asher and Hickling (2013)	46	4.8	5.0	6.0
Fernandez et al (2014) b	93	5.9	6.0	N/A
Asher and Hickling (2014) c	27	4.4	4.6	6.0
Fernandez et al (2015)	40	6.0	5.1	N/A
KPMG (2015) d	~27	N/A	6.0	6.0
Asher and Carruther (2015)	29	4.9	N/A	N/A
Fernandez et al (2016)	87	6.0	6.0	N/A
Carruther (2016)	24	5.3	N/A	N/A
Fernandez et al (2017)	26	7.3	7.6	N/A
KPMG (2017)	45	N/A	6.0	6.0
Fernandez et al (2018)	74	6.6	7.1	N/A

Sources: Several survey reports.⁹⁹²

- Notes:
- a) While this survey had 23 market participants, 19 specified what market risk premium they used.
 - b) The 2014 survey did not report the response rate. AER staff obtained this information from Professor Fernandez via email correspondence on 22 July 2014.
 - c) The response rate for this survey is lower than the response rate in previous Asher and Hickling surveys because the survey took place from 5 December 2014 to 14 December 2014, which was very close to Christmas. AER staff obtained the mode from Associate Professor Anthony Asher via email correspondence on 17 September 2015.
 - d) The KPMG (2015) survey had 29 market participants, but figure 24 indicates that not all the market participants gave a response for the market risk premium. However, visual inspection indicates that the response rate was approximately 27.

⁹⁹² Fernandez, Ortiz, Acín, Market risk premium used in 71 countries in 2016: a survey, May 2016; KPMG, Australian valuation practices survey 2015, May 2015; Fernandez, Ortiz, Acín, Discount rate (risk-free rate and market risk premium) used for 41 countries in 2015: a survey, April 2015; Asher and Hickling, Equity Risk Premium Survey 2014, Actuaries Institute, April 2015; Fernandez, Linares, Acín, Market Risk Premium used in 88 countries in 2014, IESE Business School, June 2014; Asher and Hickling, Equity Risk Premium Survey, Actuary Australia, December 2013; Fernandez, Arguirreamalloa and Linares, Market Risk Premium and Risk Free Rate used for 51 countries in 2013, IESE Business School, June 2013; KPMG, Valuation Practices Survey 2013, February 2013; Fernandez, Arguirreamalloa and Corres, Market Risk Premium used in 82 Countries in 2012, IESE Business School, January 2013; Asher and Carruther, *Equity Risk Premium Survey 2015, Actuaries Digital*, May 26 2016; David Carruthers, Equity Risk Premium Survey 2016, 8 March 2017; Fernandez, Linares, Acín, Discount Rate (Risk-Free Rate and Market Risk Premium) used for 41 Countries in 2017: a survey, April 2017; KPMG, *KPMG Valuation Practices Survey*, July 2017, Fernandez et al, Market Risk Premium used for 59 countries in 2018, April 4 2018.

9.5.4 Conditioning Variables

Dividend Yields

Dividend yields have not changed significantly since the December 2013 guidelines decision, and are currently around the long term average for the series. Dividend yields have been steady since a peak in early 2016. There is no indication from the data that suggests there is excess risk in the market at the current time.

Figure 24 Dividend Yields from ASX200

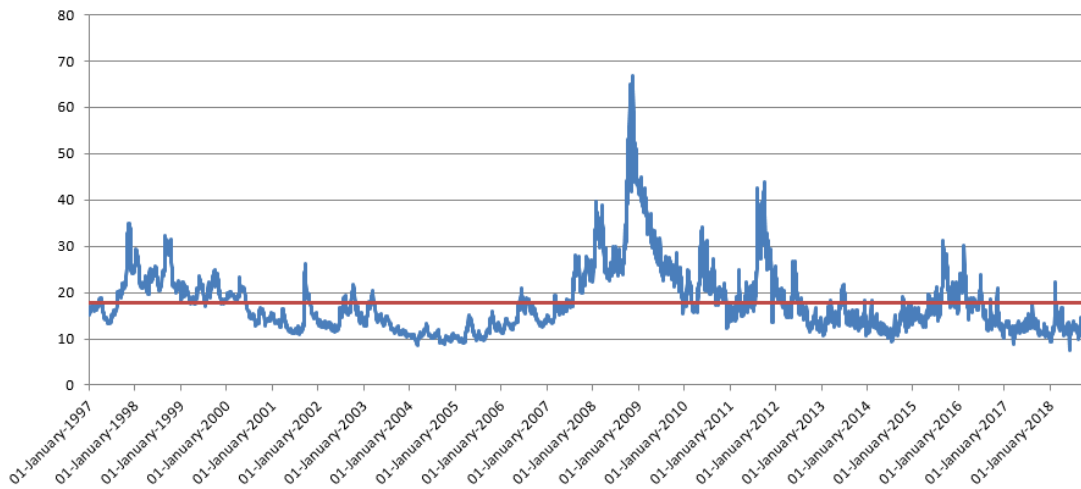


Source: AER analysis; sourced via Bloomberg code AS51. Long term average taken from the start of the data series in 2000.

Volatility Index

The implied volatility has remained low since the draft decision was published and is around the same level it was at the end of 2013. As explained in the draft decision, low volatility is likely to signal lower risk in the market. Whilst low volatility is not guaranteed going forward, we see the current low implied volatility as signalling lower risk in the market than we have seen in the past 10 years. Volatility over the previous 2 years has been consistently lower than levels seen from the start of 2011 to the end of 2013.

Figure 25 Implied Volatility of ASX200

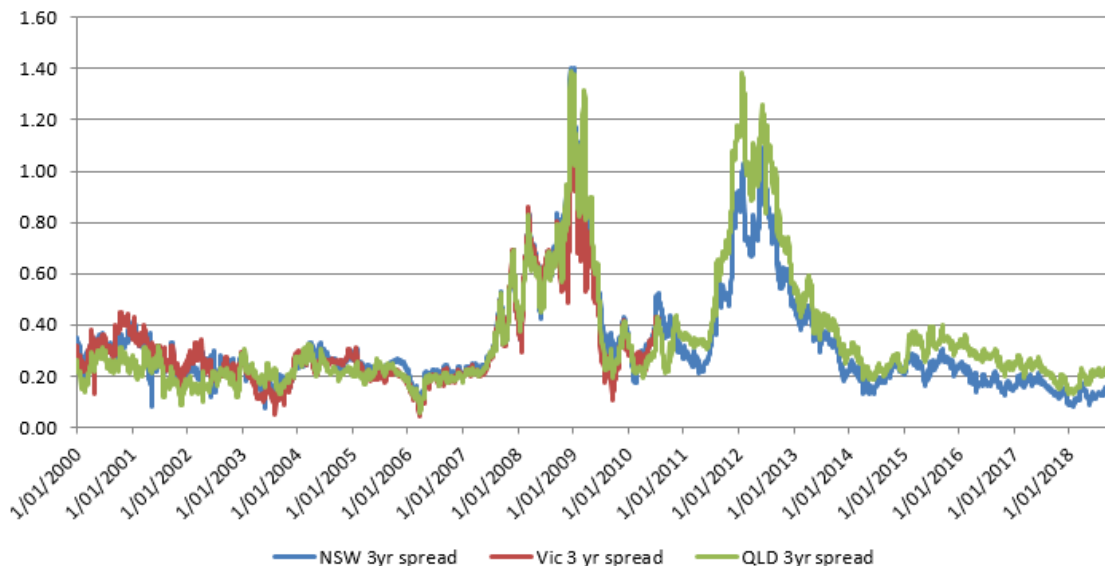


Source: AER analysis; ASX200 VIX volatility index, sourced via Bloomberg code AS51VIX from 2/01/2008 and code CITJAVIX prior to 2/01/2008. Long run average taken from the start of the data series in 1997.

Credit Spreads

Credit spreads from state government have started to increase slightly in recent months, however they are still around the pre-GFC level and are significantly lower than they were in 2013. With these low credit spreads we consider it is likely there is less risk in the market under current conditions than we have seen in the past 10 years.

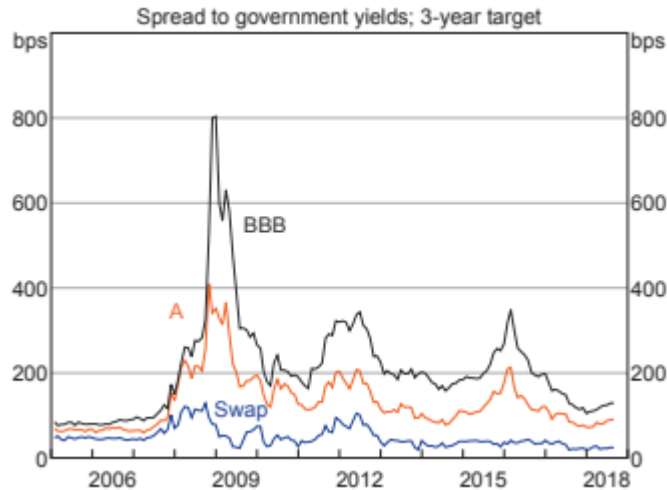
Figure 26 Spread of State Government Debt



Source: AER analysis; Spreads from Australian government securities to state government bonds with 3 years term to maturity, sourced via Bloomberg interest rate statistics.

Both BBB and A rated corporate yields have seen an increase since the start of 2018, however there has not been any significant divergence or movement away from the low values seen in the 2018 draft decision. They are lower than levels seen in 2013 when the previous guidelines decision was made.

Figure 27 Australian Bond spreads over Government Yields



Source: RBA, Chart Pack, downloaded October 2018

9.5.5 International MRPs

A recommendation of the Independent Panel was to consider international risk premiums as part of our analysis. Table 23 shows results collected by Credit Suisse as part of their Investment Handbook. We use the Credit Suisse Yearbook's analysis as it is an independent source which has analysed returns for a number of years.

Table 23 A Comparison of International Risk Premiums

	1965-2014	1900-2014	1966-2015	1900-2015	1967-2016	1900-2016
Australia	2.8	5.6	3	5	3.2	5
Austria	-1.8	2.5	-1.3	2.6	-1	2.7
Belgium	0.8	2.3	1.3	2.4	1.4	2.2
Canada	0.8	3.5	0.4	3.3	1	3.4
France	-0.7	3	-0.3	3	0	3
Germany	0.1	5	0.6	5.1	0.7	5
Ireland	1.8	2.6	2.6	2.8	2.5	2.7
Italy	-1.9	3.1	-2	3.1	-2.3	3.1
Japan	0.1	5.1	0.4	5.1	0.5	5
Netherlands	2.4	3.2	2.6	3.3	3	3.2
NZ	2.4	3.9	2.8	4	2.9	4
Switzerland	2.3	2.1	2.5	2.1	2.7	2
UK	2.9	3.7	2.8	3.6	2.9	3.6
US	2.3	4.4	1.9	4.3	2.4	4.3
Europe	1.1	3.1	1.2	3.2	1.3	3.1
World	0.9	3.2	0.8	3.2	1.1	3.2

Source: Credit Suisse Global Investment Yearbooks 2015-17 summary editions. AER Analysis.

The returns above are the estimated real risk premiums over bonds and as such are not directly comparable to the results the AER uses to estimate the MRP. However they do show that, according to Credit Suisse, Australia's historical returns are significantly above the average for the world and other developed nations. If diversification on a global scale continues it is likely that Australia's MRP will decrease over time as risks are removed from the well diversified portfolio. It is also worth noting that across most countries returns for the last 50 years are significantly below the long run return series starting in 1900, signifying lower risk globally in recent years for developed countries.

10 Return on debt

In section 3 we set out our decision for:

- a methodology to estimate the rate of return as a weighted average of the return on equity and return on debt, and
- a methodology for estimating the return on debt (rather than a set value).

Our decision is for the rate of return instrument to set out a methodology for estimating the return on debt based on the following key elements:

- A benchmarking approach based on debt yield data from third party data providers and benchmarks for term of debt and credit rating.
- A 10-year trailing average approach with an annual update.
- A 10-year transition into the adoption of the 10-year trailing average approach. For clarity, where we have commenced a transition in a previous determination, we will continue that transition.

In response to our draft decision the following issues were raised in stakeholder submissions:

- NT Power & Water Corporation submitted that it does not require a transitional arrangement and its return on debt for the 2019-24 regulatory period should reflect the full trailing average portfolio approach. We address this issue in section 10.1.
- A number of stakeholders submitted that BBB+ may not reflect an efficient benchmark credit rating due either to double-counting some firms in our benchmarking analysis, differences between gas and electricity service providers, or the impact of our return on equity decision on cash flow expectations and the interrelationships with credit ratings. We address this issue in section 10.2.
- The NSG submitted that our draft decision to estimate a return on debt for a BBB+ credit rating by a weighted average of BBB and A rated debt data is arbitrary. We address this issue in section 10.3.
- S&P Global provided further information on its third party debt data. We address this issue in section 10.4.
- AusNet Services submitted that the available window over which third party debt yields may be averaged to form a return on debt estimate (the averaging period) should be up to 12 months long, rather than 9 months as in our draft decision. We address this issue in section 10.5.

In reviewing our draft decision the Independent Panel also made the following recommendations regarding the return on debt:

- Further explain the reasons behind a 10 year benchmark term and the role of the analysis of service providers' actual debt issuances in selecting a benchmark term. We address this recommendation in section 10.6.

- Consider expanding the analysis of service providers' actual debt issuances to examine characteristics on the stock of debt. We address this recommendation in section 10.7.

Overall, we consider that the methodology for estimating the return on debt, the benchmark term, and the benchmark credit rating as set out in our draft decision remain appropriate and likely to contribute to achieving the legislative objectives to the greatest degree.

In this section we briefly set out our decisions on key aspects of the rate of return more comprehensively. Then, in the remainder of the section, we address issues raised by stakeholders and the independent panel in more detail.

Transition to the trailing average return on debt

These aspects of the methodology to estimating debt continue our current approach, which has been applied in all determinations made since 2013 and affirmed by the Australian Competition Tribunal.

In section 2.1 we discussed the requirements in the legislative objectives for our rate of return to promote efficiency. We outlined how the allowed rate of return will promote efficiency when it reflects market rates and provides for ex-ante efficient compensation given the risks of providing regulated services. We consider that a revenue neutral transition between the on-the-day approach and trailing average approach is necessary to provide for ex-ante efficient compensation and to achieve the legislative objectives.

The majority of stakeholders, both before and in response to our draft decision, supported a benchmarking, trailing-average portfolio approach with a transitional arrangement and which is calculated using third party debt data.⁹⁹³

Choice of third party data provider

Our decision is to source third party debt data from, in equal weight: Bloomberg, the RBA, and Thomson Reuters. In our view, a simple average of the curves:

⁹⁹³ Australian Pipelines and Gas Association, Submission to the Issues Paper, December 2017, p4 – 6 Energy Networks Australia, AER Rate of Return Guideline, December 2017, p16-17, p19-20; Ergon Energy and Energex, Issues paper – review of the rate of return guidelines, December 2017, p4-5; Major Energy Users, Review of the rate of return guidelines, December 2017, p10-11, 15; APA, APA submission responding to AER issues paper, December 2017, p8; Cheung Kong Infrastructure, Submission on rate of return issues paper, December 2017, p3, Energy Users Association of Australia, EUAA submission – AER Rate of Return Review Issues Paper, October 2017, p8; AusNet Services, Review of Rate of Return Guideline – Issues Paper, December 2017, p1; Network Shareholder Group, Submission on the RoRG review, May 2018, p.11, Consumer Reference Group, Submission to the AER RoRG review, May 2018, p.41. In its initial regulatory proposal for the 2019-24 regulatory period TasNetworks proposed an adjustment to its transitional arrangement. In response to our draft rate of return guideline TasNetworks submitted that it accepts our draft guideline position of continuing existing transitional arrangements. See: TasNetworks, *Re TasNetworks Response to Draft 2018 Rate of Return Guideline*, 14 September 2018, p. 2.

- Is intuitively reasonable;
- Gives equal weight to the strengths and weaknesses of the three curves, which is generally consistent with our evaluation of the curves – which is that while each has strengths and weaknesses none is clearly superior; and
- Mitigates against price shocks in the event that any one curve temporarily or permanently ceases to be published.

We have decided not to use a fourth available third party debt curve from S&P Global. The information provided by S&P Global after we published draft decision appears to indicate that S&P Global have addressed the concerns we outlined in our draft decision. However, we have had limited time to fully assess the new material provided by S&P Global. Stakeholders have also had limited time to consider the new material, and we have not had the benefit of testing views through consultation. We note that some stakeholders submitted concern with the use of a new data set without this testing through consultation, while all stakeholders appear comfortable with the draft decision to use data from Bloomberg, RBA, and Thomson Reuters.⁹⁹⁴

Benchmark term

Our final decision is to maintain a benchmark debt term of 10 years. This is consistent with the benchmark term of debt in the 2013 Guidelines and the 2009 statement of regulatory intent.⁹⁹⁵

Our key reasons for this view are that:

- We consider that a business will, within the constraints of the market for corporate bonds, aim to match the length of the debt term to the asset life in order to minimise refinancing risk. We note, however, that this is subject to consideration of the increased cost of debt associated with a longer term.
- Consideration of service providers' actual debt raising practices and relevant market circumstances over 2013–17 does not reveal clear conclusions:
 - Over the period for which we have collected actual debt data (2013-17) we have implemented a transition to the trailing average return on debt approach. This is was a material change to the return on debt approach, and we expect it would have impacted debt raising practices to some extent. Based on the data available to us, it is unclear whether or not the observed debt issuance patterns are temporary / cyclical or a transient adjustment in response to our transition to a trailing average approach.
 - A simple average estimate of terms at issuance within the sample of collected actual debt data suggests an average term of 7.4 years. However, we agree with the view expressed by service providers that a simple

⁹⁹⁴ See section 10.4.

⁹⁹⁵ AER, *Statement of WACC parameters*, May 2009, pp. 6-7; AER, *Rate of Return Guideline*, December 2013, p. 21.

average across instruments in the sample may understate the ‘true’ benchmark term of debt.⁹⁹⁶ Our conclusion based on this data is that the true benchmark term is at least 7 years.

We acknowledge that the issues above create difficulties in reaching a conclusion more precise than that the ‘true’ benchmark term will be greater than 7.4 years. In our view, retaining a 10 year estimate is appropriate in these circumstances because, having adopted a 10 year benchmark term consistently over several regulatory cycles, regulated networks seeking to minimise interest rate risk have an incentive to match debt issuance to this 10 year term.

Nonetheless, we consider empirical evidence to inform the benchmark term of debt is important. As the transition progresses, some of these complexities and uncertainties in the current data may resolve. Accordingly, we will continue to collect actual return on debt information for consideration in future rate of return reviews.

Benchmark credit rating

Our final decision is to adopt a benchmark credit rating of BBB+, consistent with or 2013 Guidelines and 2009 review of WACC parameters.⁹⁹⁷ We consider this is consistent with the available empirical evidence. In particular, we remain of the view that a BBB+ benchmark credit rating remains appropriate for both gas and electricity service providers.

We note that the service providers within the sample we analysed have generally maintained stable credit ratings over an extended period including the period affected by the GFC and maintained investment grade credit ratings (between BBB– and A–). The table below shows the historical median credit rating for Australian service providers from 2006 to 2017.

Table 24 Median credit ratings over time

Issuer	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Industry median	BBB/ BBB+	BBB/ BBB+	BBB+	BBB	BBB	BBB	BBB	BBB/ BBB+	BBB+	BBB+	BBB+	BBB+

Source: Bloomberg (S&P Global), AER analysis

Whilst the above table shows that the median credit rating has moved between BBB and BBB+, the four most recent years of data support a rating of BBB+. We consider that this recent concentration of ratings at BBB+ provides sufficient evidence that this is the appropriate benchmark credit rating.

⁹⁹⁶ ENA, *AER Debt issues paper: Analysis*, 22 June 2016; CEG, *Memorandum: ENA debt data*, June 2016.

⁹⁹⁷ AER, *Explanatory statement - Rate of Return Guideline*, December 2013, p. 126; AER, *Final Decision, Review of the WACC parameters*, May 2009, p.19

Implementation of the benchmark credit rating

Our view is that a weighting of two-thirds broad-BBB and one-third broad-A will best reflect a BBB+ benchmark. This is because, to the extent that credit ratings are an informative measure of credit risk, we expect:

- reliance on a broad-BBB curve is likely to overestimate the level of credit risk (and ultimately the required yields) of a BBB+ benchmark credit rating– because the benchmark credit rating (BBB+) is the highest rating band amongst the constituents, the inclusion of any of the lower rated bonds in the sample (BBB or BBB-) would, other things held constant, overestimate the required return on debt for the benchmark credit rating
- reliance on a broad-A curve only would underestimate the level of credit risk (and ultimately the required yields) for a BBB+ benchmark credit rating because all constituents (A-, A, A+) are higher rated than the BBB+ benchmark credit rating
- some combination of broad-BBB and broad-A curves should therefore provide the best fit to a BBB+ benchmark credit rating. As a conceptual expectation, our view is that a 2/3 broad-BBB: 1/3 broad A rating is most likely to match a BBB+ benchmark credit rating.

Secondly, our analysis of actual debt instruments raised by service providers compared to our current approach suggests that:

- When term and date of issuance are controlled, the use of broad-BBB curves has, over 2013–17, overestimated by approximately 29 basis points the spreads at which service providers have issued debt
- When term and date of issuance are controlled, a weighted average of 2/3 broad-BBB : 1/3-broad A curves has, over 2013–17, overestimated by approximately 9 basis points the spreads at which service providers have issued debt

We therefore conclude, that a 2/3 broad-BBB : 1/3 broad-A estimate is a better match for our benchmark credit rating of BBB+. This is supported conceptually and by our analysis of debt issuances over the past 5 years. Based on current market observations using a combination of broad A and BBB curves from Bloomberg, the RBA and Thomson Reuters will reduce our estimate of the benchmark return on debt by roughly 10 basis points compared to using a broad BBB curve only.⁹⁹⁸

Further detail on our return on debt estimation methodology is set out in our draft decision.

10.1 NT Power & Water Corporation's proposed immediate transition to the trailing average

⁹⁹⁸ Specifically, we have calculated this estimate over all business days in February 2018.

Our decision is to estimate the return on debt using the ten year trailing average portfolio approach. Our decision is also to include a ten-year transitional arrangement to transition from previous return on debt allowances calculated using the 'on-the-day' approach.

In its regulatory proposal for the 2019-24 period, NT Power & Water Corporation proposed a return on debt estimate based on a 10-year trailing average without any transition. NT Power & Water Corporation submitted that its current allowed rate of return is effectively already set as a 10-year trailing average and so an immediate adoption of the trailing average for its 2019-24 regulatory period would not result in a windfall gain or loss to consumers.⁹⁹⁹

10.1.1 Draft decision

In the draft decision we stated that a key feature of our transition to the trailing average is that, in each year during which we update the trailing average portfolio, we do so by adding an estimate of debt based on the prevailing cost of debt. It is this feature of our approach that provides for revenue neutrality and satisfies the NPV=0 principle.

We considered that NT Power & Water Corporation's proposed approach would be backward looking and incorporate past estimates of the cost of debt. We considered that selection of historical averaging period can introduce bias into outcomes. As a result, it is most likely that such an approach would lead to windfall gains or losses which would not be consistent with the legislative objectives.¹⁰⁰⁰

10.1.2 Independent Panel

The Independent Panel stated:¹⁰⁰¹

The AER observes that the reasons for the move to a 10-year trailing average and a 10-year transition have been discussed in detail and have been the subject of several judicial reviews. The Panel considers the AER has provided sound reasoning for the 10-year transition to the trailing average approach.

10.1.3 Stakeholder submissions

In response to our draft decision NT Power & Water Corporation submitted that:¹⁰⁰²

- NT Power & Water Corporation's 2019-24 regulatory period will be the first determination made by the AER for NT Power & Water Corporation. As such, the AER has not yet applied any approach, trailing average or on-the-day, for NT

⁹⁹⁹ NT Power & Water Corporation, Regulatory Proposal, March 2018, p.107

¹⁰⁰⁰ AER, Draft Rate of Return Guideline – explanatory statement, July 2018, p.335

¹⁰⁰¹ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, p. 47.

¹⁰⁰² NT Power & Water Corporation, Letter to AER on draft 2018 Rate of Return guidelines, September 2018, p.1

Power & Water Corporation and there is no ten-year transition to a trailing average that is currently underway.

- Current prices and revenue for NT Power & Water Corporation's 2014-19 regulatory period were set by a Ministerial direction, which is not determined by or linked to either a trailing average or on-the-day approach. As such, the approach used to set NT Power & Water Corporation's return on debt is currently undefined. The adoption of a trailing average approach in the AER's 2019-24 determination will be the setting of an approach but not a switching between approaches.
- NT Power & Water Corporation's effective return on debt allowance for the 2009-19 period is commensurate with a trailing average over that period. This effective return on debt allowance is the allowance set by the NT Utilities Commission for the 2009-14 regulatory period and a return on debt implied from the Ministerial direction affecting NT Power & Water Corporation's 2014-19 regulatory period. NT Power & Water submit that its effective return on debt allowance over this period was 6.36 per cent, compared to a trailing average of the same period of 6.37 per cent.

10.1.4 AER consideration

Our decision is to estimate the return on debt using a ten year trailing average portfolio approach. Under this approach the return on debt allowance for the forthcoming year is a simple average of the annual return on debt estimate for that year and the annual return on debt estimates for the nine previous years. The ten year trailing average approach was adopted in our 2013 Guidelines, but prior to those guidelines we had used the 'on-the-day' approach to estimating the return on debt.¹⁰⁰³ Under the 'on-the-day' approach the return on debt allowance for the entire regulatory period was estimated as the return on debt at the start of the regulatory period.¹⁰⁰⁴

As set out in the draft decision, we consider that a revenue neutral transition between the on-the-day approach and trailing average approach is necessary to achieve the legislative objectives. Without a revenue neutral transition a change in approach could increase the value of the assets used to provide regulated services and this would benefit the asset owners at the expense of consumers. Conversely, if such changes decreased the value of assets used to provide regulated services then this would cost asset owners but provide a short term financial benefit to consumers. As such, this methodological change may also have a negative impact on the confidence in the predictability of the regulatory regime.

We consider ex-ante efficient compensation (that is, the NPV=0 principle) can hold under either the on-the-day approach or the trailing average approach (if a transition is applied). As such, both approaches are capable of being approximately equivalent over the life of the assets (which will be multiple regulatory periods). As either the on-

¹⁰⁰³ AER, Final Decision, Review of the WACC parameters, May 2009, p.103

¹⁰⁰⁴ As estimated over a nominated averaging period.

the-day or trailing average approach would contribute to the achievement of the legislative objectives, a switch between regimes that is accompanied by a revenue neutral transition will also contribute to the achievement of the objectives.

We acknowledge that prices and revenue for NT Power & Water for the 2014-19 period were set by Ministerial direction, and that this direction does not set out a separate return on debt allowance. In the draft decision we considered that the Ministerial direction was relatively closer to the on-the-day approach than the trailing average approach since NT Power & Water Corporation's return on debt allowance has not been annually updated. However, we also acknowledge that the return on debt implied from the Ministerial direction may not align with market rates of return on debt at the start of the 2014-19 period – though this cannot be determined since the Ministerial direction does not identify a return on debt or any other component of overall revenue.¹⁰⁰⁵

In any case we consider that there will still be a switching between approaches to setting revenue allowances when we make a determination for NT Power & Water Corporation's 2019-24 regulatory period under the rate of return instrument. The trailing average portfolio approach set out in the instrument clearly differs from an approach adopted under the Ministerial direction.

NT Power & Water Corporation submit that while the return on debt allowances for its 2009-14 and 2014-19 regulatory periods may have been set under different approaches, the resulting values for the return on debt allowance for the 2009-19 period is commensurate with a trailing average over that period. However we note that:

- No specific return on debt allowance was set under the Ministerial direction applying to the 2014-19 period. NT Power & Water Corporation estimate an implied return on debt consistent with the direction. However, this implied return on debt estimate assumes that the entire difference in revenue between the Ministerial direction and the NT Utilities Commission's initial revenue determination is attributable to the return on debt.¹⁰⁰⁶ It is not clear why this assumption should hold.
- Even taking NT Power & Water Corporation's implied 2014-19 return on debt allowance, the overall return on debt allowance for the 2009-19 period is only commensurate with a ten-year trailing average at the end of that period. A ten-year trailing average at the start of the 2009-19 period (that is, 1 July 2009) is an average of the prevailing market rates over the previous ten years – 1999 to 2009. The trailing average then updates annually until the trailing average at the end of the 2009-19 period (that is, 30 June 2019) is an average of the prevailing market rates over 2009 to 2019.

¹⁰⁰⁵ NT Power & Water Corporation, *2019-24 Regulatory proposal – Attachment 01.01 – Return on debt transition*, 31 January 2018, p. 12.

¹⁰⁰⁶ NT Power & Water Corporation, *2019-24 Regulatory proposal – Attachment 12.21 – Return on debt transition*, 31 January 2018.

10.1.5 Conclusion

Our decision is to apply, or continue, a ten-year transitional arrangement when determining the allowed rate of return for any services that are not currently subject to a full trailing average portfolio return on debt as set in a prior AER determination.

10.2 Gas and electricity credit ratings

A credit rating is an evaluation of the credit risk of a prospective debtor. It reflects the relative risk involved in lending to the rated entity, their ability to pack back the debt and an implicit forecast of risk of default. The return on debt will likely vary for businesses with different credit ratings.

10.2.1 Draft decision

Our draft decision adopted a benchmark credit rating of BBB+ based on observed credit ratings of Australian energy network businesses from 2007 to 2018 as set out in Table 25 below.

Table 25 Credit ratings of Australian energy network businesses

Issuer	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
APT Pipelines Ltd	NR	NR	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
ATCO Gas Australia LP	NR	NR	NR	NR	BBB	BBB	A-	A-	A-	A-	BBB+	BBB+
DBNGP Trust	BBB	BBB	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB	BBB
DBNGP Finance Co P/L	BBB	BBB	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB	BBB
DUET Group	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	NR	NR	NR	NR	NR	NR
United Energy Distribution P/L	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	A-	A-
Energy Partnership (Gas) P/L	BBB	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB+	BBB+
Electra-Net P/L	BBB+	BBB+	BBB	BBB	BBB	BBB	BBB	BBB+	BBB+	BBB+	BBB+	BBB+
Australian Gas Networks Ltd	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB	BBB+	BBB+	BBB+	BBB+	BBB+
ETSA Utilities	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	NR
ETSA Utilities Finance P/L	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Powercor Australia LLC	A-	A-	A-	A-	A-	A-	BBB+	BBB+	NR	NR	NR	NR

SP AusNet Services	A	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	NR
AusNet Services	NR	NR	NR	NR	NR	NR	A-	A-	A-	A-	A-	A-	A-
AusNet Service Holdings P/L	A	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
AusNet Trans- mission Group P/L	A	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
SGSP (Australia) Assets Pty Ltd	NR	A-	A-	A-	A-	A-	BBB+	BBB+	BBB+	A-	A-	A-	A-
The CitiPower Trust	A-	A-	A-	A-	A-	A-	BBB+	BBB+	NR	NR	NR	NR	NR
Victoria Power Networks Pt/L	NR	NR	NR	NR	NR	NR	NR	NR	BBB+	BBB+	BBB+	BBB+	BBB+
Victoria Power Networks (Finance) P/L	NR	NR	NR	NR	NR	NR	NR	NR	BBB+	A-	A-	A-	A-
NSW Electricity Networks Finance P/ L	NR	NR	NR	NR	NR	NR	NR	NR	NR	BBB	BBB	BBB	BBB
Ausgrid Finance P/ L	NR	NR	NR	NR	NR	NR	NR	NR	NR	BBB+	BBB+	BBB	BBB
Network Finance Company P/L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	BBB+	BBB+	BBB+
Industry median (yearly)	BBB +/ A-	A-	BBB +	BBB +	BBB	BBB	BBB +	BBB +	BBB +	BBB +	BBB +	BBB +	BBB +

Source: Bloomberg, Standard & Poor's, Moody's

10.2.2 Independent panel review

The Panel submitted that our benchmark credit rating of BBB+ has clear empirical support and that the approach is clear and the reasoning for the decision is sound.¹⁰⁰⁷

10.2.3 Stakeholder submissions

¹⁰⁰⁷ Independent Panel, *Review of the Australian Energy Regulator's draft rate of return guidelines*, 7 September 2018, p. 45.

All stakeholders that submitted on the matter appeared to support a benchmarking approach to estimating credit rating. Submissions on the benchmark credit rating focussed on the exercise of judgment and choice of a benchmark based on the available evidence.

The Australian Energy Council submitted that benchmarking analysis supports our draft decision credit rating of BBB+, and stated:¹⁰⁰⁸

On a purely quantitative basis, for example, Moody's would rate a 60% gearing level as at the boundary of A and BBB. Moreover, its gearing ratio is net debt: RAB, not debt: Enterprise value...[energy network] companies have frequently maintained BBB+ credit rating or better with a debt/RAB ratio of 70% or more (in some cases 80%). This supports a view that the ratings agencies' qualitative assessment of the regulatory regime under which the networks operate tends to result in a higher credit rating than that implied purely by the leverage and coverage metrics.

The CRG and Simply Energy submitted that in determining a benchmark credit rating we should have regard the degree of unregulated activities of the firms in our benchmarking analysis. The CRG submitted that:¹⁰⁰⁹

What is also overlooked in the Draft Decision is that the proportion of regulated revenue a firm receives has a major bearing on credit rating as this determines the certainty of cash flow needed to demonstrate an ability to pay loan costs as and when they fall due. So the higher the proportion of regulated revenue, it would be expected there would be a corresponding higher credit rating

The CRG submitted that a consideration of the degree of unregulated activities of benchmark firms would support a benchmark credit rating of A for an entity with a benchmark gearing ratio of 60 per cent.¹⁰¹⁰

The Australian Pipelines and Gas Association submitted that:¹⁰¹¹

There is broad acceptance among our members of the BBB+ credit rating and the weighting of the A and BBB bands, noting that gas pipelines have a lower credit rating than the AER's own data suggests.

However, the Australian Pipelines and Gas Association did not provide further details on the evidence that gas business credit ratings are lower than that shown in the draft decision benchmarking analysis.

¹⁰⁰⁸ AEC, Submission on AER draft guidelines, September 2018, pp.7-8

¹⁰⁰⁹ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. 29-30.

¹⁰¹⁰ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, September 2018, p. xv

¹⁰¹¹ APGA, Submission on AER draft guidelines, September 2018, p.33

APA and ENA submitted that our draft decision benchmarking analysis includes some duplication of group company ratings (eg AusNet x 4). Regardless, ENA submits that benchmarking analysis without duplicates supports a rating of BBB to BBB+. ¹⁰¹²

APA submitted that an appropriate benchmark credit rating is BBB. APA submitted that our draft decision benchmarking analysis showed elevated credit ratings for some businesses to reflect the financial strength and support of parent entities. APA submitted that parent support typically results in a one notch upgrade and that after adjusting to remove parent support the average credit rating for Australian energy network businesses from 2013 to 2018 was BBB. ¹⁰¹³

APA also submitted that the combination of 60 per cent gearing, BBB+ credit rating, and 3.6 per cent equity risk premium from our draft decision would not be sustainable for its business, stating: ¹⁰¹⁴

APA cannot aspire to the benchmark BBB+ credit rating, and to the lower cost of debt consistent with that credit rating, without lowering its gearing well below the 60% benchmark of the Draft Guidelines...A benchmark which cannot be attained and copied is no stimulus to efficiency

The Network Shareholder Group, APA, Australian Pipeline and Gas Association, and Joint Energy Businesses submitted that a benchmark BBB+ credit rating needs to be re-examined in light of consistency with our draft decision on gearing and the return on equity. These stakeholders submitted that the cash flows resulting from the draft decision would place further pressure on service providers' credit ratings and likely result in a downgrade to BBB if implemented. ¹⁰¹⁵ This issue of consistency of parameters and their overall cash flow implications is addressed in the financeability section in section 12.3.

10.2.4 AER consideration

We are not aware of any re-ratings since our draft decision and consider that Table 25 remains the appropriate benchmarking data set.

We acknowledge that there are multiple entities from the same corporate group in Table 25. While many entities within the same corporate group have identical credit ratings, Victoria Power Networks Pty Ltd has a BBB+ rating while Victoria Power Networks (Finance) Pty Ltd has an A- rating. We have decided to show each entity for transparency. We do not necessarily place equal weight on each entity in the table.

¹⁰¹² ENA, Submission to the draft rate of return guideline, September 2018, p. 52

¹⁰¹³ APA, Submission on AER draft guidelines, September 2018, p.5

¹⁰¹⁴ APA, Submission on AER draft guidelines, September 2018, p.3

¹⁰¹⁵ APA, Submission on AER draft guidelines, September 2018; NSG, Submission on AER draft guidelines, September 2018; Australian Pipeline and Gas Association; Joint Energy Business, Submission on AER draft guidelines, September 2018

Similarly, we have had regard to the degree of unregulated activities and impact of parent ownership when exercising our judgment on the benchmark credit rating from Table 25. As discussed further in section 2.4, we consider that regulation is likely to affect the degree of systematic risk involved in the provision of regulated energy network services and may consequently impact credit ratings. However, the businesses in Table 25 have varying degrees of unregulated activities and credit ratings ranging from BBB- to A. It is not clear that a lesser degree of unregulated activities corresponds with a credit rating greater than BBB+.

APA submitted that parent support typically results in a one notch upgrade.¹⁰¹⁶ While credit rating agencies may take parent support into account it is not clear that it necessarily results in a one notch upgrade in any deterministic way. We note that many of the businesses in Table 25 are part of a corporate group or have a parent entity. However, APA's submission refers only to entities associated with ATCO Gas, SGSP (Australia Assets), Cheung Kong Infrastructure, AusNet Services, and Network Finance Company Pty Ltd.

It is not clear that the financial strength and degree of parent support from these entities is consistent across the businesses in Table 25. There is a mix of domestic and international parent entities, with varying degrees of global diversification. There is also a mix of parent ownership structures, ranging from outright ownership by a single parent entity, consortiums and joint ventures, long-term lease arrangements, and listed entities with large individual shareholders. For example, Cheung Kong Infrastructure has outright ownership of Australia Gas Networks.¹⁰¹⁷ SGSP (Australia Assets) has outright ownership of Jemena, but SGSP (Australia Assets) is itself a joint venture between Singapore Power International and State Grid Corporation of China.¹⁰¹⁸ However, AusNet Services' is listed on the ASX with its largest shareholder being Singapore Power International with a minority stake of about 30 per cent.¹⁰¹⁹ Endeavour Energy (Network Finance Company Pty Ltd) is controlled by a four-party consortium of domestic and international entities that has a 50.4 per cent stake in a 99-year lease from the NSW Government (who retains a 49.6 per cent stake in the lease).¹⁰²⁰

Further, there is a potential bias in adjusting the credit ratings of only those businesses that appear to have relatively greater financial strength. On these grounds, while we have regard to potential effects of parent support on credit ratings, we do not consider that adjustments to the ratings in Table 25 are appropriate.

We have also had regard to credit ratings for gas businesses, and note that:

¹⁰¹⁶ APA, Submission on AER draft guidelines, September 2018, p.3

¹⁰¹⁷ <https://www.australiangasnetworks.com.au/our-business/about-us/who-we-are>

¹⁰¹⁸ <https://jemena.com.au/about/about-us/who-we-are>

¹⁰¹⁹ Available at: <https://www.ausnetservices.com.au/Misc-Pages/Links/Investor-Centre/Shares-and-investors>

¹⁰²⁰ <https://www.afr.com/business/energy/electricity/nsw-sells-endeavour-energy-stake-to-macquarie-grouped-consortium-20170511-gw25t7>

- Dampier-Bunbury Pipeline and APT Pipelines Ltd (financing vehicle for APA) are rated as BBB.
- Australian Gas Networks, ATCO Gas and Energy Partnership (Gas) Ltd (finance vehicle for Multinet) are rated as BBB+.
- AusNet Services and SGSP (Australia Assets) (financing vehicle for Jemena) are rated as A-.

We note that these businesses have varying degrees of unregulated activities, making it difficult to isolate this impact and identify if gas businesses are likely to have a different credit rating from electricity businesses. APA has a significant degree of revenue from unregulated services, while AGN and AusNet Services have relatively less unregulated revenue.¹⁰²¹ AusNet Services and SGSP (Australia Assets) own both electricity and gas assets, making it less clear the extent to which their credit ratings reflect the risks of their gas or electricity businesses.

Overall, having regard to these factors and the credit ratings in Table 25, we consider that an appropriate benchmark credit rating for both gas and electricity service providers is BBB+.

10.2.5 Conclusion

Our final decision is to adopt a benchmark credit rating of BBB+.

10.3 Credit rating implementation

Our benchmark credit rating is BBB+, however none of the third party data providers estimate a BBB+ yield curve. Available third party yield curves are limited to broad BBB (reflects data of bonds rated BBB-, BBB, and BBB+) and broad A (reflects data of bonds rated as A-, A, and A+).

10.3.1 Draft decision

In our draft decision we adopted a weighted average of the broad-BBB and broad-A curves offered by Bloomberg, RBA and Thomson Reuters, with two-thirds weight on the broad-BBB curve estimates from the three data providers and one-third weight on broad-A curve estimates. We considered that, all else equal, use of the broad-BBB curve estimates alone would over-estimate the return on debt for a BBB+ benchmark and the use of broad-A curve estimates alone would under-estimate.

Our view was that a weighting of two-thirds broad-BBB and one-third broad-A would as a conceptual expectation most likely reflect a BBB+ benchmark. We also considered that our analysis of actual debt instruments raised by service providers supported the view that the weighted average of broad-BBB and broad-A curve estimates would

¹⁰²¹ APA, 2018 Annual Report, p. 22; AusNet Services, 2018 Annual Report, p. 21.

result in a better estimate of the efficient return on debt that using either broad-BBB or broad-A alone, finding that:¹⁰²²

- When term and date of issuance are controlled, the use of broad-BBB curves has, over 2013-17, overestimated by approximately 29 basis points the spreads¹⁰²³ at which service providers have issued debt, and
- When term and date of issuance are controlled, a weighted average of two-thirds broad-BBB and one-third broad-A has, over 2013-17, overestimated by approximately 9 basis points the spreads at which service providers have issued debt.

10.3.2 Independent panel review

The Panel found that given the three-notch difference between 'BBB' flat and 'A' flat, a two-thirds and one-third weight respectively is appropriate. The Panel found the approach to be clear and the reasoning for the decision sound.¹⁰²⁴

10.3.3 Stakeholder submissions

Energy Australia submitted that they agree that a combination of broad-BBB and broad-A curves is most likely to match the benchmark credit rating of BBB+.¹⁰²⁵ The Australian Energy Council submitted that our decisions to use one-third weighting of the A-rated data series and a two-thirds weighting of the BBB data series appears to be a pragmatic considering that there is no available third-party data set for BBB+.¹⁰²⁶ Energy Consumers Australia submitted that the move to a combination of BBB and A series is an appropriate move to reflect the (unchanged) benchmark credit rating of BBB+.¹⁰²⁷

Energy Networks Australia submitted that a two-thirds BBB and one third-A weighted average was capable of acceptance, but stated it had concerns over the analysis of service providers' actual debt issuances that was used to support the weighted average.¹⁰²⁸ We set out these concerns in further detail in section 10.7.

The Network Shareholder Group submitted that we had not demonstrated that a weighted average of broad-BBB and broad-A results in a better estimate than solely using broad BBB. The Network Shareholder Group submitted that our assessment of service providers' actual cost of debt being lower than estimated debt yields is not sufficiently robust.¹⁰²⁹

¹⁰²² AER, Rate of return review draft decision – explanatory statement, July 2018, p. 60.

¹⁰²³ Spread refers to the difference between the debt yield and the fixed-to-floating swap rate.

¹⁰²⁴ Independent Panel, Review of the AER's Rate of Return Draft Guidelines, September 2018, p.44

¹⁰²⁵ ENA, Submission on AER draft guidelines, September 2018, p.2

¹⁰²⁶ AEC, Submission on AER draft guidelines, September 2018, p.11

¹⁰²⁷ ECA, Submission on AER draft guidelines, September 2018, p.13

¹⁰²⁸ ENA, Submission on AER draft guidelines, September 2018, p.52

¹⁰²⁹ NSG, Submission on AER draft guidelines, September 2018, p.17

10.3.4 AER consideration

We consider that credit ratings, while imperfect, provide a reasonable proxy for the cost of debt. It then follows that the information in credit rating notches is likely reflected in the rates at which investors lend to entities with different credit ratings (such as BBB compared to BBB+). In this case, use of broad-BBB data only would underestimate the return on debt for a BBB+ rated entity.

We note that the weighted average of broad-BBB and broad-A data was supported by our analysis of the spreads at which service providers' have issued debt over the period 2013-17.

Since our draft decision, we have revised our estimate of the matched term spread differences under a BBB-only estimate from 29 basis points to 33 basis points. This results from correction of an error in our initial modelling for aggregating the BBB-data only. Our matched term spread estimate under our draft decision approach (2/3 broad-BBB: 1/3 broad-A) was not affected by the same error. While this implies slightly greater outperformance under our previous approach, it does not change our conclusions. In particular, the matched term spread difference using our final decision approach (2/3 broad-BBB: 1/3 broad-A) remains at 9 basis points.

We note that the Network Shareholder Group did not provide further explanation on why this analysis is not sufficiently robust, but Energy Networks Australia did set out its concerns with the following aspects of our analysis of services providers' actual debt issuances. We address these concerns, and further comments from the Independent Panel, in section 10.7. Overall, we consider that our analysis of service providers' actual debt issuances is sufficiently robust to support the use of a weighted average of broad-BBB and broad-A curves from third party data providers as an estimate of a return on debt for a BBB+ rated entity.

10.3.5 Conclusion

Our final decision is to estimate the return on debt for a BBB+ credit rating by calculating a weighted average of the broad-BBB and broad-A rated debt yields from third party data providers, with two-thirds weight on broad-BBB and one-third weight on broad-A.

10.4 Third party debt data providers

The yield curve data sourced from the third party providers is used to estimate the return on debt. In the 2013 Guidelines we relied on yield curve data from two independent data providers (RBA and Bloomberg)¹⁰³⁰ and subsequently identified two potential additional providers (Thomson Reuters and S&P Global).¹⁰³¹

¹⁰³⁰ AER, Draft Rate of Return Guideline – explanatory statement, July 2018, p.352

¹⁰³¹ AER, Draft Rate of Return Guideline – explanatory statement, July 2018, p.352

10.4.1 Draft decision

Our draft decision was to estimate the return on debt from data sourced from the RBA, Bloomberg, and Thomson Reuters. We decided that we would not at this time source data from a fourth available data provider, S&P Global.¹⁰³²

Our decision on third party data sources was based on consideration of data providers' methodologies for constructing their debt yield curves. We considered that S&P Global's Australian-dollar-denominated curves produced outcomes which are materially different to the other curve providers and noted that:¹⁰³³

- Over the data series we have available, the S&P Global broad-A and broad-BBB curves produce very similar results where we would expect a more material difference. In contrast, the BVAL, RBA and Thomson Reuters curves as well as S&P Global's US-dollar-denominated curves exhibit a more material difference.
- For the majority of the period since December 2013, the S&P Global Australian dollar-denominated broad-BBB yield curve produce yields estimates below the 'A' rated curves from the other curve providers.

We recognised that there may be valid drivers of the differences between curve estimates. We considered that disaggregation of the drivers of these differences is complex due to the proprietary nature of curve estimation and we were not able to reconcile the differences at that point time.

10.4.2 Independent panel review

The Panel considers that the AER has assessed the relevant data on market yields and interpreted those data accurately. Where judgement is required regarding market yields, the AER has explained its approach and its rationale clearly.¹⁰³⁴

10.4.3 S&P Global submission

Since the draft decision was published S&P Global submitted revised debt yield data and a submission seeking reconsideration of its data. S&P Global stated:¹⁰³⁵

The AER's Draft Determination highlighted some anomalies in S&P Global Market Intelligence's bond curves. After a formal internal review, we identified that it would be necessary to better capture the active portion of the Australian bond market. We therefore conducted an analysis of other bond market pricing providers, and following due process, have identified a new third-party source of bond pricing data, and verified the integrity of the data.

¹⁰³² AER, Draft Rate of Return Guideline – explanatory statement, July 2018, pp. 352-353

¹⁰³³ AER, Draft Rate of Return Guideline – explanatory statement, July 2018, pp. 356-357

¹⁰³⁴ Independent Panel, Review of the AER's Rate of Return Draft Guidelines, September 2018, p.44

¹⁰³⁵ S&P Global, S&P Global Market Intelligence's submission to the Australian Energy Regulator, August 2018, p. 1

Other stakeholders' submissions did not raise any concerns with our draft decision approach to source data from RBA, Bloomberg and Thomson Reuters but did however have concerns about using the S&P Global curve at this time.

Energy Networks Australia submitted that the S&P Global curve appears to produce materially different estimates of the return on debt than either the RBA or Bloomberg curves, which are very consistent with one another. Energy Networks Australia submitted that the significant divergence in outcomes between the S&P Global curve and the Bloomberg and RBA curves alone provided grounds for cautious treatment of the S&P Global curve.¹⁰³⁶

APGA & AusNet Services submitted that they had concerns about the role of S&P Global curve due to insufficient information available to engage meaningfully.¹⁰³⁷ AusNet Services submitted that stakeholders have only had 3-4 weeks to consider the information presented by S&P Global in responding to the draft decision, and that they have not had the opportunity to consider our view or the Independent Panel's views of this information.¹⁰³⁸

10.4.4 AER consideration

We acknowledge the efforts that were made by S&P Global to investigate the behaviour of S&P Global Market Intelligence's bond curves and the appreciate the access given to us to understand the curves through the S&P Capital IQ platform.

As noted in our draft decision, based on evaluation of available information on the curve methodologies we hold the view that all four curves have strengths and weaknesses and none is clearly superior with respect to either the bond selection criteria or curve fitting methodology. Overall, there is a substantial overlap between the curves in terms of bond selection criteria, though each curve has distinctive characteristics. In our view none of the differences are clearly 'right' or 'wrong'. We continue to hold this view about the curve methodologies of the four third party data providers.

Our draft decision to not use the S&P Global curves was based on our concerns about the curve outcomes from the S&P Global's Australian-dollar-denominated curves. The information provided by S&P Global after we published draft decision appears to indicate that S&P Global have addressed these concerns.

However, we have had limited time to fully assess the new material provided by S&P Global. Stakeholders have also had limited time to consider the new material, and we have not had the benefit of testing views through consultation and review by the Independent Panel. We note that some stakeholders submitted concern with the use of

¹⁰³⁶ ENA, Submission to the draft rate of return guideline, September 2018, p.53

¹⁰³⁷ AST, Submission to the draft rate of return guideline, September 2018, p.3; APGA, Submission to the draft rate of return guideline, September 2018, p.3

¹⁰³⁸ AST, Submission to the draft rate of return guideline, September 2018, p.4

a new data set without this testing through consultation, while all stakeholders appear comfortable with the draft decision to use data from Bloomberg, RBA, and Thomson Reuters.

We also consider that a reliable estimate of the return on debt – with sufficient tolerances for risks of data unavailability – can be obtained from the three data providers of the RBA, Bloomberg, and Thomson Reuters.

Given these considerations, we are of the view that an instrument that estimates the return on debt using data from Bloomberg, RBA, and Thomson Reuters will promote achievement of the legislative objectives.

We are open to reconsidering the use of the S&P Global curve, or any other third party data providers, in future reviews.

10.4.5 Conclusion

Our final decision is to estimate the return on debt from data sourced from the RBA, Bloomberg, and Thomson Reuters.

10.5 Return on debt averaging periods

To mitigate the 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 the determination. In response to our draft decision¹⁰³⁹ AusNet Services and Energy Networks Australia proposed modifications to the length of window of time in which a return on debt averaging period may fall.

10.5.1 Draft decision

Under the trailing average portfolio approach to estimating the return on debt, the estimated portfolio return on debt consists of an average of ten annual return on debt estimates, which is then updated annually. An averaging period is then required to estimate each annual return on debt estimate in the portfolio.

In the draft decision we considered that there should be a 12 month window in which a service provider could nominate an averaging period for an annual return on debt estimate. We considered that this approach would:¹⁰⁴⁰

- avoid service providers being forced to raise debt in some months of the year during which some participants choose to stay out of the market, and

¹⁰³⁹ AER, Rate of return guidelines draft decision explanatory statement, 10 July 2018, p.370-1

¹⁰⁴⁰ AER, Rate of return review draft decision – explanatory statement, July 2018, p. 370.

- allow service providers which raise debt as part of a corporate group to select averaging periods which overlap.

We also considered that return on debt averaging periods must end no later than 3 months before the commencement of the relevant regulatory year, to allow sufficient time for us to calculate the annual return on debt estimate, the updated trailing average portfolio estimate, and the updated X-factors and to communicate these figures to the service provider.¹⁰⁴¹

In the draft rate of return guidelines clause 18 stated that:

18. A return on debt averaging period nominated in accordance with clause 17 must:
 - (a) finish no earlier than 12 months prior to the commencement of a regulatory year
 - (b) finish no later than 3 months prior to the commencement of a regulatory year
 - (c) be observed over a period of 10 or more consecutive business days, up to a maximum of 12 months

10.5.2 Independent panel review

The independent panel did not raise concerns about the methodology in the draft decision for the determination of return on debt averaging periods.

10.5.3 Stakeholder submissions

Energy Networks Australia submitted that it agrees with the spirit of the proposal in the draft instrument that service providers should be able to nominate a return on debt averaging period of 10 days to 12 months in length, and which ends between 3 and 12 months prior to the start of the relevant regulatory year. However, the wording in the draft instrument may bring some unintended consequences, so ENA has proposed a wording change. ENA suggests rewording clause 18 (a) from the draft instrument to read start no earlier than 15 months prior to the commencement of a regulatory year.¹⁰⁴²

AusNet services submitted that the first averaging period selection criteria contained in the draft rate of return instrument should be changed to avoid restricting the periods during which service providers can raise debt that will be matched to their regulatory allowance. Therefore, AusNet Services submitted that the current criteria which is to finish no earlier than 12 months prior to the commencement of a regulatory year,

¹⁰⁴¹ AER, Rate of return review draft decision – explanatory statement, July 2018, p. 370.

¹⁰⁴² ENA, Submission to the draft rate of return guideline, September 2018, p. 47

should be changed to read commences no earlier than 15 months prior to the commencement of a regulatory year.¹⁰⁴³

10.5.4 AER consideration

We consider there are two changes necessary to the averaging period criteria:

- A change to correct for the interaction of clauses 18(a), 18(b), and 18(c)
- A change to allow more time to estimate the return on debt prior to its implementation

Interaction of clauses 18(a), 18(b), and 18(c)

In the draft decision we stated that service providers should be able to nominate an averaging period that:

- is between 10 business days and 12 months in length, and
- falls anywhere within a 12 month window

Clause 18(c) outlines the averaging period length between 10 days and 12 months. Clauses 18(a) and (b) reflect the position set out in the draft decision that service providers have a 12 month window in which to nominate a return on debt averaging period.

The combination of clauses 18(a) and 18(b) provide limits on the end date for averaging periods and provides a 9 month window in which the averaging period must end. There are no limits on the start date – an averaging period may start on any date before this 9 month window so long as it ends within the 9 month window (and so long as the period is no longer than 12 months in accordance with clause 18(c)). Therefore, service providers are only provided a 12 month window over which an averaging period may fall if that averaging period is long enough to end within the last 9 months of the 12 month window.

The draft instrument may therefore not facilitate both a 12 month window and a minimum 10 business day length. For example:

- For a regulatory year commencing on 1 January 2019, the averaging period must end no earlier than 1 January 2018.
- A period of 10 consecutive business days ending on 1 January 2018 is the period 15 December 2017 to 1 January 2018.
- A service provider may nominate an averaging period that starts on 14 December 2017, but the minimum length of the period is 11 business days instead of the minimum 10 days indicated in the draft decision, as the period must end no earlier than 1 January 2018.

¹⁰⁴³ AST, Submission to the draft rate of return guideline, September 2018, p. 4

- A service provider may nominate an averaging period that starts on 13 December 2017, but the minimum length of the period will be 12 business days.
- A service provider may nominate an averaging period that starts on 12 December 2017, but the minimum length of the period will be 13 business days.
- And so on.

To provide service providers with both a 12 month window in which an averaging period may fall and a minimum averaging period length of 10 consecutive business days, we have amended the relevant clauses of the rate of return instrument.

Time taken to estimate the averaging period—Change to 18(b)

We have also amended the averaging period clauses of the rate of return instrument to allow sufficient time for estimating the return on debt. We require a period of time after the end of an averaging period and before the start of a regulatory year to calculate the updated return on debt and communicate the results to service providers. Service providers then need an amount of time to consider these results and incorporate them into their annual pricing for that regulatory year.

In the draft decision we stated that we require 3 months for this process. However, the combination of the following two practical factors requires this timing to be adjusted to 4 months:

- the need to interpolate between monthly RBA data points, which involves taking the next monthly data point after the end of the averaging period, and
- the timing of RBA data publication, which is typically between 5 to 10 days after the end of each month.

The RBA data used in our return on debt estimation is monthly data falling on the last day of each month. To estimate the return on debt over a nominated averaging period we need to interpolate between the previous month-end RBA data point and the subsequent month-end RBA data point.

For example:

- Take a regulatory year commencing on 1 January 2019.
- Take an averaging period of the minimum ten business days from 3 September 2018 to 14 September 2018.
- To estimate the RBA debt yield over the averaging period we need to interpolate between the RBA data for 31 August 2018 and 30 September 2018.
- The RBA data point for 30 September 2018 is published on 5 October 2018.
- 3 months before the commencement of the regulatory year is 1 October 2018.

To ensure that at least three months is provided between the availability of data and the commencement of the regulatory year, we have amended the rate of return instrument to state that averaging periods must end no later than 4 months before the commencement of the regulatory year.

10.5.5 Conclusion

To address these issues we have amended the relevant clauses of the rate of return instrument to provide that a return on debt averaging period must:

- start no earlier than 16 months prior to the commencement of a regulatory year
- finish no later than 4 months prior to the commencement of a regulatory year

10.6 Benchmark Term

We need to specify the benchmark debt term for a debt portfolio in order to estimate the allowed return on debt for a service provider.

10.6.1 Draft decision

Our draft decision was to maintain the current benchmark debt term of 10 years. In our issues paper we proposed that we would not conduct an extensive review of our approach to setting the benchmark term but instead update the empirical elements of our current consideration of the benchmark term.¹⁰⁴⁴

10.6.2 Independent panel review

The independent panel made the following recommendations about the benchmark term of debt:¹⁰⁴⁵

- Test what assumptions would be required to reconcile the Chairmont data with an average 10-year term at issuance.
- Explain the reasons for adopting a 10-year benchmark for the average term of debt at issuance, rather than relying on the judicial reviews, which did not consider the choice between a 10-year and a shorter term.

10.6.3 Stakeholder submissions

ENA submitted that the empirical evidence supported the continued use of a 10-year term. It also highlighted that a change of commitment of a 10 year term would affect the current debt management strategy for many networks and suggested another method of averaging.¹⁰⁴⁶

Energy Australia submitted that it noted the independent Panel's view that we have not provided sufficient justification for setting the benchmark term at 10 years and agree that, if retained, further substantiation should be provided.¹⁰⁴⁷

¹⁰⁴⁴ AER, Draft Rate of Return Guideline – explanatory statement, July 2018, pp. 345 - 352

¹⁰⁴⁵ Independent Panel, Review of the AER's rate of return guideline, Sep 2018, p.47.

¹⁰⁴⁶ ENA, Submission to the draft rate of return guideline, September 2018, p. 54

¹⁰⁴⁷ Energy Australia, Submission to the draft rate of return guideline, September 2018, p.3

ECA submitted that there is little dispute about the debt approach and a 10-year debt tenor has been chosen even though networks mostly have shorter term debt.¹⁰⁴⁸

10.6.4 AER consideration

Having regard to these submissions and the evidence available to us, we consider the benchmark 10 year term remains appropriate.

Our key reasons for this view are that:

- Conceptually, we expect service providers would seek to issue long term debt where possible to match the lives of their assets. In our view, this continues to support use of a 10 year benchmark term.
- Consideration of service providers' actual debt raising practices and relevant market circumstances over 2013–17 does not reveal clear conclusions. We consider the strength of conclusions we are able to draw about benchmark term in particular would be improved by the development of a consistent and longer time series of service providers' actual debt information.
- Over the period for which we have collected actual debt data (2013-17) we have implemented a transition to the trailing average return on debt approach. This was a material change to the return on debt approach, and we expect it would have impacted debt raising practices to some extent. Based on the data available to us, it is unclear whether the observed debt issuance patterns are temporary / cyclical or a transient adjustment in response to our transition to a trailing average approach.
- A simple average estimate of terms at issuance within the sample of collected actual debt data suggests an average term of 7.4 years. However, we agree with the view expressed by service providers that a simple average across instruments in the sample may understate the 'true' observed term of debt over 2013–17.¹⁰⁴⁹

We acknowledge that the issues above create difficulties in reaching a conclusion more precise than that the 'true' benchmark term will be greater than 7.4 years. In our view, retaining a 10 year estimate is appropriate in these circumstances because, having adopted a 10 year benchmark term consistently over several regulatory cycles, regulated networks seeking to minimise interest rate risk have an incentive to match debt issuance to this 10 year term.

We sought where possible prior to the draft decision to test the impact of these characteristics in explaining the difference between the simple average of terms from bonds in the EICSI sample (7.4 years) and our 10 year benchmark. In particular, we

¹⁰⁴⁸ ECA, Submission to the draft rate of return guideline, September 2018, p.13

¹⁰⁴⁹ AER, Rate of return review draft decision – explanatory statement, July 2018, pp. 379-382.

conducted discussions with individual networks to ask questions about debt strategies and constraints specific to their responses.¹⁰⁵⁰

We consider that ongoing collection of actual cost of debt information will allow us to develop a longer-term EICSI value-weighted portfolio which would avoid the tendency of a simple average estimate to understate the benchmark return on debt. Collection of a consistent time-series of actual debt data should allow us to form conclusions about the benchmark term which are not materially impacted by particular market circumstances.

10.6.5 Conclusion

Our final decision is to maintain the current benchmark debt term of 10 years.

10.7 Service providers' actual debt information

We engaged Chairmont Group (Chairmont) to assist us in obtaining and analysing actual debt data from a total of 11 privately owned service providers, for comparison to the broader corporate debt market. We requested all debt instruments and financial hedging instruments issued between 1 January 2013 and 31 December 2017 as well as the issuer's debt portfolio outstanding as at 1 January 2013. Chairmont developed this data into an energy infrastructure credit spread index (EICSI) and provided us with:

- a report setting out its methodology, reasons for that methodology and high level conclusions.¹⁰⁵¹
- the data included in the EICSI series on which we could undertake further analysis.

We have relied on this analysis as a 'sense check' on our benchmark characteristics and how we implement them.

10.7.1 Draft decision

As set out in section 10.3, we had regard in our draft decision to service providers' actual debt information in reaching our view on implementation of the benchmark credit rating.

10.7.2 Independent panel review

The Independent Panel noted our intention to continue collecting actual cost of debt information and recommended:¹⁰⁵²

- expanding the scope to include characteristics on the stock of debt, as well as recent issuances

¹⁰⁵⁰ These discussions were held individually due to the commercially sensitive nature of the discussions.

¹⁰⁵¹ Chairmont, Aggregation of return on debt data, April 2018

¹⁰⁵² Independent Panel, Review of the Australian Energy Regulator's draft rate of return guidelines, 7 September 2018, p. VII.

- making more of the Chairmont detail available in the Explanatory Statement for the final decision, while respecting the commercially sensitive nature of the source data.

10.7.3 Stakeholder submissions

Energy Networks Australia submitted that a two-thirds BBB and one third-A weighted average was capable of acceptance, but stated it had concerns over the analysis of service providers' actual debt issuances that was used to support the weighted average.¹⁰⁵³ Energy Networks Australia submitted that:

- The selection of bonds within the sample used to construct the EICSI should be selected in a consistent way, and that if short-term bonds are to be included then callable and subordinated debt should not be excluded as issuance of the latter facilitates the issuance of the former.¹⁰⁵⁴
- The difference in spreads at which service providers have issued debt compared to the spreads from third party BBB curves is less pronounced after having regard to outliers in the RBA data (9 short term bonds issued around the beginning of 2016), which account for around 25% of the estimated 29 basis points outperformance over 2013-17.¹⁰⁵⁵
- Thomson Reuters curves should be included to match our draft decision method for estimating the return on debt.¹⁰⁵⁶
- We should seek full and consistent data on fees. This should include all debt transaction costs (including those associated with hedging instruments and overhead costs at the portfolio level - such as those associated with maintaining a credit rating) and debt prefunding cost, which is on an instrument by instrument basis and not captured in the analysis. Energy Networks Australia submitted that these fees should be considered in our debt analysis as they are not fully compensated through expenditure allowances for capital raising costs or timing assumptions in the PTRM.¹⁰⁵⁷

The Network Shareholder Group submitted that we had not demonstrated that a weighted average of broad-BBB and broad-A results in a better estimate than solely using broad BBB. The Network Shareholder Group submitted that our assessment of service providers' actual cost of debt being lower than estimated debt yields is not sufficiently robust.¹⁰⁵⁸

10.7.4 AER consideration

¹⁰⁵³ ENA, Submission to the draft rate of return guideline, September 2018, pp. 45–46

¹⁰⁵⁴ ENA, Submission to the draft rate of return guideline, September 2018, p. 49

¹⁰⁵⁵ ENA, Submission to the draft rate of return guideline, September 2018, p. 51.

¹⁰⁵⁶ ENA, Submission to the draft rate of return guideline, September 2018, p. 51.

¹⁰⁵⁷ ENA, Submission to the draft rate of return guideline, September 2018, pp. 49–51

¹⁰⁵⁸ Network Shareholder Group, Submission to the draft rate of return guideline, September 2018, p 17

We consider the actual return on debt information collected from service providers has served an important role in:

- testing the fitness for purpose of our estimation and implementation of benchmark debt characteristics under our previous approach; and
- evaluating the impact of our change to the implementation of our benchmark credit rating.

We remain satisfied that our analysis of spread differences at matched terms is robust and supports our conceptual expectations, as set out in the draft decision, that a 2/3 broad-BBB and 1/3 broad-A curves should provide the best fit to a BBB+ credit rating.¹⁰⁵⁹ We consider our analysis of spread differences at matched terms, using the service providers' actual cost of debt information, provides robust empirical support for this conclusion.

We agree with the Independent Panel that further information on the stock of debt is a viable expansion to the scope of information collected. This would allow us to consider the relative impact of debt which is actually drawn down and on which the service providers are paying full interest costs as compared to those instruments which are available for liquidity purposes but for which the service providers may not be paying full interest costs at a point in time. In our view this is most relevant to the task of determining a value-weighted portfolio return on debt to assist in determining the benchmark term of debt.

At this stage we have not published further disaggregated actual cost data because of its commercial sensitivity. Nonetheless, as part of our ongoing collection of this data we intend to undertake a consultation process in which stakeholders can carefully engage on what level of detail can be made available.

We have summarised our responses to the ENA's submission on our draft decision analysis in Table 26, below.

Table 26 Response to ENA submissions on use of actual cost of debt information

Issue	AER analysis
	We maintain our view that it is appropriate to exclude callable (other than make-whole callable) and subordinated debt from the sample.
Exclusion of callable and subordinated debt	Our approach of comparing spread differences at matched terms means that shorter-term and longer term debt are comparable on a like-for-like basis where spread differences driven by term have already been controlled for. The exclusions occur only to those debt instruments where the options make valuation of that debt on a like-for-like basis problematic, as noted by Chairmont. In particular, inclusion of callable debt substantially complicates any analysis of the term within portfolios. Further, as noted in our draft decision, all of Thomson Reuters, Bloomberg and S&P

¹⁰⁵⁹ AER, Draft rate of return guideline explanatory statement, July 2018, p. 60.

Global exclude callable and debt with embedded options (other than make-whole callable debt) from their samples for estimating third party yield curves.

Treatment of fees	<p>We agree with Chairmont's initial recommendation that fees should be excluded from a comparison on the basis where they are not a part of the borrowing margin on debt. Where fees are in effect a part of the borrowing margin, such as line or commitment fees, Chairmont has included these in the sample.</p> <p>In our view, this approach leads to an appropriate comparison of our return on debt approach against the actual borrowing margins of the networks. As noted by Chairmont and the ENA, we separately compensate networks for debt raising transaction costs. These costs form part of our opex allowance for regulated networks and our approach to estimating them can be reviewed outside of the rate of return instrument having regard to the methodology we ultimately adopt.</p>
PTRM timing assumptions	<p>We agree with the ENA's submission that the value of the PTRM's timing assumptions at a point in time depends on the time-value of money and so varies with the WACC. ACG's estimate was determined when the pre-tax real rate of return under consideration was 7.14% compared to roughly half that in current market conditions. However, as noted in our draft decision, our PTRM methodology was modified in 2007 after ACG's 2002 review to add an additional half-year of WACC to all capex in the year it enters into the asset base. We would expect this to materially lift the timing benefit holding all else constant.</p> <p>The allocation of the PTRM's favourable timing benefits between debt and equity is complex and we note that service providers are also compensated with equity raising costs where equity requirements in a particular year exceed internal equity generated subject to a series of benchmark assumptions on dividend payouts etc.</p> <p>Nonetheless, we agree that any further work on debt raising transaction costs should consider the interaction with transaction costs.</p>
Impact of selected bond observations	<p>We have had regard to robustness of our sample results in choosing to rely on it, including having regard to the influence of subsets of data. The ENA notes that it does not necessarily disagree with our position in the draft determination that it would be arbitrary or asymmetrical to omit this bond data from the sample. Further, we do not agree with the ENA's characterisation of the relevant RBA estimate as unusually high. CEG submitted that the 5 year spread-to-swap estimate was high relative to the RBA's 10 year spread-to-swap. However, as noted in the draft decision:¹⁰⁶⁰</p> <p><i>even if we agreed this was evidence that the term profile of the RBA curve did not accurately reflect market conditions, it is unclear whether this reflects elevated spreads on 5 year debt or depressed spreads on longer term debt. If we assumed the latter, this would suggest that differences on longer term debt over the corresponding time period are being understated.</i></p> <p><i>Similarly, there may be other periods of time within the sample, not identified by CEG, in which the RBA or BVAL curves produced an inaccurately low estimation of the spreads at a particular term.</i></p> <p><i>Further, even if we concluded that it is not appropriate to rely on that RBA data over the specific time period identified by CEG, it is unclear why instruments issued in this period should be excluded from the sample rather than simply relying on the BVAL data for the period.</i></p>

10.7.5 Conclusion

¹⁰⁶⁰ AER, Rate of return review draft decision – explanatory statement, July 2018, p. 459.

We remain of the view that our use of service providers' actual debt information was fit-for-purpose.

10.8 Contingencies

The rate of return instrument is to apply automatically¹⁰⁶¹ and involves the use of an annually updating return on debt approach. Our decision on how to apply these third party data series must be fully specified upfront in each determination and in our final rate of return instrument, and be capable of automatically applying over the regulatory period without the use of subsequent judgement or discretion.

For this reason, we need to establish contingencies that set out how we will react to potential events that could occur over the life of the rate of return instrument.

10.8.1 Draft decision

Our draft decision set out the principles for how we will make our contingency clauses. These principles are:

- Be clear and unambiguous to easily enable the automatic application of the return on debt formula
- 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
- Preserve the use of as many data sources as possible
- Favour up-to-date data

Our draft decision provides greater context for these principles.¹⁰⁶²

10.8.2 Independent panel review

We did not receive feedback from the independent panel on our contingency clauses.

10.8.3 Stakeholder submissions

We did not receive submissions from stakeholders on our contingency clauses.

10.8.4 AER consideration

We have reconsidered the contingency clauses with regard to the principles we used for selecting our contingency, and to make their intended application clearer. Our consideration of changes to contingency clauses compared to our draft decision is set out in Table 27 below.

¹⁰⁶¹ See section 3.2.

¹⁰⁶² AER, Rate of return guidelines draft decision explanatory statement, 10 July 2018, p.372

Table 27 Changes to the contingency clauses between the draft and final decision

Clause	Draft decision	Final decision	Considerations
21(a)	If a curve provider on day <i>i</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>i</i> must be linearly extrapolated to an exact term of 10 years in accordance with clause 14	No change from the draft decision	This clause remains appropriate and had a sufficiently clear intent.
21(b)	If a curve provider on day <i>i</i> does not publish both 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>i</i> in clause 10 must be calculated using the data from the remaining curve providers	If a curve provider on day <i>i</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>i</i> in clause 10 must be calculated using the remaining available data curves	This clause was amended slightly to better reflect the principle of preserving the use of as many data sources as possible. The amendment means that if a curve provider provides an estimate of only one of the two curves, the curve they have provided will still be used in our calculations.
21(c)	if all curve providers on day <i>i</i> do not publish both a broad A-rated and a 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 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	If all curve providers on day <i>i</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,	We changed this clause to be consistent with the changes made to the preceding clause. This change reflects the principle that we want to favour the use up to date data. This amendment means that if two curve provider produce only an A-rated curve and the third provider provides only a BBB-rated curve. We will continue to use this data to derive our estimate, and will only apply this subclause in the event there are no available A-rated curves or no available BBB-rated curves.
21(d)	If any curve provider substitutes its current methodology for a revised or updated methodology, then the revised or updated methodology must be used to calculate $Yield_{n,i}$ for day <i>i</i> in clause 10, as long as the yield estimates are obtained from the same data sources identified in	Need an alternative for this	We have changed how this clause is applied, to allow curves with a revised methodology to continue to be used. We consider the draft decision was arbitrarily restrictive in that changes to the methodology would result in the curve still being used or not being used, only

	clauses 22,23 and 24		based on whether the name of the curve had changed. We changed the language to allow the use of the same curve in the scenario where a curve provider changes their methodology and name but retain the fundamental object they are estimating. This reflects our principle of relying on the independent expertise of the curve providers
21(e)	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.	Same as the draft decision, however we added in some specifications that outline when the allowed return on debt figures will be deemed to be finalised, being the earlier of either i. when the AER notifies the service provider of the annual estimate, or four weeks after the end of the service provider's annual averaging period.	We added these subclauses in to provide greater clarity of how to apply the rate of return instrument. We could have simply made it when the AER notifies the service provider of the annual estimate, however the second subclause provides greater regulatory certainty and will not impede the debt raising practices of the regulated business.
21(f)	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	No change from the draft decision	This clause remains appropriate
21(g)	If either Thomson Reuters or Bloomberg replaces their publication with a different frequency (eg, 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	No change from the draft decision	This clause remains appropriate

10.8.5 Conclusion

Our decision is to adopt the contingencies set out in Table 27 above.

11 Value of imputation 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. We factor the value of imputation credits (known as gamma or 'γ') into regulation to recognise that imputation credits benefit equity holders, in addition to any dividends or capital gains they receive.¹⁰⁶³

The value of imputation credits affects the estimation of building block revenue allowances. However, the manner in which imputation credits are accounted for depends on whether cash flows are pre-tax or post-tax. We use a post-tax framework with a rate of return that is after company tax but before personal tax. Under a pre-tax WACC framework, the value of imputation credits is a WACC parameter. In contrast, under a post-tax WACC framework, the value of imputation credits is not a WACC parameter.¹⁰⁶⁴ Instead, it is a direct input into the calculation of tax liability for the company, 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 Rules.¹⁰⁶⁵

11.1 Final decision

In the Rate of return instrument we are applying a value for imputation credits of 0.585. We are satisfied that this value will, or is most likely to, contribute to the achievement of the National Electricity Objective (NEO) or National Gas Objective (NGO) to the greatest degree.

0.585 is the product of our estimated utilisation rate of 0.65 and our estimated efficient distribution rate of 0.90 (or 90 per cent). This is a departure from our draft decision, in which we proposed a rounded value of imputation credits of 0.5 from an estimate of 0.53 based on a distribution rate estimate of 0.88 and a utilisation rate estimate of 0.6.¹⁰⁶⁶

The value of imputation credits is interrelated with the market risk premium (MRP). Accordingly, in our determination of the return on equity in this final decision we adjust estimates of the MRP in a manner consistent with our determination of the value of imputation credits. This is also required by the National Electricity Rules (NER)/National Gas Rules (NGR).¹⁰⁶⁷

¹⁰⁶³ In this document we use 'value of imputation credits' and 'gamma' interchangeably. It is common to refer to the value of imputation credits as gamma.

¹⁰⁶⁴ However, in estimating the MRP, the AER 'grosses up' the measurement of observed excess returns (from capital gains and dividends) to consistently value the imputation credits distributed with those dividends. This is to be consistent with a framework that is after company tax but before personal tax.

¹⁰⁶⁵ NER, cl. 6.5.3, NER, cl. 6A.6.4 and NGR r.87A

¹⁰⁶⁶ The AER, Draft rate of return guidelines- explanatory statement, July 2018, p. 388.

¹⁰⁶⁷ NER, cll. 6.5.2(d)(2), 6A.6.2(d)(2); NGR, r. 87(4)(b).

The Framework we have used to estimate a value of imputation credits of 0.585

We have used our 'utilisation' approach for estimating the value of imputation credits. Under this framework the value of imputation credits (or gamma) is equal to the product of two parameters:¹⁰⁶⁸

- The payout ratio, which is the proportion of imputation credits generated that is distributed to investors.¹⁰⁶⁹
- The utilisation rate, which is the utilisation value to investors in the market per dollar of imputation credits distributed.¹⁰⁷⁰

This approach is consistent with the Monkhouse extension of the Officer framework and effectively considers investors get a certain 'utilisation' value from distributed credits and no value from undistributed credits. 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.

This 'utilisation' based approach is consistent with the approach we used for all determinations made under the 2013 Rate of return guideline.¹⁰⁷¹ This approach was also found open to us by the Full Federal Court of Australia.¹⁰⁷² We consider that the value of imputation credits within the building block revenue framework is effectively an estimate of the expected proportion of company tax which is expected to be returned to investors through the utilisation of imputation credits. This is consistent with the Officer framework, which models the value of imputation credits via the parameter gamma (usually labelled using the Greek letter, γ):¹⁰⁷³

γ [gamma] is the proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend.

Estimating the distribution rate (or payout ratio)

We consider that on average 90% of the imputation credits created from the payment of corporate tax will be distributed by a regulated network service provider acting efficiently.

¹⁰⁶⁸ See P. Monkhouse, 'The Valuation of Projects Under the Dividend Imputation Tax System', *Accounting and finance*, 1996, vol. 36(2), pp. 185–212.

¹⁰⁶⁹ The imputation credit payout ratio is distinct from the dividend payout ratio, which is the proportion of available firm free cash flow distributed to equity holders via dividends. This choice of terminology is consistent with the draft decision and most submissions on this issue. It is sometimes called the distribution rate or the access fraction, and in equations is sometimes referred to using the symbol F .

¹⁰⁷⁰ More formally, as set out below, the utilisation rate is the complex weighted average (by value and risk aversion) of individual investors' utilisation rates.

¹⁰⁷¹ See the AER past determinations for detail. For example: The AER, *Final decision: AusNet Services transmission determination 2017-22, Attachment 4—Value of imputation credits*, April 2017,

¹⁰⁷² Federal Court of Australia, *Australian Energy Regulator v Australian Competition Tribunal (No 2)* [2017] FCAFC 79, May 2017, para. 756.

¹⁰⁷³ R. Officer, 'The cost of capital of a company under an imputation tax system', *Accounting and finance*, May 1994, vol. 34(1), p. 4.

In estimating the distribution rate we consider that an efficient network service provider should be based on listed firms. This is supported with advice by Lally who examined the regulated firms and concluded the firms are listed or owned by listed entities (local or foreign).¹⁰⁷⁴ Lally also noted that unlisted firms would be expected to have lower distribution rates due to tax deferral advantages to the owners.¹⁰⁷⁵ We consider this is likely correct and it appears consistent with the Australian Taxation Office (ATO) public data that shows materially lower distribution rates for unlisted firms in Australia.¹⁰⁷⁶

In estimating the distribution rate we have considered several pieces of evidence:

- An estimate of the aggregate distribution rate estimate from the financial reports of the top 20 Australian Stock Exchange (ASX) listed firms. This indicates a distribution rate of 0.88 over the period 2001 to 2017.
- An estimate of the aggregate distribution rate from the financial statements of the top 50 ASX listed firms. This indicates a distribution rate of 0.89 over the period 2001 to 2017.
- Publically available ATO franking account balance (FAB) data. This indicates an aggregate distribution rate of 0.765 for all listed firms over the period 2004 to 2016.
- An analysis of the impact of foreign income on the aggregate distribution rate of the top 50 ASX listed firms. This indicates an aggregate distribution rate of 0.96 once the impact of foreign income is controlled for.

The estimated distribution rate of 0.9 is primarily based on data in the audited financial reports of the top 50 ASX listed firms over the period 2001 to 2017 rounded to the nearest 0.05. We consider an estimate of the aggregate distribution rate of these firms is a reasonable estimate for a regulated firm operating efficiently. This is because we expect a regulated firm will typically be a listed firm or owned by a listed firm and this firm will seek to distribute a large proportion of its credits to its shareholders in a manner consistent with the estimated aggregate distribution rate of listed firms. Given that the top 50 ASX listed firms account for a large proportion of the market capitalisation of listed firms, we consider a distribution rate estimate based on the top 50 ASX listed firms is appropriate for a regulated network service provider operating efficiently.

We consider the estimate from the top 50 ASX listed firms is a marginally better estimate than the estimate from the top 20 ASX listed firms we considered in making the draft decision. This is because it is a larger sample that accounts for a larger proportion of the market capitalisation of listed firms, which we consider will give a better distribution rate estimate for a regulated network service provider operating

¹⁰⁷⁴ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹⁰⁷⁵ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 8.

¹⁰⁷⁶ While the ATO public data cannot be used for reliable estimates of the distribution rate (relative to estimates based on financial statements), we consider it is reliable enough to show lower distribution rates for unlisted firms relative to listed firms.

efficiently. However, we note the difference in the estimates between these two samples is not material.

We have also considered the estimates based on the ATO FAB data. While the ATO FAB data gives a lower estimate of the distribution rate for listed equity, we do not consider this data sufficiently reliable (relative to data from audited financial reports) to place any weight on. This is supported by the ATO's advice that indicates the issues with using its publically available data for estimating any parameters related to gamma.¹⁰⁷⁷ In particular, the ATO noted the issues with using the FAB data as the basis for a macro-economic analysis of the Australian imputation system.¹⁰⁷⁸ It has been generally agreed by stakeholders that the ATO FAB data should not be used.¹⁰⁷⁹ Lally also considered we should not use ATO data for estimating the distribution rate.¹⁰⁸⁰

In the submissions to the AER, the ENA and some regulated firms raised that an Australian regulated firm will have no foreign income and firms with foreign income will have higher distribution rates.¹⁰⁸¹ Therefore, these parties considered an estimate based on the financial reports of the top 20 ASX listed firms (some of which have foreign income) will have an upwards biased distribution rate.¹⁰⁸² In response to these submissions we asked Lally to examine the impact of foreign income on the aggregate distribution rate of the top 50 ASX firms. Lally estimated the impact of foreign operation is to reduce the estimated distribution rate.¹⁰⁸³ He estimated a higher aggregate distribution rate of 0.96 if the firms had no foreign operations.¹⁰⁸⁴ In light of this analysis he recommended we use a rounded value of 0.95 for the distribution rate. While we acknowledge that a regulated network service provider will have 100% of its regulated operation in Australia and generate profit domestically, we have not increased the distribution rate based on regulated firms not having any foreign source operation. This is because Lally's recent analysis is new and stakeholders have not had an opportunity

¹⁰⁷⁷ The ATO, *ATO note to the AER: Clarification of points in previous note titled 'Franking account balance- tax of time series data from Taxation Statistics'*, 14 Sep 2018

¹⁰⁷⁸ The AER, *Note on ATO staff response to AER staff inquiries about Hathaway's 2013 report on imputation credit redemption*, 29 March 2018

¹⁰⁷⁹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 152; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, pp. 47-48

¹⁰⁸⁰ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 7.

¹⁰⁸¹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 147; Cheung Kong Infrastructure, *Review of the Rate of Return Guideline*, 12 December 2017, pp. 5-6; ENA, *Response to AER Issues Paper*, 12 December 2017, p. 37; APGA, *Submission to the AER: Review of rate of return guideline*, 4 May 2018, p. 16.

¹⁰⁸² ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 147; Cheung Kong Infrastructure, *Review of the Rate of Return Guideline*, 12 December 2017, pp. 5-6; ENA, *Response to AER Issues Paper*, 12 December 2017, p. 37; APGA, *Submission to the AER: Review of rate of return guideline*, 4 May 2018, p. 16.

¹⁰⁸³ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 4-5

¹⁰⁸⁴ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 4-5

to analyse it, we have had limited opportunity to test it ourselves, and no stakeholders proposed a distribution rate higher than 90%.¹⁰⁸⁵

Estimating the utilisation rate

We have estimated the utilisation rate for the Australian economy as 0.65 (or 65%). That is, for each dollar of credits distributed to shareholders by Australian firms we estimate investors will receive \$0.65 in 'utilisation' value.

In estimating the utilisation rate we have had regard to a range of evidence including:

- Estimates of the utilisation rate based on the data from the Australian Bureau of Statistics (ABS) applying the equity ownership approach. This approach suggests a utilisation rate of between 0.61 and 0.70 for all equity over the period September 2000 to June 2018 and a most recent point estimate of 0.638. The averages of the point estimates for each quarter over the last five and ten years are 0.646 and 0.643.
- New estimates by the ATO of the redemption rate of distributed credits over the financial years 2012 through 2016. These suggest a redemption rate of between 0.50 and 0.59.¹⁰⁸⁶
- Estimates of the utilisation rate based on implied market value studies, which suggest a range for the estimate of the utilisation rate of 0 to 0.5. In particular, the adjusted estimate from SFG's dividend drop off study suggests a utilisation rate of 0.4.¹⁰⁸⁷
- Estimates of the utilisation rate based on publically available ATO dividend data. This data indicates a redemption rate of around 0.60.

Having considered all the new evidence before us since the draft decision, our approach for estimating the utilisation rate in this final instrument is to base the

¹⁰⁸⁵ We note that while CRG considered a distribution rate of close to 1 based on the notion that there is clear evidence of excess network capacity, it proposed a gamma of 0.9. This is because it considered a gamma of 0.9 would cover the possibility that over the period there may be some need for net new investment in the networks. Our interpretation is a distribution rate of 0.9 and a utilisation rate of 1 proposed by the CRG. The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 38.

¹⁰⁸⁶ The ATO, *note to the AER: Franking account reconciliation*, 11 December 2018

¹⁰⁸⁷ Since the 2013 Guidelines we have considered that implied market value studies support an estimate of the utilisation rate between 0 and 0.5. The SFG dividend drop off study is one common type of implied market value studies that was adopted by most businesses. The businesses previously proposed a utilisation of 0.35 from SFG's study. We consider implied market value studies, if they are to be used at all, need to be adjusted for the incorrect estimates of the post company pre-personal tax value of cash dividends which would expect to also result in an incorrect estimate of the value of imputation credits. Based on Handley and Lally's advice, we consider the estimate from SFG's dividend drop off study should be interpreted as an estimate of around 0.4. Our detailed discussion on implied market value studies is set out in the attachment 4 to our determination for ElectraNet. The AER, *Draft decision for ElectraNet transmission determination 2018 to 2023, Attachment 4- Value of imputation credits*, October 2017

estimate on the equity ownership approach based on the ABS data. This is because we consider the equity ownership approach based on the ABS data:

- is well aligned with the interpretation of the utilisation rate in the Monkhouse framework that shows the utilisation rate is a weighted average (by wealth and risk aversion) of investors' utilisation rates.
- 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

This approach is also supported by Lally.¹⁰⁸⁸ He considered the utilisation rate in accordance with a rigorous derivation of the Officer model is a weighted average over the utilisation rates of all investors in the Australian market.¹⁰⁸⁹ If the AER recognizes the existence of foreign investors, Lally considered the utilisation rate is equal to the proportion of Australian equities owned by local investors and therefore one should use the equity ownership approach for estimating the parameter.¹⁰⁹⁰ The most recent estimate and the averages of the point estimates for each quarter over the last five and ten years based on this approach all suggest a utilisation rate estimate of 0.65 rounded to the nearest 0.05. Therefore, Lally considered an appropriate utilisation estimate is 0.65.¹⁰⁹¹ We depart from our draft decision and have placed no weight on the redemption rate estimates from the public ATO dividend data. In reaching this final decision, we have considered a new ATO note dated 14 September 2018 which advised us not to use ATO public data for any estimates of the parameters concerned with franking credit including gamma, the distribution rate and the utilisation rate.¹⁰⁹² The ATO advised that the utilisation rate of imputation credits is not able to be calculated from public taxation statistics data due to the aggregate nature of the data.¹⁰⁹³ We acknowledge the issues identified by the ATO with using the ATO public data for estimating any parameters related to gamma. In light of this ATO note, we consider the alternative data sources appear to have fewer issues and therefore we consider it appropriate to place no weight on any estimates from the ATO public data including the estimate of the utilisation rate.

Following the Draft decision the ENA requested that we ask the ATO for estimates of credits created and credits redeemed from tax filings.¹⁰⁹⁴ The ATO in response has provided new analysis that was not available at the time we published the draft decision. This analysis was undertaken by the ATO upon the request of the AER and

¹⁰⁸⁸ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 21.

¹⁰⁸⁹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹⁰⁹⁰ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹⁰⁹¹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 31.

¹⁰⁹² The ATO, *ATO note to the AER: Clarification of points in previous note titled 'Franking account balance- tax of time series data from Taxation Statistics'*, 14 Sep 2018

¹⁰⁹³ The ATO, *ATO note to the AER: Clarification of points in previous note titled 'Franking account balance- tax of time series data from Taxation Statistics'*, 14 Sep 2018

¹⁰⁹⁴ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 155.

was submitted to the AER shortly before the publication of the final decision. While the annual estimates are volatile, the ATO's internal analysis estimates the redemption rate of distributed imputation credits varied between 0.5 and 0.59 over the period from 2012 to 2016.¹⁰⁹⁵ However, we note that this new analysis was undertaken in a relatively short time frame, provided very late in our review process so that we were not able to consult on it, and it did not provide any estimates on the likely error bounds in the estimates. In addition, the AER has been unable to check the underlying data or calculations.¹⁰⁹⁶ Therefore, given the underlying uncertainties associated with these new redemption rate estimates and the fact stakeholders have not had an opportunity to comment on them, and given the use of the equity ownership approach based on ABS data is both better aligned to the theoretical basis of the Monkhouse extension of the Officer framework and based on publically available data and replicable, we consider no adjustment to the utilisation rate of 0.65 based on the ABS equity ownership data is warranted based on these new ATO estimates.

In coming to our final estimate of the utilisation rate, we have also revisited the estimates based on implied market value studies. In particular, we have reconsidered the adjusted estimate from SFG's dividend drop off study, which suggests a utilisation rate of 0.4. This re-examination led us to depart from the draft decision and place no weight on the estimates from implied market value studies. This is because we consider there are some underlying problems with this approach. Given the underlying issues with using implied market value studies for estimating the utilisation rate, we no longer consider they will provide a reliable utilisation rate estimate for an efficiently regulated network service provider. We discuss the estimates from implied market value studies in detail in section 11.8.3.4.

We also note that while Lally has continued to recommend we use a utilisation rate of 1 to be consistent with the Officer model (which has no foreign investors), we have not done this.¹⁰⁹⁷ We remain of the view that our approach appropriately reflects (the reality) that a proportion of Australian equity is owned by foreigners who cannot utilise imputation credits to reduce their taxable income or claim a refund from the taxation office.

Rounding policy in relation to gamma

The Independent Panel recommended the AER reconsider its rounding policy in relation to gamma, including considering whether to round to the nearest five per cent or to round to two decimal places.¹⁰⁹⁸ We have revisited our rounding policy in relation

¹⁰⁹⁵ The ATO, *ATO Note - Australian Energy Regulator - Franking account reconciliation*, 11 Dec 2018; The ATO (and its staff) were very helpful in undertaking this work in a short time frame and this assistance has been greatly appreciated by AER staff.

¹⁰⁹⁶ In addition to the timeframe that has meant the AER could not have reviewed the ATO analysis, the ATO data is subject to confidentiality restrictions that mean raw tax return data cannot be shared with the AER.

¹⁰⁹⁷ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹⁰⁹⁸ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 58.

to gamma in light of the Independent Panel's report. We propose to round the distribution rate and utilisation rate to the nearest 0.05. The produce of these two rounded values have been used to produce the final value for imputation credits (or gamma). No rounding is applied to the final value for gamma. This is based on Lally's advice that rounding should occur for the distribution rate and utilisation rate given that gamma is the product of the two sub-parameters and these two sub-parameters are individually estimated rather than gamma.¹⁰⁹⁹ We agree with Lally on this point and consider rounding should be applied to the sub-parameters and the value of gamma is simply the product of the two rounded sub-parameters.

Furthermore, Lally considered the extent to which parameter values should be rounded should be based upon the degree of precision in the estimate.¹¹⁰⁰ In respect of the distribution rate, he considered an appropriate estimate is 0.95 rounded to the nearest 0.05. In respect of the utilisation rate, if account is taken of foreign investors, Lally considered an appropriate estimate is 0.65 rounded to the nearest 0.05.¹¹⁰¹ We have considered Lally's recommended rounding to the nearest 0.05 and consider it appropriate to round the sub-parameters to the nearest 0.05 based on his advice. The product of the rounded utilisation rate of 0.65 and rounded distribution rate of 0.9 give the estimate of gamma of 0.585 used in the rate of return Instrument.

Calculating the value imputation credits directly from ATO data

While regulated businesses submitted that one can use aggregate ATO data to estimate the overall value of imputation credits, this will not lead to an efficient estimate in accordance with our approach.¹¹⁰² Lally considered the ATO public data is unsuitable for estimating gamma directly because this approach implies a distribution rate based on all equity that is unsuitable for a regulated network business operating efficiently.¹¹⁰³ We agree with Lally and consider the distribution rate in our utilisation approach is a firm specific value we estimate for an efficient regulated firm while a direct estimate from the ATO data gives an average value for imputation credits based on an average distribution rate across all corporations in Australia. As we consider that the distribution for a regulated firm should be based on listed firms and listed firms have higher imputation credit distribution rate than the average Australian corporation based on Lally's advice, the proposed approach will materially under estimate the value of imputation credits.¹¹⁰⁴ Absent adjustment for the distribution rate this would overcompensate regulated firms and not achieve the NEO/NGO.

Changes relative to the Draft 2018 decision

¹⁰⁹⁹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹¹⁰⁰ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹¹⁰¹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹¹⁰² ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 154; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. v; NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 19.

¹¹⁰³ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 32-33

¹¹⁰⁴ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 8.

The value of 0.585 is increased from a value of 0.50 used in the draft instrument. The increase is driven by three estimation changes:

- We no longer round the final estimated value to the nearest 0.10. In making the draft we rounded the final value from 0.53 to 0.50.¹¹⁰⁵ We reconsidered where we should round in response to the comments by the Independent Panel and have determined to round intermediate estimates (for utilisation and distribution rates to the nearest 0.05) and to not to round the final product of these values.
- We have used an estimate for the distribution rate of 0.90 (rounded to the nearest 0.05) based on Lally's estimate of the aggregate distribution rate for the top 50 ASX listed firms from their financial reports over the period from the start of the financial year of 2001 to the end of the financial year of 2017. In making the draft decision our estimate was based on an estimate by Lally based on the financial reports of the top 20 ASX listed firms which gives an unrounded estimate of around 0.88.¹¹⁰⁶ However, in making our draft decision we also rounded the final estimate of gamma down to 0.50 and set the distribution rate in a manner consistent with this final number (at 0.83).¹¹⁰⁷
- We have used an estimate for the utilisation rate of 0.65 (rounded to the nearest 0.05) based on the equity ownership approach using the ABS data. We no longer consider the utilisation rate estimates from the ATO public data or implied market value studies are appropriate estimates for an efficiently regulated network service provider. Consistent with this change in our utilisation value we have re-estimated the Market Risk Premium using a utilisation (or theta) value of 0.65. This change has directly resulted in an increase in the MRP used in the Instrument from 6.0 per cent to 6.1 per cent.

Changes relative to regulatory decisions made under the 2013 Guideline

The value of 0.585 is an increase relative to the value of 0.40 used for all decisions made under the 2013 Rate of return guideline. The increase from 0.40 to 0.585 is driven by the following changes in our estimation approach:

- We have used a distribution rate based on listed equity estimated from the financial reports of the 50 largest ASX traded firms trading over the entire period from 2001 to 2017.
- We have used a utilisation rate based on all equity estimated using the equity ownership approach from the ABS data. The most recent estimate and the averages of the point estimates for each quarter over the last five and ten years based on this approach suggest an utilisation rate estimate of 0.65 rounded to the nearest 0.05.
- We no longer consider it necessary, or appropriate, to estimate the distribution rate and utilisation rate from a matched set of firms. As supported by Lally, this is

¹¹⁰⁵ The AER, *Draft rate of return guidelines- explanatory statement*, July 2018, p. 388.

¹¹⁰⁶ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 397.

¹¹⁰⁷ The AER, *Draft rate of return guidelines- explanatory statement*, July 2018, p. 388.

because theoretically under the Monkhouse and Lally and Van Zeal models the utilisation rate is an equilibrium rate for the entire economy whereas the distribution rate is firm specific.

In the following sections, we cover submissions to the process which discussed our approach to estimating the value of imputation credits, including what weight we should give to the sources of evidence for estimating gamma and its sub-parameters. As part of the rate of return guideline review process, we also address the recommendations from the Independent Panel in the sections below. Having had regard to stakeholders' submissions and Independent Panel's recommendations, we consider the empirical evidence warrants a departure from the draft decision to adopt a distribution rate estimate of 0.90, a utilisation rate of 0.65 and a resulting gamma estimate of 0.585.

11.2 Approach to determining imputation credits

11.2.1 Draft decision

In the draft decision, we considered a benchmark efficient entity (BEE) would be an entity that operates in Australia with the potential for both domestic and foreign investors to participate in the Australian market.¹¹⁰⁸ That is, we considered that the market is an Australian domestic market that recognises the presence of foreign investors to the extent that they invest in the Australian market. We considered this is important in determining a value of imputation credits because typically domestic investors are eligible to utilise imputation credits while foreign investors are not.¹¹⁰⁹

Our draft decision was to adopt a 'utilisation' interpretation of the value of imputation credits.¹¹¹⁰ That is, we view the value of imputation credits as the proportion of company tax returned to investors through the utilisation of imputation credits. Under this interpretation, our approach to estimating the value of imputation credits was to use the Monkhouse formula, which considers gamma as the product of two parameters:¹¹¹¹

- The payout ratio, which is the proportion of imputation credits generated by the benchmark efficient entity that are distributed to investors.¹¹¹²
- The utilisation rate, which is the extent to which investors can use the imputation credits they receive to reduce their personal tax.¹¹¹³

¹¹⁰⁸ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 394.

¹¹⁰⁹ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 394.

¹¹¹⁰ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 419.

¹¹¹¹ See P. Monkhouse, 'The Valuation of Projects Under the Dividend Imputation Tax System', *Accounting and finance*, 1996, vol. 36(2), pp. 185–212.

¹¹¹² The imputation credit payout ratio is distinct from the dividend payout ratio, which is the proportion of available firm free cash flow distributed to equity holders via dividends. This choice of terminology is consistent with the draft instrument and most submissions on this issue. It is sometimes called the distribution rate or the access fraction, and in equations is sometimes referred to using the symbol F.

We have applied this 'utilisation' approach since the 2013 Guideline.¹¹¹⁴ In estimating the value of imputation credits, we undertook an incremental review to examine and update the empirical evidence. Having had regard to the strengths and limitations of the relevant empirical evidence, we departed from some specific aspects of the 2013 Guideline in relation to the weights we put on the relevant empirical evidence.

We noted in our draft decision that some stakeholders proposed that the AER should review its overall approach.¹¹¹⁵ In response to the submissions, we considered this.¹¹¹⁶ We reviewed the building block framework employed under the NER/NGR and considered whether our approach for estimating gamma is consistent with the legal requirements. We considered our approach is consistent with the Officer framework, which provides a basis for the rate of return framework in the NER/NGR.¹¹¹⁷ We therefore considered that our current 'utilisation' approach is consistent with the Rules and will contribute to the achievement of the NEO and NGO.¹¹¹⁸

11.2.2 Independent Panel review

The Independent Panel considered that the AER demonstrated in the draft decision that it identified, accessed and considered the available, relevant information. It considered the AER critically assessed the merits and shortcomings of the data and made rational and well-reasoned decisions about the relevance and weight of data sources.¹¹¹⁹

Subject to the exceptions discussed in the Independent Panel's report, the Independent Panel concluded that the proposed approach to determining the value of imputation credits is supported by sound reasoning and there are logical links to the relevant information sources. It considered the methodology is clear and the relevant data sources are accessible and current.¹¹²⁰

However, the Independent Panel suggested that the AER should explain more clearly why adopting an incremental review to update the estimates for theta (the utilisation

¹¹¹³ More formally, the utilisation rate is the complex weighted average (by value and risk aversion) of individual investors' utilisation rates. In turn, these reflect each investor's expected ability to use imputation credits to reduce their tax (or get a refund).

¹¹¹⁴ The AER, *Explanatory statement to the rate of return guideline*, December 2013, p. 158.

¹¹¹⁵ APA, *APA submission responding to AER issues paper*, 12 December 2017, p. 12; ENA, Response to discussion papers and concurrent expert evidence sessions, 4 May 2018, p. 3; Spark Infrastructure, Response to issues paper on the review of the Rate of Return Guideline, December 2017, p. 10.

¹¹¹⁶ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 419.

¹¹¹⁷ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, pp. 416-424

¹¹¹⁸ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 419.

¹¹¹⁹ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 50.

¹¹²⁰ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 50.

rate) and the distribution rate is consistent with the Rules and the achievement of the national electricity and gas objectives.¹¹²¹

11.2.3 Stakeholder submissions

Most of the stakeholders have accepted our 'utilisation' interpretation of gamma, while the CRG in its submission proposed that it does not accept the AER's empirical 'utilisation' approach.¹¹²² It considered the AER's statement in the draft decision quoted below is incorrect:¹¹²³

"We note that there was a general level of agreement amongst stakeholders to: Applying a 'utilisation' based post-company tax approach to estimating the value of imputation credits."

However, the CRG appeared to accept an estimate of gamma from the product of the utilisation rate and the distribution rate. The CRG considered:

- A distribution rate of or close to 1- the earnings should be distributed if there is no need to make a net new investment in the regulated asset base (RAB) and given there is clear evidence of excess network capacity.¹¹²⁴
- A utilisation rate of 1 assuming a BEE would use the most efficient source of funding from Australian sources.¹¹²⁵

The NSG and the ENA submitted that the AER's adoption of the new approach for estimating gamma is not an incremental review.¹¹²⁶ The ENA considered the AER applied a new approach that went beyond past approaches and review outcomes, while the newly introduced methodologies are not robust compared to the past approaches.¹¹²⁷ The NSG considered such a significant change of the value of imputation credits from 0.4 to 0.5 may have negative long-term implications for customers.¹¹²⁸

¹¹²¹ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 52.

¹¹²² NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 17; ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 140; Evoenergy, *Review of rate of return guideline-draft decision*, 25 September 2018; South Australian Centre for Economic Studies, *Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report*, July 2018, p. 8; The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 34.

¹¹²³ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 34.

¹¹²⁴ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 33.

¹¹²⁵ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, pp. 35-37

¹¹²⁶ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 17; ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 6.

¹¹²⁷ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 6.

¹¹²⁸ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 17.

11.2.4 AER consideration

We firstly respond to the Independent Panel's recommendation that the AER should explain more clearly why adopting an incremental review for the value of imputation credits is consistent with the Rules and the achievement of the NEO/NGO. In this final decision we set out the approach we have taken to assess our 'utilisation' approach for estimating gamma. This approach includes consideration of:

- the building block framework employed under the Rules
- the construction of the tax building block under the Rules
- the conceptual framework for the value of imputation credits
- the consistency between the 'utilisation' approach and the framework

We conclude that the 'utilisation' approach for estimating gamma is consistent with the framework employed under the Rules and the best available in all the circumstances. We are satisfied that applying this approach will, or is most likely to, contribute to the achievement of the NGO and NEO to the greatest degree.

11.2.4.1.1 The building block framework employed under the Rules

Under the NER/NGR, we employ a building block framework to estimate revenue for service providers. The building block framework sets out how to estimate the various components (that is, 'building blocks') that make up a total revenue allowance.¹¹²⁹ The function of this building block revenue estimate is to determine the revenue that a service provider operating efficiently is expected to require to:

- Fund its operating expenses
- Achieve adequate returns to raise debt and equity in order to finance its capital investments. This is made up of a rate of return on capital to compensate investors for the risks of investment. It also includes a return of capital (depreciation), which gradually returns the initial principal of the investment, and subsequent investments, back to investors
- Pay its tax liability
- Reflect any revenue increments or decrements from incentive mechanisms in the design of the regulatory regime.

Importantly, the building block framework is intended to compensate the service provider (and its investors) only for costs incurred by the service provider and not by its investors; that is, the framework is on a post-company before-personal-tax and before-personal-costs basis. Handley described this consideration as follows:¹¹³⁰

¹¹²⁹ NER, cl. 6.4.3, 6A.5.4; NGR, r. 76.

¹¹³⁰ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5 and footnote 2.

The post-tax basis of the regulatory framework can be more fully described as an after-company-before-personal-tax framework. In other words, cash flows and returns are to be measured after company taxes but before personal taxes. By definition, this means that allowed revenues should include compensation for corporate taxes incurred by the regulated firm but not for personal taxes incurred by the firm's shareholders. Similarly, allowed revenues should include compensation for prudent, efficient costs incurred by the regulated firm but not for costs (including personal transactions costs) incurred at the shareholder level. Note, this does not mean that personal taxes and costs are being ignored or assumed not to exist – rather there is no need to explicitly include them in the modelling framework.

...

The regulatory WACC framework is an after-company-before-personal-tax framework which requires explicit modelling of cash flows and returns after allowing for company tax but avoids most of the complications associated with having to model personal taxes - one complication which remains of course, is gamma. If one wanted to explicitly model personal taxes then an after-company-after-personal-tax WACC framework could be used instead.

11.2.4.1.2 The construction of the tax building block under the Rules

One expense that a service provider potentially faces is taxation. An allowance for taxation can be estimated as a separate building block allowance, or through the rate of return. Either way, the service provider and its investors are compensated for its expected efficient tax liability. The NER/NGR specify that we must estimate a nominal vanilla rate of return.¹¹³¹ A nominal vanilla rate of return combines a post-tax return on equity with a pre-tax return on debt. More specifically, as described by Handley above, the return on equity is a post-company tax pre-personal-tax return on equity. This means the return on capital does not include an allowance for the expected cost of corporate taxation. As a result, the building block framework includes an estimate of the cost of corporate income tax as a separate revenue item.

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. This 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:

$$ETC_t = (ETI_t \times r_t)(1 - \gamma)$$

where:

¹¹³¹ NER, cl. 6.5.2, 6A.6.2; NGR, r. 87.

- 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 regulated services if such an entity, rather than the service provider, operated the business of the 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.
- γ is the value of imputation credits.

The objective of the adjustment for the value of imputation credits is to reduce the regulatory cost of corporate income tax such that only the proportion of company tax which is expected to be retained by the government is reflected in the corporate income tax building block. That is, the adjustment is an estimate of the company tax paid which the government subsequently transfers back to investors when they utilise imputation credits.

11.2.4.1.3 The conceptual framework for the value of imputation credits

Unlike many other aspects of the NER/NGR, there is no specific objective we must achieve for the value of imputation credits and no specific factors we must take into account in estimating it. The allowed rate of return objective does not specifically apply to the value of imputation credits. However, the rate of return must be determined on a nominal vanilla basis that is consistent with our estimate of the value of imputation credits.¹¹³²

In this context, the conceptual rate of return framework developed by Officer in a 1994 paper informs our approach to interpreting and estimating the value of imputation credits.¹¹³³ This is because:

- The NER/NGR's cost of corporate income tax formula (shown above) mirrors Officer's framework for the treatment of imputation credits, including through the use of the parameter denoted by the Greek letter 'gamma'.¹¹³⁴
- We have received expert advice that Officer's definition of the nominal vanilla rate of return provides the basis for the rate of return framework in the NER/NGR.¹¹³⁵ Previous statements by the consultant for the majority of the service providers', Gray, and their industry association appear to support this consideration:
 - During the AEMC's 2012 rule change process, Gray advised the AEMC that '...there are a number of different WACC formulas that can all be identified

¹¹³² NER, cll. 6.5.2(d)(2), 6A.6.2(d)(2); NGR, r. 87(4)(b).

¹¹³³ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.

¹¹³⁴ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, equation 2.

¹¹³⁵ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–8.

as post-tax nominal definitions of WACC. Officer (1994), in the paper that forms the basis for the regulatory rate of return framework, sets out four such definitions...'.¹¹³⁶

- During the development of the Guideline, the Energy Networks Association (ENA) submitted '[t]he fundamental economic framework in relation to dividend imputation was set out by Officer (1994)...'.¹¹³⁷

The NER/NGR requires that we determine the rate of return on a nominal vanilla basis that is consistent with our estimate of the value of imputation credits.¹¹³⁸ The Officer framework provides a means for doing this. It provides a consistent framework for determining the rate of return for a business, which takes into account the value that investors receive from imputation credits.¹¹³⁹ An important implication of this is that gamma is not a standalone concept or parameter. It is part of a broader framework, and should be interpreted and estimated accordingly.

11.2.4.2 The interpretation of gamma in Officer's model

As the Officer Paper underpins the inclusion of gamma in the corporate income tax formula in NER 6.5.3 and NGR 87A, it is fundamental to a coherent understanding of the role of gamma in the regulatory scheme.

The Officer Paper specifically identified gamma in its WACC formulae to be the "proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend": It directly supports an interpretation of gamma which is focused on the utilisation or redemption of imputation credits, and an approach to theta which seeks to identify the proportion of investors that are eligible to utilise distributed imputation credits. So much is confirmed by Handley, who states:¹¹⁴⁰

It is clear from Monkhouse (1996) that the second parameter refers to the utilisation value of a distributed imputation credit. This parameter is commonly denoted and called theta. It is also clear from the post-tax basis of the regulatory framework (and the Officer and Monkhouse WACC frameworks) that the item of interest is more precisely described as the after-company-before-personal-tax utilisation value of a distributed imputation credit.

The Officer Paper makes clear that gamma is:

- (f) the proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend; *which is*
- (g) the value of a dollar of tax credit to the shareholder; *with the result that*

¹¹³⁶ SFG, *Response to submissions on rule change proposals, Report for the AEMC*, 5 November 2012, para. 2.

¹¹³⁷ ENA, *Response to the Draft Rate of Return Guideline of the Australian Energy Regulator*, 11 October 2013, p. 49.

¹¹³⁸ NER, cll. 6.5.2, 6A.6.2; NGR, r. 87.

¹¹³⁹ For a detailed discussion of the Officer framework, see: J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–12.

¹¹⁴⁰ Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 9, 17.

(h) if the shareholder can fully utilise the imputation tax credits then the value of $\gamma = 1$.¹¹⁴¹

Gray (for SFG) previously submitted that Officer's paper suggests that there are two possible interpretations of γ :¹¹⁴²

(a) Officer means γ to have a *value* interpretation and that words suggesting a *utilisation* interpretation were poorly drafted (i.e., the reference to utilisation should be read as simply identifying the source of value); or

(b) Officer means γ to have a *utilisation* interpretation and that words suggesting a *value* interpretation were poorly drafted (i.e., the reference to value should be read as "the number used for" rather than "worth").

I concluded that the value interpretation was plausible and the utilisation/redemption interpretation was not, and set out my reasons for doing so. Nothing in the AER's recent draft decisions lead me to change my conclusion on this point.

We do not agree with Gray. As explained by Handley in his September 2014 report, interpretation of γ on a before-personal-tax and before-personal-costs basis reconciles this apparent inconsistency in Officer;¹¹⁴³ that is, on this basis the 'value' and 'utilisation' interpretations are consistent. Handley reiterates this in his April 2015 report:¹¹⁴⁴

This is precisely the reason why Officer refers to γ as the value of franking credits in some parts of the paper, and as the proportion of tax collected from the company which will be rebated against personal tax, in other parts of the paper. These two descriptions are equivalent when one interprets value to mean the value of imputation credits before personal tax and before personal costs.

There would appear to be further support for Handley's view in the first line of footnote 5 of Officer's paper, which seemingly equates the ideas of 'utilisation' and 'value':¹¹⁴⁵

For example, if the shareholder can fully utilize the imputation tax credits then ("value") $\gamma = 1$, e.g. a superfund or an Australian resident taxpayer.

Handley also noted:¹¹⁴⁶

¹¹⁴¹ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, p. 4.

¹¹⁴² SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 122–123.

¹¹⁴³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 8–9.

¹¹⁴⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 5.

¹¹⁴⁵ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.

It is clear that the Officer WACC valuation framework is a before-personal-tax framework. It is also a before-personal-cost framework in the limited sense that, there is no explicit adjustment (deduction) made to the cash flows or the discount rate for either personal taxes or personal costs.

On the other hand, if gamma was intended to reflect investors' personal taxes and costs, then the proportion of company tax returned to investors would never be equivalent to the value to investors per dollar of imputation credits. This is because, on an after-personal-tax and after-personal-costs basis where such taxes and costs were non-negligible, investors would likely value credits at less than their face value. Therefore, there would be no justification for defining gamma, as Officer does, in terms of the proportion of company tax returned to investors. As shown in the earlier quote, Gray attributed such a definition to 'poor drafting'. However, this is unconvincing to us.

Further, if the intended interpretation of gamma is on an after-personal-tax and after-personal-costs basis, then it would seem to make little sense to contemplate, as Officer does in footnote 5 of his paper, an investor having an individual utilisation rate of 1.¹¹⁴⁷ Again, this is because, on an after-personal-tax and after-personal-costs basis where such taxes and costs were non-negligible, investors would likely value credits at less than their face value.

Our view is supported by Officer's treatment of gamma in the numerical example in the appendix to his paper. Officer describes this numerical example as '...designed to help the reader through some of the obstacles to going from theory to practice':¹¹⁴⁸

Assume that 50 per cent of the tax collected at the company level represents personal tax, i.e. 50 per cent of tax credits can be utilized against personal tax liabilities so that $\gamma = 0.5$.

We consider our approach is consistent with the Officer framework and our estimation of the required return on equity. We consider what matters from a value to investor's perspective is the face value of imputation credits expected to be utilised as this reflects both the cost of these imputation credits to the regulated businesses and the benefit that investors receive from these credits when utilised to reduce their tax payable (or to receive a refund from the government). The post company (pre-personal) tax value of an imputation credit when utilised is approximately¹¹⁴⁹ its face value.

The Officer framework assumes all free cash flows (including imputation credits) are fully paid out each period. That is, the Officer framework is a 'perpetuity' framework.

¹¹⁴⁶ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 4.

¹¹⁴⁷ Recall that the utilisation rate equals gamma under Officer's perpetuity framework.

¹¹⁴⁸ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 11–17.

¹¹⁴⁹ It is approximately equal due to the time value of money that impacts the present valuation of distributed imputation credits. However, we consider any discounting for this would be immaterial

However, in reality not all imputation credits are necessarily paid out each period, nor are all other free cash flows necessarily paid out.¹¹⁵⁰ For example, it is typical for a company to retain some earnings from a previous year to fund part of its future investment, rather than pay out all earnings as dividends and fully raise the funding of future investment from external sources. Work by Monkhouse (and others) extends the Officer framework by allowing for less than a full payout of cash flows and imputation credits each period. Handley advised that Monkhouse effectively shows that:¹¹⁵¹

$$\gamma = F\theta + (1 - F)\psi$$

where:

- F is the proportion of imputation credits generated that are distributed in a period (the 'distribution rate').
- θ (theta) is the utilisation value to investors in the market per dollar of imputation credits distributed (the 'utilisation rate').
- ψ (psi) is the utilisation value of a retained credit to investors in the market.

Handley also advised that in frameworks such as Monkhouse's the utilisation rate in equilibrium is equal to the weighted average, by wealth and risk aversion, of the individual utilisation rates of investors in the market:¹¹⁵²

This interpretation of theta as a complex weighted average of investor utilisation rates is consistent with that appearing in Monkhouse (1993) and Lally and van Zijl (2003)...

This is also supported by Lally's remarks on the work of Lally and van Zijl:¹¹⁵³

Although Officer (1994) provides no clarification on this matter, because his derivation of the model is intuitive rather than formal, Lally and van Zijl (2003, section 3) provide a formal derivation of a generalisation of Officer's model (with the Officer model being a special case), in which variation of utilisation rates across investors is recognised. In this derivation, they show that [the utilisation rate] is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion.

Consistent with the advice we received from Lally, in the 2013 Guideline we recognised that the utilisation rate is equal to the weighted average, by wealth and risk

¹¹⁵⁰ This is evident in companies having positive franking account balances in aggregate.

¹¹⁵¹ Handley considered that, although Monkhouse does not use the term gamma, the interpretation is clear: J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 11 and footnote 12.

¹¹⁵² J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 18–20.

¹¹⁵³ M. Lally, *The estimation of gamma*, 23 November 2013, p. 11.

aversion, of the individual utilisation rates of investors in the market.¹¹⁵⁴ In the 2013 Guideline, we also considered the utilisation rate as the extent to which investors can use the imputation credits they receive to reduce their tax (or receive a refund). In this Instrument, consistent with Handley's advice and our decision made since 2014, we consider the utilisation rate is the utilisation value to investors in the market per dollar of imputation credits distributed.¹¹⁵⁵ However, we consider that our views in the 2013 Guideline, in more recent decision, and in this Instrument are broadly equivalent; that is, we consider the utilisation rate in this final decision still reflects the extent to which investors in the market can use the imputation credits they receive.

Finally, the 'utilisation' approach to the value of distributed imputation credits that is after company tax before personal tax and costs was confirmed by the Full Federal Court in May 2017 where the Court found it was not an error of construction for the AER to focus on utilisation rather than on implied market value.¹¹⁵⁶

11.2.4.2.1 Consistency between the 'utilisation' approach and the framework

For this final decision, we propose to maintain the 'utilisation' interpretation of gamma adopted in the draft decision. The 'utilisation rate' (or theta) is the value to investors of utilising imputation credits per dollar of imputation credits distributed. In estimating the utilisation rate, we have relied on the interpretation of theta from the Monkhouse framework. The framework considers that the utilisation rate is equal to the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors. For an 'eligible' investor, each dollar of imputation credit received can be fully returned to the investor in the form of a reduction in tax payable or a refund.¹¹⁵⁷ Therefore, we have considered that eligible investors have a utilisation rate of 1. Conversely, 'ineligible' investors cannot utilise imputation credits and have a utilisation rate of 0.

Our approach to interpreting and estimating the value of imputation credits is guided by:

- The requirements of the NER/NGR
- The role of the value of the imputation credits in the revenue building block framework—this suggests that the value of imputation credits is intended to reflect the value of imputation credits to investors in the benchmark efficient entity.¹¹⁵⁸
- Relevant academic literature (Officer)—the framework developed in a 1994 paper by Officer is widely recognised as providing the basis for the value of imputation

¹¹⁵⁴ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 23; The AER, *Explanatory statement to the rate of return guideline- Appendices*, December 2013, p. 179.

¹¹⁵⁵ See the AER past determinations for detail. For example: The AER, *Final decision: AusNet Services transmission determination 2017-22, Attachment 4—Value of imputation credits*, April 2017, p. 10.

¹¹⁵⁶ Federal Court of Australia, *Australian Energy Regulator v Australian Competition Tribunal (No 2)* [2017] FCAFC 79, May 2017, para. 756.

¹¹⁵⁷ This is the return to eligible investors before administrative costs, personal taxes and diversification costs. Handley advises that this is the desired basis for the utilisation rate.

¹¹⁵⁸ See section 11.2.4.1.2.

credits in the building block framework.¹¹⁵⁹ A key implication of Officer's framework is that the value of imputation credits should be estimated on a before-personal-tax and before-personal-costs basis. This is consistent with a rate of return determined on a nominal vanilla (that is, a post-company tax pre-personal tax and costs) basis.

- Relevant academic literature (Monkhouse)—the work of Monkhouse (and others) extends the Officer framework, and shows that the value of imputation credits can be estimated as the product of two parameters:
 - the proportion of imputation credits generated that is distributed to investors (the distribution rate)
 - the utilisation value to investors in the market per dollar of imputation credits distributed (the utilisation rate).

Consistent with this literature, we determine the value of imputation credits as the product of these two parameters.

More specifically, in determining the value of imputation credits our approach is to:

- calculate the distribution rate, we look at the (face) dollar of the imputation credits distributed as a proportion of the (face) dollar value of tax paid by a regulated firm operating efficiently.
- calculate the utilisation rate, we look at the before personal tax (face value) reductions of company tax as a proportion of the (face) dollar value of imputation credits that are distributed from companies.

We consider our 'utilisation' interpretation of the value of imputation credits that reflects the before-personal-tax and before-personal-costs value of tax returned to investors is consistent with the Officer's framework. Under this 'utilisation' interpretation, we consider estimating the value of gamma from the product of the utilisation rate and the distribution rate is appropriate.

The NER/NGR employs the building block framework to determine a revenue allowance that contributes to the achievement of the NEO/NGO. The Officer framework forms the basis for the regulatory rate of return framework in the NER/NGR, and gamma forms part of the Officer framework. We consider adopting an estimation approach that is consistent with the Officer framework will or is likely to contribute to the achievement of the NEO/NGO¹¹⁶⁰ and other requirements of the NER/NGR. Therefore, we consider adopting an incremental review limited to updating the estimates for theta (the utilisation rate) and the distribution rate is consistent with the Rules and the achievement of the national electricity and gas objectives.

¹¹⁵⁹ R. Officer, *The cost of capital of a company under an imputation system*, *Accounting and finance*, vol. 34(1), May 1994

¹¹⁶⁰ NEL, s. 16(1)(a); NGL, s. 28(1)(a).

In response to the NSG and ENA's submission that the AER's adoption of the new approach for estimating gamma is not an incremental review¹¹⁶¹, we consider our approach to examine and update the empirical evidence in determining the gamma input estimates for the utilisation and distribution rates, rather than constructing an extensive review of our 'utilisation' approach, is an incremental review. We also do not consider an increase in the gamma estimate from 0.4 to 0.585, either in isolation or in combination with the changes in the vanilla WACC relative to the 2013 rate of return guideline, will have negative long-term implications for customers. We expect a gamma of 0.585, in combination with an allowed return on equity calculated in accordance with this Instrument, will provide the service providers with a post company tax return on equity inclusive of imputation credits at least sufficient to contribute to a rate of return that meets the ARORO. Most importantly, we consider this value will contribute to the achievement of the NEO and NGO.

We acknowledge the CRG's submission that it did not accept the AER's empirical 'utilisation' approach and it considered that the AER's statement that there is a general level of agreement amongst shareholders to applying a 'utilisation' approach is incorrect.¹¹⁶²

The previous debate on gamma was around the interpretation of the utilisation rate. Two different interpretations have been proposed for the utilisation rate (theta):

- A market value approach - the price that the investor would be prepared to pay for a distributed credit if there was a market for it¹¹⁶³
- A cash flow, or 'utilisation' approach - the proportion of distributed credits return to investors through the utilisation of imputation credits¹¹⁶⁴

In the draft decision, we noted that some stakeholders had accepted our 'utilisation' interpretation of gamma.¹¹⁶⁵ In the submissions on the draft decision, most of the stakeholders proposed to adopt the 'utilisation' approach.¹¹⁶⁶ In light of the Independent Panel's recommendation and the CRG's submission, we have reconsidered our approach to gamma in this final decision and given the reason above, we consider it

¹¹⁶¹ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 17; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 6.

¹¹⁶² The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 34.

¹¹⁶³ See the AER past determinations for detail. For example: The AER, *Final decision: AusNet Services transmission determination 2017-22, Attachment 4—Value of imputation credits*, April 2017

¹¹⁶⁴ See the AER past determinations for detail. For example: For example: The AER, *Final decision: AusNet Services transmission determination 2017-22, Attachment 4—Value of imputation credits*, April 2017

¹¹⁶⁵ Ergon Energy and Energex, *Ergon Energy and Energex submission on AER Issues Paper*, 12 December 2017, p. 7; PIAC, *PICA letter to the AER*, December 2017, p. 2; EUAA, *EUAA submission to AER Rate of Return Review issues paper*, December 2017, pp. 9-10

¹¹⁶⁶ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 17; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 140; Evoenergy, *Review of rate of return guideline-draft decision*, 25 September 2018; South Australian Centre for Economic Studies, *Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report*, July 2018, p. 8

appropriate to maintain the 'utilisation' approach used since the 2013 Guideline and taken in the draft 2018 rate of return decision.

Moreover, we consider the CRG's estimate of the utilisation rate of 1 is also based on the 'utilisation' interpretation for theta. It considered that the shareholders of a BEE are Australian who are able to utilise the distributed imputation credits and therefore a utilisation rate of 1.¹¹⁶⁷ It proposed a distribution rate to be estimated from its proposed formula, which looks at the net investment in the RAB.¹¹⁶⁸ We acknowledge that the CRG's proposed basis for estimating the two parameters. However, we consider its proposed approach is consistent with our 'utilisation' interpretation of gamma that the value of imputation credits is the proportion of company tax returned to investors through the utilisation of imputation credits. We respond to the CRG's proposed approach for estimating each parameter in detail in section 11.6 and 11.9.

11.2.5 Conclusion

We have revisited the approach we have taken to assess our 'utilisation' approach for estimating gamma in light of the Independent Panel's recommendation. We remain of the view that our 'utilisation' approach adopted in the draft decision is appropriate and will, or is most likely to, contribute to the achievement of the NGO and NEO to the greatest degree. We therefore have maintained our 'utilisation' approach adopted in the draft decision for estimating the value of imputation credits used in the Instrument.

11.3 The distribution rate as an industry-specific parameter and the utilisation rate as a market-wide parameter

11.3.1 Draft decision

In the draft decision, we considered a distribution rate estimate for listed equity and a utilisation rate estimate for all equity was appropriate for a BEE.¹¹⁶⁹ The draft decision departed from our approach used in recent regulatory determinations, where we adopted a market wide distribution rate for a BEE (i.e. based on all equity).¹¹⁷⁰

11.3.2 Independent Panel review

The Independent Panel acknowledged the AER's proposed approach for estimating gamma was based on a utilisation rate estimate for all equity and a distribution rate

¹¹⁶⁷ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 35.

¹¹⁶⁸ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 33.

¹¹⁶⁹ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 397.

¹¹⁷⁰ The AER, *Final decision: Ausnet Services transmission determination 2017-2022, Attachment 4- value of imputation credits*, April 2017, p. 52.

estimate from the financial reports of the top 20 ASX listed firms.¹¹⁷¹ The Panel accepted that the aggregate distribution rate of the top 20 ASX listed firms provides a meaningful insight into the BEE, but recommended the AER extend the analysis beyond the top 20 ASX listed firm and give more attention to excluding offshore operations.¹¹⁷² The Panel did not raise any issues with a utilisation rate estimate based on all equity for a regulated business.

11.3.3 Stakeholder submissions

The ENA proposed the distribution rate and the utilisation rate should be estimated consistently.¹¹⁷³ It considered the 'utilisation' interpretation of gamma seeks to determine how much of the corporate tax paid by a BEE will be returned to its shareholders via the redemption of imputation credits. Under this interpretation, the ENA argued the value of imputation credits should be estimated based on the proportion of credits distributed to a BEE's shareholders and the proportion of credits redeemed by those shareholders.¹¹⁷⁴

If listed equity represents the most suitable estimate of a BEE, the ENA proposed gamma should be based on the proportion of credits distributed to, and redeemed by, shareholders in listed firms.¹¹⁷⁵ The ENA considered this approach would involve pairing the AER's preferred estimate of the distribution rate of 0.83 for listed equity from the financial statements of the top 20 ASX listed firms with what the ENA stated is the AER's preferred estimate of the utilisation rate for listed equity of 0.47, producing a gamma of 0.39.¹¹⁷⁶

Alternatively, if a BEE is better represented by all equity, the ENA proposed that the best estimate of gamma would be the direct estimate of 0.34 from tax statistics.¹¹⁷⁷

The NSG did not support the AER's specification that a BEE is likely to be a listed Australian company.¹¹⁷⁸ It considered this conceptualisation of a BEE excludes the approach proposed by the ENA and the NSG to adopt a direct estimate for Australian companies from ATO tax statistics.¹¹⁷⁹

11.3.4 AER consideration

¹¹⁷¹ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 49.

¹¹⁷² Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 53.

¹¹⁷³ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 143.

¹¹⁷⁴ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 143.

¹¹⁷⁵ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 143.

¹¹⁷⁶ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, pp. 143-144

¹¹⁷⁷ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 144.

¹¹⁷⁸ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 17.

¹¹⁷⁹ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 17.

We have considered the ENA's submission on the sub-parameters of gamma being estimated consistently. We consider it is not necessary to match the distribution and utilisation rate estimates for listed and all equity. Rather, we remain of the view that a distribution rate estimated from listed equity and a utilisation rate estimated from all equity is appropriate. Our decision is based on the following reasons:

- Lally advised most of the regulated firms are either listed or owned by listed firms, and listed firms have much higher distribution rates than unlisted ones. Therefore, a distribution rate estimated from listed equity would be appropriate for a regulated firm operating efficiently.¹¹⁸⁰
- Many unlisted firms are owned by individuals who have an incentive to reduce dividends to limit the amount of tax paid at higher marginal personal rates. Therefore, the dividend policy of these firms would be different from a regulated firm acting efficiently and a distribution rate from all equity will overcompensate such a firm. This is supported by Lally, who considered unlisted firms include sole traders who have corporatized in order to reduce their tax bill and this requires a low dividend payout rate. Whereas, he considered listed companies are generally widely held by investors, who have little knowledge of the actual state of affairs within these firms, and dividends can be used to signal the firm's profits.¹¹⁸¹
- The public data from the ATO confirms the point above. It shows that the distribution rate estimate for unlisted firms in Australia is materially lower than the estimates for listed firms.¹¹⁸²
- Lally advised it is not necessary to estimate the utilization and distribution rates from the same set of companies.¹¹⁸³ This is because he considered the distribution rate is firm specific and one would not want to use unlisted firms for the distribution rate. By contrast, the utilisation rate as interpreted by the AER in accordance with derivations of the Officer model is a weighted average over the utilization rates of all investors in the market, including both foreign and local investors, if one recognize the existence of foreign investors. Under this interpretation, Lally considered theta is a market-wide parameter and should be estimated from the ABS data for all equity.¹¹⁸⁴ We agree with Lally and consider a market wide utilisation rate is consistent with the Officer model.

¹¹⁸⁰ M. Lally, *The estimation of gamma*, November 2013, pp. 10-11; M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 19; M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 33, p. 4.

¹¹⁸¹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 32, p. 9.

¹¹⁸² We note that while we do not consider the public ATO data sufficiently reliable to estimate the distribution rate, we consider it is sufficiently reliably to support there is a material lower distribution rate for unlisted firms relative to listed firms.

¹¹⁸³ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 3-4

¹¹⁸⁴ M. Lally, *Issues in the estimation of gamma*, April 2017, p. 13; M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 3-5

We note the ENA proposed that the utilisation rate of 0.47 for listed equity was the AER's best estimate. This is not correct. The figure of 0.47 comes from the AER's regulatory draft decision for APA VTS released in July 2017. We do not consider this estimate will give a reliable and relevant utilisation rate estimate for a regulated firm for two reasons:

- The data is out of date. This estimate is based on the March 2017 ABS data release, which is before the ABS reviewed and updated its data sets.
- We consider the utilisation rate estimate should be based on all equity

Even if we considered a utilisation rate estimate based on listed equity was appropriate, which we do not, the updated ABS data indicates a listed equity utilisation rate estimate ranging from 0.52 to 0.58 over the period from Sept 2000 to June 2018 with a June 2018 estimate of 0.57. If we pair the current estimate of 0.57 with a distribution rate estimate of 0.90 based on Lally's recent analysis on top 50 ASX firms with no adjustment for foreign operations, it would give a value of imputation credits of 0.513.

The NSG proposed that it does not support the AER's view that a BEE is likely to be a listed Australian company.¹¹⁸⁵ It considered an estimate of the distribution rate for the ASX top 20 firms and an utilisation rate for all companies does not produce an estimate of gamma that is consistent with that for a BEE.¹¹⁸⁶ For the reasons outlined above, we consider our approach for estimating the distribution rate based on listed equity and the utilisation rate based on all equity remain appropriate. We do not consider a distribution rate based on all equity appropriate because unlisted firms are frequently owned by individuals who have the incentive to reduce dividends to limit the amount of tax paid at higher marginal personal rates. We do not consider a distribution rate estimate based on, or heavily influenced by, unlisted firms is an appropriate estimate for an efficient entity taken to be operating the business of the regulated firm.

Further, we do not agree with the ENA and the NSG that the ATO tax statistics gives a direct estimate of gamma for an efficient regulated firm for reasons discussed in section 11.4. Our consideration to the estimates for the sub-parameters from different empirical evidence is discussed in sections below.

11.3.5 Conclusion

Consistent with the draft decision, we have used a distribution rate estimate for an efficient regulated firm from listed equity and a utilisation rate estimate from all equity.

11.4 A value of imputation credits from the ATO tax statistics

¹¹⁸⁵ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 17.

¹¹⁸⁶ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 18.

11.4.1 Draft decision

In the draft decision, we had regard to the estimates of parameters from the ATO tax statistics in estimating gamma. However, we did not put much weight on the estimates given the underlying issues identified by the ATO with these statistics.¹¹⁸⁷ In particular, the ATO noted the issues with using the FAB data as the basis for a macro-economic analysis of the Australian imputation system.¹¹⁸⁸ We considered the ATO dividend data is likely to have less problems.¹¹⁸⁹

In estimating the distribution rate, we had regard to the estimate of 0.57 from the ATO dividend data for all equity.¹¹⁹⁰ In estimating the utilisation rate, we placed some reliance upon ATO dividend data, which suggests an estimate of 0.61 for all equity.¹¹⁹¹

We did not agree with some stakeholders proposed a direct estimate of the value of imputation credits from the ATO tax statistics.¹¹⁹² This is because we considered there are some potential issues with this approach, which includes a market wide distribution rate being a poor proxy for the distribution rate of a BEE.¹¹⁹³

We considered Wheatley's proposed adjustment to the direct estimate of gamma from ATO tax statistics for a firm specific distribution rate¹¹⁹⁴. The adjusted estimate indicated a value of imputation credits of 0.49, which we considered supported a value of imputation credits of 0.5 in our draft decision.

11.4.2 Independent Panel review

The Independent Panel agreed with the AER's intention to continue to work with the ATO to better understand the ATO data sets, and the reliance that should be placed on the different data sets for estimating gamma.¹¹⁹⁵

11.4.3 Stakeholder submissions

The ENA, the NSG and APA proposed an estimate of gamma of 0.34 from ATO tax statistics because they considered there is no material concerns about the quality of the data for 'credits created' and 'credits redeemed', which could be used to calculate

¹¹⁸⁷ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 433.

¹¹⁸⁸ The AER, *Note on ATO staff response to AER staff inquiries about Hathaway's 2013 report on imputation credit redemption*, 29 March 2018

¹¹⁸⁹ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 433.

¹¹⁹⁰ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 397.

¹¹⁹¹ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 399.

¹¹⁹² The AER, *Draft rate of return guidelines explanatory statement*, July 2018, pp. 433-434

¹¹⁹³ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 434.

¹¹⁹⁴ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, pp. 434-435

¹¹⁹⁵ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 51.

gamma.¹¹⁹⁶ The NSG considered this approach is better than the AER's method because:¹¹⁹⁷

- It does not require a separate estimate of the utilisation rate and distribution rate.
- It does not create a hybrid estimate of the value of imputation credits for all listed equity and all equity rather than an estimate for a BEE
- It considers a broader range of comparable firms that are more likely to represent the characteristics of the NSP BEE

APA considered that other than the FAB data, the use of other statistics published by the ATO does not seem to be in question.¹¹⁹⁸ Therefore, it considered greater weight should be placed on the gamma estimates made using tax statistics. This includes using the tax statistics for calculating the utilisation rate.¹¹⁹⁹

APGA proposed that the tax statistics should be weighted no lower than other complementary datasets such as the ABS data.¹²⁰⁰ It considered both the ABS and the ATO datasets provide useful information but both are imperfect. It suggested the AER consider whether it is prudent to rely heavily on the ABS-based equity ownership approach in place of taxation statistics.¹²⁰¹

The ENA and joint energy businesses proposed a number of problems with a new note from the ATO dated 20 September 2018.¹²⁰² However, the ENA considered the main concern is with the AER's process. It considered the ATO should have reliable data on credits redeemed and credits created. If the AER has concerns about the reliability of the data on credits redeemed and credits created obtained from the published taxation statistics, the ENA proposed the AER to ask the ATO for the correct figures.¹²⁰³

The ENA submitted that the alternative of a continuing focus on the ATO's notes, which it considered brief and unclear, would not be consistent with a transparent evidence-led process.¹²⁰⁴ It considered a final guideline which adopts this approach

¹¹⁹⁶ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 154; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. v; NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 19.

¹¹⁹⁷ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 19.

¹¹⁹⁸ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, pp. 47-48

¹¹⁹⁹ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. v.

¹²⁰⁰ APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, p. 37.

¹²⁰¹ APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, p. 38.

¹²⁰² ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 154; Joint Energy Businesses, *Submission to draft 2018 rate of return guideline*, 25 September 2018, p. 7.
<https://www.aer.gov.au/system/files/ATO%20Note%20-%20Clarification%20of%20points%20in%20previous%20ATO%20note%20dated%209%20May%202018%20titled%20%E2%80%98ATO%20note%20to%20the%20AER%20regarding%20imputation%27%20-%2014%20September%202018.pdf>

¹²⁰³ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 155.

¹²⁰⁴ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 155.

would rather create a perception that significant evidence that is relevant to the assessment of credible alternative methodologies has not been actively or appropriately sought.¹²⁰⁵ The ENA recommended the AER:¹²⁰⁶

- Request the relevant data from the ATO
- Provide the stakeholders with guidance that this information is being sought and publish the resulting data on receipt

In contrast, SACES considered the fact that the ATO seemingly should have good data does not mean that it actually does have a good data.¹²⁰⁷

11.4.4 AER consideration

Since the publication of our draft decision, we have received a new note from the ATO dated 14 September 2018 which seeks to clarify the points in its previous note titled 'Franking account balance - tax of time series data from Taxation Statistics' dated 9 May 2018.¹²⁰⁸ In the 14 September note, the ATO advised:¹²⁰⁹

- Taxation statistics cannot be used to estimate the quantum of franking credits created over time because it has insufficient information to reliably quantify the amount.
- The usage rate of franking credits is not able to be calculated from taxation statistics data due to the aggregated nature of the data.
- The franking account balance and franked dividends paid amounts are information labels which may have some data reporting issues

We acknowledge the issues raised in the ATO note in relation to the use of the ATO public data for estimating any parameters concerned with franking credit which include gamma, the distribution rate and the utilisation rate. Lally also considered the ATO public data should not be used given that the shortcomings in the data and the alternatives are superior to the ATO data.¹²¹⁰ He also suggested that the ATO public data is unsuitable for estimating gamma directly because it covers all firms, which are unsuitable for estimating the distribution rate for a regulated network business operating efficiently.¹²¹¹

¹²⁰⁵ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 155.

¹²⁰⁶ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 155.

¹²⁰⁷ South Australian Centre for Economic Studies, *Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report*, July 2018, p. 9.

¹²⁰⁸ The ATO, *ATO note to the AER: Clarification of points in previous note titled 'Franking account balance- tax of time series data from Taxation Statistics'*, 14 Sep 2018

¹²⁰⁹ The ATO, *ATO note to the AER: Clarification of points in previous note titled 'Franking account balance- tax of time series data from Taxation Statistics'*, 14 Sep 2018

¹²¹⁰ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 6.

¹²¹¹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 32-33

The ENA and joint energy businesses proposed a number of problems with the ATO new note dated 20 September 2018.¹²¹² The ENA considered the new note is as materially unclear as the ATO's previous note. In particular, it proposed that the AER should ask the ATO for the 'correct' figures if it has concerns with the ATO public data.¹²¹³ In light of the Independent Panel's recommendation and the businesses' submission, we have requested the ATO to provide us with its estimated figures for corporate tax paid and credits redeemed over recent years. We also have requested an estimate of imputation credits 'lost' through time due to corporate changes or other reasons.

In response to our request the ATO provided estimates of the net redemption rate of distributed credits for financial years 2012 through 2017 of between 0.5 and 0.59 after taking into account credits recycled within companies.¹²¹⁴ However, we note that this new analysis was undertaken in a relatively short time frame and does not provide any estimates on the likely error bounds in the estimates. In addition, the AER has been unable to check the underlying data or calculations.¹²¹⁵ The ATO's final advice was only received on 11 December 2018. Therefore, given the underlying uncertainties associated with these new redemption rate estimates and the fact stakeholders have not had an opportunity to comment on them, and given the use of the equity ownership approach based on ABS data is both better aligned do the theoretical basis of the Monkhouse extension of the Officer framework and based on publically available data and replicable, we consider no adjustment to the utilisation rate of 0.65 primarily based on the ABS equity ownership data is warranted based on these new ATO estimates, or appropriate at this stage. We will continue to work with the ATO to explore the possibility of obtaining reliable data in future reviews.

The ENA, the NSG and APA proposed an estimate of gamma of 0.34 from the ATO public tax statistics.¹²¹⁶ We consider that even if the credits redeemed and company tax paid calculated from the ATO public taxation statistics were reliable, a market wide value of imputation credits from ATO tax statistics, which implies a distribution rate estimate from all equity, is not appropriate. As discussed in section 11.3 and in our draft decision, we consider the distribution rate of an efficient regulated firm is firm specific and should be estimated from listed firms. We do not consider that a market

¹²¹² ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 154; Joint Energy Businesses, *Submission to draft 2018 rate of return guideline*, 25 September 2018, p. 7. <https://www.aer.gov.au/system/files/ATO%20Note%20-%20Clarification%20of%20points%20in%20previous%20ATO%20note%20dated%209%20May%202018%20titled%20%E2%80%98ATO%20note%20to%20the%20AER%20regarding%20imputation%27%20-%202014%20September%202018.pdf>

¹²¹³ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 155.

¹²¹⁴ The ATO, *note to the AER: Franking account reconciliation*, 11 December 2018; The ATO, *Confidential attachment to ATO note to the AER*, 11 Dec 2018.

¹²¹⁵ In addition to the timeframe that has meant the AER could not have reviewed the ATO analysis, the ATO data is subject to confidentiality restrictions that mean raw tax return data cannot be shared with the AER.

¹²¹⁶ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 154; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. v; NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 19.

wide distribution rate is representative of the efficient distribution rate of a regulated entity. We also do not consider it is necessary to estimate the distribution rate and the utilisation rate based on the same group of investors. Lally supported our views on both points. He considered that a distribution rate estimate based on all firms is not appropriate for the regulated businesses and would underestimate the expected distribution rate.¹²¹⁷ He also remains of the view that the utilisation rate is market wide while the distribution rate is firm specific.¹²¹⁸

Moreover, a national gamma from the ATO public tax statistics includes firms that make losses and disappear from the tax system without distributing their accumulated credits. The implied market wide distribution rate under this approach appears to have limited connection with a regulated firm that we consider to be an ongoing concern. Indeed, it will underestimate the efficient distribution rate of a regulated firm acting efficiently for this reason. This is supported by Lally, who considered such companies necessarily have lower distribution rates and are not suitable to estimate the distribution rate of a regulated firm operating efficiently.¹²¹⁹ The ATO's analysis also supports us on this point. In its note, the ATO indicated there are approximately 1%-2.5% of total available franking credits for distribution lost each year by companies who no longer lodge income tax returns. It considered this impact accumulates over time, producing a pronounced error effect when attempting to reconcile the franking account balance.¹²²⁰

The NSG argues that a direct estimate of gamma from the ATO tax statistics for all companies is better than the AER's estimation approach because it does not require separate estimates of the utilisation rate and distribution rate.¹²²¹ However, the Officer's model requires an estimate of the utilisation rate in order to estimate the market risk premium and hence we still need a separate and consistent estimate of the utilisation rate. Lally considered that the utilisation rate estimate would presumably have to use the ATO public data if gamma was estimated from the ATO public data, and the unreliability of the ATO public data in estimating the credits distributed (and hence the utilization rate) would then be problematic.¹²²² Overall, for the reasons discussed above, we do not consider a direct gamma estimate from the ATO public data is an appropriate estimate for a regulated network service provider operating efficiently.

The APGA and APA recommended the AER give more weights to the public ATO data, acknowledging that both the ABS and ATO datasets provide useful information but both are imperfect.¹²²³ We have considered the businesses' recommendation to give

¹²¹⁷ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 37; M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 3-4

¹²¹⁸ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹²¹⁹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 12.

¹²²⁰ The ATO, *note to the AER: Franking account reconciliation*, 11 December 2018

¹²²¹ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p.19.

¹²²² M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 7.

¹²²³ APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 37; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. v.

more weights to the ATO data. However, in light of the ATO's notes, we consider there is a range of issues with the estimates of gamma and its sub-parameters based on the ATO public data and we no longer consider the ATO public data will give a reliable estimate for any of the parameters, including gamma, the distribution rate and the utilisation rate.

11.4.5 Conclusion

We have placed no weight on estimates based on the ATO public data. We have also made no adjustment to the utilisation rate based on the most recent ATO analysis.

11.5 Distribution rate (or payout ratio)

11.5.1 Draft decision

In estimating the payout ratio, we proposed to continue using the cumulative payout ratio approach we had adopted since the 2013 Guideline. This approach calculates the proportion of imputation credits generated (via tax payments) that have been distributed by companies over a certain period of time. We considered the strengths and limitations of the relevant evidence. The body of evidence included:

- An estimate by Lally based on the top 20 ASX-listed firms' financial reports
- ATO tax statistic based estimates
- estimates of the potential comparators' distribution rates based on the data from the financial reports

Our estimate of 0.83 for the distribution rate was based on:

- giving primary weight on the updated estimate from Lally's top 20 ASX-listed firms' financial reports, which suggested an estimate of at least 0.88 after adjustment for the credits recycled
- having regard to ATO tax statistics estimate (dividend data), which suggested an estimate of 0.57 for all equity
- having regard to the distribution rate of the comparators from the same industry as a BEE, which suggested an estimate of 1 based on Lally's analysis
- rounding to ensure consistency between parameters given we had used an overall value of imputation credits of 0.5 and a utilisation value of 0.6.

11.5.2 Distribution rate from top 20 ASX listed firms

11.5.2.1 Draft decision

We proposed to place primary weight on the distribution rate estimated from the financial statements of the top 20 ASX-listed firms having considered Lally's advice.¹²²⁴ This approach suggested an estimate for the distribution rate of at least 0.88.

11.5.2.2 Independent Panel review

The Independent Panel acknowledged the AER relied on more recently available data provided by Lally on the distribution rate of the top 20 ASX listed firms since 2000.¹²²⁵ It agreed the data is relevant (it measures precisely what is required), reliable (audited) and replicable (the definitions and methodology are clear).¹²²⁶ It also considered the estimates of the distribution rate for listed companies in the sector appeared broadly consistent with the top 20 data.

While agreeing the distribution rates for the top 20 ASX listed firms provide a meaningful insight into a BEE, the Independent Panel found:¹²²⁷

- It is not clear whether the top 20 ASX listed firms were used because it is the most relevant group or because it is judged representative. Either way, there would be merit in extending the analysis beyond the top 20 ASX listed firms, especially in view of the concentration of finance sector securities in the top 20 ASX listed firms. The information to undertake this work is readily available.
- Given the specific mention of domestic operations when considering the characteristics of a BEE to which we referred earlier, there could be more attention given to excluding offshore operations (or companies with a high proportion of offshore earnings). Lally has provided some information about this impact.

11.5.2.3 Stakeholder submissions

Some stakeholders proposed that the distribution rates for the top 20 ASX listed firms are not comparable with a BEE.¹²²⁸ They considered the limitations of this approach include:

- The top 20 ASX listed companies have not been shown to be comparable with a BEE NSP, and indeed almost 50% of its market weights are of financial firms¹²²⁹

¹²²⁴ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 397.

¹²²⁵ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 53.

¹²²⁶ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 53.

¹²²⁷ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 53.

¹²²⁸ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 18; ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p.140; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018,p. 45; The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 32.

- The AER has not considered the comparability of the top 20 ASX listed firms with a BEE in regards to the capital intensity of a firm, which will affect its dividend payout ratio¹²³⁰
- The top 20 ASX listed firms have 40% foreign revenue, whereas a BEE has 100% domestic revenue.¹²³¹ To the extent that these 20 companies are able to use foreign revenues to distribute imputation credits, the estimate will be overstated.¹²³²
- The relevant BEE characteristics for estimating the distribution rate is that it pays tax at the company tax rate. It is necessary to use data from a broader range of companies that are comparable in a relevant way¹²³³
- The top 20 ASX listed firms were used because of the size of the task of estimating the distribution rate for all listed firms. This results in inconsistent estimation approaches for the utilisation and distribution rates¹²³⁴
- The top 20 ASX listed firms vary materially in terms of dividend payout rate. For example, over the 2000-2013 period examined by Lally, the large mining firms had low dividend payout rates (as that period coincided with the mining investment boom) while Telstra had a very high payout rate. It is impossible for all 20 firms to be appropriate comparators on this dimension, because not all can have a dividend payout ratio that matches a BEE.¹²³⁵
- The top 20 ASX listed firms has been selected on the basis of size, but size is not relevant to the distribution rate¹²³⁶
- Scale of operation is likely to be an important factor for the distribution rate, but scale has not been systematically investigated¹²³⁷
- The estimates are derived from franking account balance (FAB) data, which is known to be unreliable due to the 'dynamic nature of the imputation system'.¹²³⁸

¹²²⁹ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p.18; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

¹²³⁰ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p.18.

¹²³¹ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p.18; ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 147; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

¹²³² ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 147.

¹²³³ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 18.

¹²³⁴ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 18.

¹²³⁵ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 147.

¹²³⁶ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 147; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

¹²³⁷ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

¹²³⁸ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 140.

The problems for individual firms that have been identified in the ATO FAB data also apply to the estimate of the top 20 ASX listed firms.¹²³⁹

- The top 20 ASX listed firm approach assumes that all reductions in the FAB relate to credits being distributed to shareholders, although material reductions occur for other reasons. So, this approach can be used only as an upper bound and not a point estimate.¹²⁴⁰
- Not all credits distributed by the top 20 ASX listed firms are immediately available for end shareholders to redeem. Some credits will be retained by other companies or trusts until they pay a dividend or make a distribution.¹²⁴¹

The ENA also noted section 8.2 of its May 2018 submission documented a number of other problems with the estimate from the top 20 ASX listed firms which appeared to remain unaddressed in the draft guideline.¹²⁴² It also considered the evidence does not support the AER's abandonment of its current approach in favour of placing 100% weight on the ASX listed firm approach (from either the largest 20 or largest 50 ASX listed firms).¹²⁴³

11.5.2.4 AER consideration

We have considered the stakeholders submissions and the Independent Panel's recommendation on the distribution rate estimate from the financial reports of the top 20 ASX listed firms. We agree with the Independent Panel that the source is reliable, relevant and replicable, and the distribution rates for the top 20 ASX listed firms based on this data source provide a meaningful insight into the distribution rate of an efficient regulated firm. In response to the Independent Panel's questions, the reason for using the top 20 firms is because the top 20 firms account for a large proportion of the value of the equity in the ASX200¹²⁴⁴ and Lally considered the distribution rate estimate should be based on listed equity, therefore, he considered the gains from further increases in the sample size would be small.¹²⁴⁵ We agree with Lally and consider an aggregate estimate from a sample of large listed firms representative of the efficient distribution rate of a regulated firm could be expected to achieve on average.

Consistent with the Independent Panel's recommendation that there would be merit to extend the analysis beyond the top 20 ASX listed firms and that more attention should be given to excluding offshore operations, we commissioned Lally to extend his analysis to the top 50 ASX listed firms. The analysis indicates a distribution rate of 0.89 for the top 50 ASX listed firms.¹²⁴⁶ We consider the estimate from the top 50 ASX listed

¹²³⁹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 145.

¹²⁴⁰ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 146; APGA, Submission to the AER 2018 rate of return guideline draft decision, 25 September 2018, p. 39.

¹²⁴¹ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 148.

¹²⁴² ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 149.

¹²⁴³ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 140.

¹²⁴⁴ M. Lally, Review of submissions to the QCA on the MRP, risk-free rate and gamma, 12 March 2014, p. 30.

¹²⁴⁵ M. Lally, *Issues in the estimation of gamma*, April 2017, p.12.

¹²⁴⁶ M. Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, October 2018, p. 3.

firms is marginally better than the estimate from the top 20 ASX listed firms we considered in making the draft decision given it is a larger sample of large listed firms. However, we note the difference between the two estimates is not material.

Lally also examined the distribution rate of a subset of the top 50 companies with minimal foreign operations.¹²⁴⁷ His analysis indicates the aggregate distribution rate for the firms with a foreign operation ratio of no more than 20% is 0.93 and the weighted median is 0.96. The aggregate distribution rate for the firms with a foreign operation ratio of no more than 10% is 0.89 and the weighted median is 0.92.¹²⁴⁸ Lally also regressed the distribution rate on the foreign operations proportion, with the intercept in the regression providing the estimate for the distribution rate of a firm with no foreign operations. The regression result indicated an estimate of the distribution rate for a firm with no foreign income is 0.96.¹²⁴⁹ Overall, Lally considered an estimate of 0.95 for the distribution rate for a BEE is appropriate after taking into account the effect of foreign operations.¹²⁵⁰

We accept it appears likely companies with only Australian operations are distributing a higher proportion of imputation credits. However, it is ultimately an empirical question which we asked Lally to examine. While we acknowledge that a regulated entity will have 100% of its regulated income from Australian sources and Lally's analysis indicates a distribution rate estimate of 0.95 for firms have only Australian operations, we have not increased the distribution rate to 0.95 because:

- Lally's recent analysis is new and stakeholders have not had an opportunity to comment on it. Nor have we had sufficient time to properly test the regressions in Lally's analysis.
- No stakeholders proposed a higher distribution rate than 90%.

Overall, we consider a distribution rate estimate of 0.9 rounded to the nearest 0.05 from an estimate of 0.89 based on the financial reports of the top 50 ASX listed firms is an appropriate estimate for a regulated network service provider operating efficiently. We consider Lally's analysis on the impact of foreign operation also warrants a distribution rate estimate of at least 0.9. However, given the reasons outlined above, we consider a distribution rate of 0.9 is appropriate for this final decision. Our consideration to the rounding policy in relation to gamma and its sub-parameters is discussed in sections below.

While we acknowledge the limitations of the ASX listed firms approach for estimating the distribution rate proposed by the stakeholders, we consider the estimate we have used appropriate and better than the alternatives.

¹²⁴⁷ M. Lally, *The estimation of gamma: review of recent guideline*, December 2018

¹²⁴⁸ M. Lally, *The estimation of gamma: review of recent guideline*, December 2018, p. 28.

¹²⁴⁹ M. Lally, *The estimation of gamma: review of recent guideline*, December 2018, pp. 28-29

¹²⁵⁰ M. Lally, *The estimation of gamma: review of recent guideline*, December 2018, p. 5.

Table 28 summarises our response to the stakeholder submissions on the top 20 ASX listed firm approach and the estimate.

Table 28 AER responses to stakeholder submissions on the top 20 ASX listed firm approach and the estimate

Stakeholder submission	AER comments
<p>The top 20 ASX listed companies have not been shown to be comparable with a BEE NSP, and indeed almost 50% of its market weights are of financial firms¹²⁵¹</p>	<p>Given that the regulated firms are either listed or owned by listed firm, we consider the distribution rate for a regulated firm operating efficiently should be estimated from listed equity. We have considered the available data sources for estimating the distribution rate for listed equity. This includes the estimates based on the financial reports of the top 20 and top 50 ASX listed firms, estimates based on the ATO public data.</p> <p>Having considered the available empirical evidence for estimating the parameter, we propose to place primary weight on the estimate based on the financial reports of the top 50 ASX listed firms because we consider the distribution rate for the top 50 ASX listed firms, which accounts for 62% of Australia's share market capitalisation, is likely to reflect the distribution rate for a regulated firm operating efficiently.¹²⁵² We consider the data from the financial reports is reliable given it is audited and would therefore give a reliable estimate of the distribution rate. We also consider the estimate from the top 50 ASX listed firms is marginally better than the estimate from the top 20 ASX listed firms because of the larger sample size of listed firms.</p> <p>We have considered using the estimate from the ATO FAB data. However, given the underlying issues with the data and in light of the ATO's note that recommends the AER not use the ATO public data as the basis of a detailed macro analysis of Australia's imputation system, we consider it appropriate to place no weight on the ATO public data for estimating the distribution rate.¹²⁵³</p> <p>Some stakeholders argued that the distribution rate estimates of the top 20 firms, which large proportion of its market weights are of financial firms, are not comparable with a BEE.¹²⁵⁴ Consistent with the stakeholder submissions and the Independent Panel's recommendation, we commissioned Lally to extend his analysis to the top 50 ASX listed firms and also examine the mean and median of the distribution rate estimates of the top 50 firms ASX listed firms. Lally's new report indicates an aggregate distribution rate of 0.89 for the top</p>

¹²⁵¹ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 18; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

¹²⁵² <https://www.asx50list.com/>

¹²⁵³ ATO, *Note to the AER: Franking account balance- tax of time series data from Taxation Statistics*, 9 May 2018

¹²⁵⁴ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 18; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

50 ASX listed firms and a rounded estimate of 0.95 after adjustment for foreign operations.¹²⁵⁵ We note the unadjusted estimate is marginally higher than the estimates of the distribution rate for the top 20 ASX listed firms. We consider the unadjusted estimate of 0.89 supports a distribution rate of 0.90 when rounded to the nearest 0.05.

The AER has not considered the comparability of the top 20 ASX listed firms with a BEE in regards to the capital intensity of a firm, which will affect its dividend payout ratio¹²⁵⁶

We considered the comparability of the top 20 ASX listed firms with a BEE in regards to the capital intensity in the draft decision.¹²⁵⁷

Some businesses argued that a BEE is a highly levered and capital intensive firm, hence it should have a lower distribution rate than the estimates of the top 20 ASX listed firms.¹²⁵⁸ While the CRG considered the network businesses are in a mature market with largely mature technologies, whereas most of the firms listed on the stock exchange are in growth industries, which can be expected to be withholding dividends to finance an expanding capital base.¹²⁵⁹ Moreover, the CRG considered there is clear evidence of excess network capacity in the network businesses and therefore new net investment is unlikely in the present environment of over-investment.¹²⁶⁰ It proposed that if there was to be a fixed γ for the duration of this determination, the CRG suggested a value of 0.9, which would cover the possibility that over the period there may be some need for net new investment in the networks.¹²⁶¹

In the draft decision, we examined the actual growth in the regulated asset base (RAB) of the network businesses.¹²⁶² The average real rate of growth in RAB between 2013-14 and 2016-17 was approximately 1.9 per cent per annum for the electricity networks across the national electricity market according to the ENA's submission.¹²⁶³ We do not consider the growth rate of 1.9 per cent supports the argument that an efficient regulated firm would necessarily have a lower distribution rate than the average entity or Lally's estimate based on either the largest 20 or largest 50 ASX listed firms.

¹²⁵⁵ M. Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, October 2018, p. 3; M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹²⁵⁶ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p.18.

¹²⁵⁷ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 427.

¹²⁵⁸ ENA, *Response to discussion papers and concurrent expert evidence sessions*, 4 May 2018, p. 11; NSG, *Submission on the Rate of Return Guideline review*, 4 May 2018, p. 18; APGA, *Submission to the Issues Paper*, 12 December 2017, p. 10; Cheung Kong Infrastructure, *Review of the Rate of Return Guideline*, 12 December 2017, pp. 5-6; CEPA, *Expert Joint report: Rate of return guideline review- facilitation of concurrent expert evidence*, 21 April 2018, pp. 77-78.

¹²⁵⁹ CRG, *Submission to the AER on its Rate of Return Guideline Review*, May 2018, p. 60.

¹²⁶⁰ CRG, *Submission to the AER on its Rate of Return Guideline Review*, May 2018, p.G33, p. 38.

¹²⁶¹ CRG, *Submission to the AER on its Rate of Return Guideline Review*, May 2018, p. 38.

¹²⁶² The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 428.

¹²⁶³ ENA, *Response to discussion papers and concurrent expert evidence sessions*, 4 May 2018, p. 25.

RAB data collected from RFMs published by the AER as part of determinations for individual service providers, and from annual Economic Benchmarking RIN responses.

Moreover, we consider even if a service provider required a relatively large amount of equity capital to be invested into its asset base each year on top of the allowed revenue for the depreciation they get from the regulator, there are a number of ways that firms could fund their growth. This includes through the use of dividend reinvestment plans and secondary equity raisings. In particular, dividend reinvestment plans allow companies to retain their earnings while still distributing a high proportion of their imputation credits generated to shareholders. Therefore, for a regulated firm that operates efficiently, we do not agree with the businesses that it is necessarily true that an efficient regulated firm would retain a large proportion of its profit to fund its growth and thus have a lower distribution rate than the average entity or to Lally's estimates based on either the largest 20 or largest 50 ASX listed firms.

The top 20 ASX listed firms have 40% foreign revenue, whereas a BEE has 100% domestic revenue.¹²⁶⁴ To the extent that these 20 companies are able to use foreign revenues to distribute imputation credits, the estimate will be overstated.¹²⁶⁵

Having considered the stakeholders' submission and the Independent Panel's recommendation, we have commissioned Lally to examine the foreign operations in the top 50 ASX firms and its likely impact on the estimated distribution rate for a regulated firm operating efficiently. His analysis suggests a distribution rate estimate of 0.89 for the top 50 ASX listed firms and an estimate of 0.95 for the top 50 ASX listed firms after adjustment for foreign operations.¹²⁶⁶ The estimate for the top 50 ASX listed firms with no adjustment for foreign operations is slightly higher than the distribution rate estimate of 0.88 for the top 20 ASX listed firms. We consider the estimate of 0.95, which takes into account the effect of foreign operations, warrants a distribution rate estimate of at least 0.9 for a regulated firm operating efficiently. However, given the reasons discussed above, we consider adopting a rounded distribution rate estimate of 0.9 is appropriate for this final decision.

The relevant BEE characteristics for estimating the distribution rate is that it pays tax at the company tax rate. It is necessary to use data from a broader range of companies that are comparable in a relevant way.¹²⁶⁷

As discussed in section 11.3, we consider the distribution rate of an efficient regulated firm is a firm specific parameter and is appropriate to be estimated from listed equity.

In the draft decision, we placed primary weight on the distribution rate estimates from Lally's analysis of the financial reports of the top 20 ASX listed firms.¹²⁶⁸ For this final decision, we have considered a broader range of companies. We have considered Lally's estimate of the distribution rate from the financial reports of the top 50 ASX listed firms. This is based on the extension of Lally's

¹²⁶⁴ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 18; ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 147; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

¹²⁶⁵ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 147.

¹²⁶⁶ M. Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, October 2018; M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹²⁶⁷ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 18.

¹²⁶⁸ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 397.

(2018) earlier analysis covering the largest 20 ASX listed firms.¹²⁶⁹ Lally's new report indicates a distribution rate estimate of 0.89 and an estimate of 0.95 after adjustment for foreign operations.¹²⁷⁰ We consider a rounded distribution rate estimate of 0.9 from the financial statements for the top 50 ASX listed firms is likely to reflect an appropriate estimate of the distribution rate of an efficient regulated firm.

We agree with the ENA that some credits might be trapped or delayed. However, it is hard to quantify the amount. For a company that operates efficiently, it should distribute its franking credits to its shareholders as soon as it could because it is effectively a cash flow that can be returned to investors for the tax paid at company level. We do not consider the distributed credits retained by companies or trust will have a material impact on the utilisation value of imputation credits by investors. We consider this is a timing issue and it is difficult to quantify the likely impact on the value of imputation credits to investors.

Lally have also considered the effect of trapped credits on the distribution rate estimate. His analysis indicates the presence of intermediaries who might delay or trap the passing on of the credits to the ultimate users does not materially reduce the distribution rate being as credits received by the ultimate users within a year as a proportion of those released by the source companies in the same year.¹²⁷²

Moreover, in estimating the value of imputation credits we have not explicitly included the value of retained credits. This is mainly because we recognise that investors can only use imputation credits to reduce tax or receive a refund once the credits are distributed. However, as Handley acknowledged that the retained imputation credits may be worth more than zero and hence the traditional approach will be downward biased to the extent that retained imputation credits have value.¹²⁷³ We agree with Handley and consider assuming retained imputation credits have no value is a conservative assumption. We consider retained imputation credits have a positive value but it is difficult to quantify this value. There are many ways retained imputation credits could potentially benefit investors. For example, retained imputation credits may allow firms to conduct off market buy backs of their own stocks at a discount to prevailing market values. Off market buybacks can be structured in such a way that the purchase price is derived from both fully franked dividends and capital. Investors are prepared to sell back their shares at a discount as they derive value from imputation credits distributed and the capital gains loss that

Not all credits distributed by the top 20 ASX listed firms are immediately available for end shareholders to redeem. Some credits will be retained by other companies or trusts until they pay a dividend or make a distribution.¹²⁷¹

¹²⁶⁹ M. Lally, *Estimating the distribution rate for imputation credits*, June 2018

¹²⁷⁰ M. Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, October 2018, p. 3.
M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹²⁷¹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 148.

¹²⁷² M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 17-19

¹²⁷³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 14.

outweighs the capital loss they incur from selling at a discount.¹²⁷⁴ Shareholders that do not participate in off market buybacks benefit from capital appreciation of their shares as the firm's capital is brought back at a discount to the prevailing market prices.

However, we consider assuming retained imputation credits have no value might be a reasonable assumption to the extent that imputation distributions rates are expected to remain constant overtime.

We agree with the ENA that not all reductions in the FAB relate to credits being distributed to shareholders. However, we do not consider this will have a material impact on the distribution rate estimate of an efficient regulated firm.

One example considered by the ENA involves BHP. It proposed that BHP Ltd has distributed over \$1 billion of credits in BHP Plc to UK shareholders as part of its 'dividend equalisation scheme' which have not been distributed to shareholders and are completely wasted.¹²⁷⁶ However, Lally considered this issue involves the utilisation rate rather than the distribution rate and hence it will not affect our estimates for gamma.¹²⁷⁷ We agree this is a utilisation rate issue.

The ENA also proposed that a number of firms have received large tax refunds that reduce materially their FAB. It considered that under the Lally 20-firms approach these reductions are treated incorrectly as distribution to shareholders, resulting in an overstatement of the distribution rate.¹²⁷⁸

Lally considered a refund would affect the estimated distribution rate if the period used to calculate it included the refund but not the original tax payments.¹²⁷⁹ Given that Lally's analysis looks at the distribution rate of the top 50 ASX firms over the 2000 to 2017 period, we consider the total amount of the refunds that the original tax payments were made before 2000 is likely to be immaterial compared to the total amount of the imputation credits distributed. Moreover, Lally considered the problem is not one of using financial statement data but using a small set of firms, and this reinforces the case for estimating the distribution rate of an efficient regulated firm from data for all listed firms rather than a small set of comparable firms.¹²⁸⁰ We agree with Lally that the estimated distribution rate based on a sample size of 50 ASX listed firms, which accounts for 62% of Australia's sharemarket capitalisation, is likely to be more reliable than the

The top 20 ASX listed firm approach assumes that all reductions in the FAB relate to credits being distributed to shareholders, although material reductions occur for other reasons. So, this approach can be used only as an upper bound and not a point estimate.¹²⁷⁵

¹²⁷⁴ L. Gitman, R. Juchau and J. Flanagan, *Principles of Managerial Finance*, 6th Edition, 2011, p. 475.

¹²⁷⁵ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 146; APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, p. 39.

¹²⁷⁶ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 146.

¹²⁷⁷ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 31.

¹²⁷⁸ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 146.

¹²⁷⁹ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 31.

¹²⁸⁰ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 31.

distribution rate estimate based on a small set of comparable firms.¹²⁸¹

The estimates are derived from franking account balance (FAB) data, which is known to be unreliable due to the 'dynamic nature of the imputation system'.¹²⁸² The problems for individual firms that have been identified in the ATO FAB data also apply to the estimate of the top 20 ASX listed firms.¹²⁸³

This is not correct for several reasons. Firstly, as the top 20 ASX listed firms Lally examined are constant through time, his analysis does not suffer from the material entry and exit problems associated with the use of the ATO FAB data over time (where firms may liquidate for example). This is concurred with by Lally, who considered the problem of the composition of companies in the ATO's data changed over time, an issue that does not apply to the estimates from the top 20 or 50 companies because there are no drop-outs.¹²⁸⁴ Further, he considered even if there were drop-outs in the analysis of the top 20 or 50 companies, this analysis by Lally (2018) never aggregates over the franking account balance and therefore the same problem would not arise.¹²⁸⁵ Secondly, the data Lally used is from audited financial accounts and therefore should not suffer from the same potential reliability issues associated with the ATO informational reporting data (the ATO aggregate FAB data is based on information data collected on corporate tax filings and not used to calculate tax owing). The raw audited data from financial reports also has the advantage of being largely publicly available and therefore the estimate is replicable and transparent.

The top 20 ASX listed firms has been selected on the basis of size, but size is not relevant to the distribution rate.¹²⁸⁶

The sample of the 20 firms was selected because we considered the distribution rate of an efficient regulated firm should be estimated from listed firms. Given the top 20 firms account for a large proportion of the value of the listed equity, we considered the distribution rate estimate based on the top 20 or 50 ASX listed firms is likely to represent an appropriate estimate of the distribution rate for listed equity reflective of an efficient regulated firm.

This is supported by Lally. He considered that the significant feature of the sample is the proportion of company taxes paid to the ATO that come from the top 20 ASX listed firms.¹²⁸⁷ As the top 20 ASX listed firms account for a large proportion of the value of the equity in the ASX200¹²⁸⁸, Lally considered the gains from further increases in the sample size would be small and the selection of the top 20 (or top 50) firms would provide a

¹²⁸¹ Data is from the following website: <https://www.asx50list.com/>

¹²⁸² ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 140.

¹²⁸³ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 145.

¹²⁸⁴ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 11.

¹²⁸⁵ Issues arise when one uses aggregate FAB data, which includes the FAB of the firms that drop out during the period examined, in calculating the distribution rate.

M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 11-12

¹²⁸⁶ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 147; APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

¹²⁸⁷ M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, p. 29.

¹²⁸⁸ M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, p. 30.

better estimate of the market-wide rate than any other sample involving the same number of firms.¹²⁸⁹

For this final decision, we have considered the aggregate distribution rate of the top 50 ASX listed firms in light of the Independent Panel's recommendation and stakeholder submissions. Lally's analysis indicates a distribution rate estimate of 0.89 for the top 50 ASX listed firms and an estimate of 0.95 after adjustment for foreign operations.¹²⁹⁰ The aggregate distribution rate has increase marginally from 0.88 to 0.89.

Scale of operation is likely to be an important factor for the distribution rate, but scale has not been systematically investigated¹²⁹¹

We do not consider scale of operation is an important factor for selecting the sample. This is supported by the ENA.¹²⁹² In response to the APA's submission that size is likely to be an important factor for the distribution rate, we have compared the distribution rate estimate for the top 19 ASX listed firms (excluding Westfield as it is no longer listed) to the estimate for a further 31 ASX listed firms by market size. Lally's analysis indicates a distribution rate estimate of 0.933 for the further 31 companies, which is slightly higher than the estimate for the top 19 ASX listed firms. This suggests that scale of operation is likely to be immaterial for our purposes.

The top 20 ASX listed firms were used because of the size of the task of estimating the distribution rate for all listed firms. This results in inconsistent estimation approaches for the utilisation and distribution rates¹²⁹³

We do not consider the sample size of the largest 20 or 50 ASX listed firms is necessarily too small.

Lally considered that the significant feature of the sample is the proportion of company taxes paid to the ATO that comes from the top 20 ASX listed firms.¹²⁹⁴ He considered the set of the top 20 ASX listed firms is large and gains from further increases in the sample size would be small.¹²⁹⁵ Lally explained that if a market comprised 100 firms of equal size, sampling 90 of them would clearly be sufficient. If those 90 merged into a single firm, sampling that single firm would provide the same information as before and therefore be equally good. Hence, he considered it is the collective size of those firms that is important.¹²⁹⁶

Consistent with Lally's advice we consider a key factor is the proportion of company taxes paid to the ATO that comes from the top 20 ASX listed firms. As the top 20 ASX listed firms account for a large proportion of the value of listed equity, we consider the distribution rate estimate based on the top 20 or 50 ASX listed firms is likely to be a reasonable estimate for listed equity and reflective of a regulated firm operating efficiently.

Since the publication of the draft decision, we have

¹²⁸⁹ M. Lally, *Issues in the estimation of gamma*, April 2017, p.12; M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 25.

¹²⁹⁰ M. Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, October 2018, p. 3.

¹²⁹¹ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 45.

¹²⁹² ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, p. 147.

¹²⁹³ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 18.

¹²⁹⁴ M. Lally, Review of submissions to the QCA on the MRP, risk-free rate and gamma, 12 March 2014, p. 29.

¹²⁹⁵ M. Lally, *Issues in the estimation of gamma*, April 2017, p.12.

¹²⁹⁶ M. Lally, *Issues in the estimation of gamma*, April 2017, p.12.

extended the sample size to cover the largest 50 firms. The analysis done by Lally indicates a distribution rate estimate for the top 50 ASX listed firms of 0.89 and that the estimate is relatively insensitive to the increase in the number of firms in the sample.¹²⁹⁷

The top 20 ASX listed firms vary materially in terms of dividend payout rate. For example, over the 2000-2013 period examined by Lally, the large mining firms had low dividend payout rates (as that period coincided with the mining investment boom) while Telstra had a very high payout rate. It is impossible for all 20 firms to be appropriate comparators on this dimension, because not all can have a dividend payout ratio that matches a BEE.¹²⁹⁸

As the regulated firms in Australia are listed or owned by listed entities and the distribution rates for unlisted firms are much lower, we consider it is necessary to estimate the distribution rate of an efficient regulated firm from listed equity. We agree with the ENA that the dividend payout rate of the sample of 20 firms over periods of time may vary materially. Therefore, it is important to examine a large sample of listed firms over a long period of time to ensure that any extraordinary dividend payout policy of some individual firms will not have material impact on the aggregate distribution rate. We consider the distribution rate estimate based on a sample of the top 50 ASX listed firms over the period 2000 to 2017 is likely to reflect the distribution rate for listed equity and is an appropriate estimate of the efficient (and achievable) distribution rate for a regulated firm operating efficiently. We consider any extraordinary dividend payout policy is not likely to have a material impact on the aggregate distribution rate given the sample size is relatively large and the sample period is relatively long.

It appears the problems that the ENA was referring to are included in section 8.3 of the ENA's May 2018 submission.¹³⁰⁰

In the draft decision, we considered the issues with the 20-firms figures proposed in the ENA's May 2018 submissions. Our response to the issues is covered in Appendix A.3 and A.4.3 in our draft decision.

The ENA submits that its May 2018 submission (section 8.2) documented a number of other problems with the 20-firms figures which appear to remain unaddressed in the draft guideline.¹²⁹⁹

For completeness, we have reconsidered these problems in this final decision. We agree with the ENA that it is difficult to construct a set of firms who has similar risk associated with a firm in the provision of regulated services and operates efficiently in Australia. However, estimation challenges do not mean we are not going to (or required to) estimate the distribution rate of such a firm. Having considered all the available empirical evidence for estimating the parameter, we consider Lally's approach gives an appropriate estimate of the distribution rate for an efficient regulated firm. We acknowledge that the ENA proposed a number of issues relating to Lally's approach. This includes:¹³⁰¹

- The inability to reconcile the estimates of dividends paid.
- The inconsistent use of group and parent figures.

¹²⁹⁷ M. Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, October 2018

¹²⁹⁸ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 147.

¹²⁹⁹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 149.

¹³⁰⁰ ENA, *Response to discussion papers and concurrent expert evidence sessions*, 4 May 2018, p. 88.

¹³⁰¹ ENA, *Response to discussion papers and concurrent expert evidence sessions*, 4 May 2018, p. 88.

- No explanation of exchange rate conversions.
- Material change in company structure over time not accounted for.
- Some figures inconsistent with annual reports.

We recognize that there are a number of issues with this approach. However, we consider these issues are only significant if they materially change the estimate for the aggregate distribution rate, and the ENA has not presented a revised estimate of the aggregate distribution rate or any expected biases. Overall, we do not consider these problems are likely to be material.

Having considered all the new material since the publication of the draft decision, we acknowledge that the top 20/50 ASX listed firm approach is subject to some limitations. This is no different to most estimation tasks in the absence of perfect information. However, we consider an estimate from this approach will still give us a reasonable estimate of the distribution rate for a regulated firm operating efficiently. This is because:

- The regulated businesses in Australia are listed or owned by listed firms. For a regulated firm operating efficiently, we expect it will seek to distribute a large proportion of its credits to its shareholders in a manner consistent with the aggregate distribution rate of listed firms. Given that the top 50 ASX listed firms account for a large proportion of the market capitalisation of listed firms, we therefore consider a distribution rate estimate based on the top 50 ASX listed firms is an appropriate distribution rate estimate for a regulated network service provider operating efficiently.
- The data from the financial statements of the top 50 ASX listed firms is of high quality given it is audited and subject to scrutiny in financial markets.¹³⁰²
- Lally considered the data from the financial statements for the top 50 listed firms gives an estimated distribution rate for listed equity that is likely to reflect the distribution rate of a regulated service provider operating efficiently.¹³⁰³
- It has been generally agreed that the ATO FAB data (the alternative approach for estimating the distribution rate for listed equity) should not be used in any analysis of imputation credits.¹³⁰⁴

11.5.2.5 Conclusion

¹³⁰² M. Lally, *Gamma and the ACT Decision*, May 2016, p. 26.

¹³⁰³ M. Lally, *Gamma and the ACT Decision*, May 2016, pp. 4–6, 18, 25. In making this choice, Lally considered there is a trade-off between statistical reliability (which is greater if a market-wide estimate is used) versus potential bias (worse from a sector-wide estimate). Lally discussed various issues with using firm-specific data, industry averages and market-wide data to estimate the distribution rate.

M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹³⁰⁴ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 152.

In estimating the distribution rate for an efficient regulated firm, we propose to place primary reliance on the rounded distribution rate estimate of 0.9 from the financial reports of the top 50 ASX listed firms. We consider the distribution rate estimate after adjustment for foreign operations warrants an estimate of at least 0.9 for a regulated firm operating efficiently.

11.5.3 Distribution rate of the comparators from the same industry

11.5.3.1 Draft decision

We had regard to the distribution rate of the comparators from the same industry as a BEE. This suggested an estimate of 1 based on Lally's analysis.¹³⁰⁵ We did not place much weight on this source of evidence because we considered the sample size used in the analysis was too small and because the choice of whether or not to include certain marginal cases was likely to have a material impact on the resulting estimate.¹³⁰⁶

11.5.3.2 Independent Panel review

The Independent Panel acknowledged that the industry specific estimates of the distribution rate are higher.¹³⁰⁷

11.5.3.3 Stakeholder submissions

The ENA proposed a number of material problems with Lally's analysis on the distribution rate for the five comparator firms from the same industry as a BEE:¹³⁰⁸

- Dr Lally is unable to find the required FAB information in relation to three of those firms, although for one of those firms he assumes a closing FAB and proceeds on that basis.
- For one of the two remaining firms, Dr Lally replaces his empirical estimate of the distribution rate with his assessment of what he considers the distribution rate would have been if the company in question had adopted what he considers to be more efficient behaviour.
- For the one remaining firm (AusNet), Dr Lally concludes that the distribution rate must be 1 because the 2017 FAB is less than the 2007 FAB. However, AusNet's annual reports reveal that the FAB increased materially from \$10.3 million in 2006 to \$28.6 million in 2007 to \$51.2 million in 2016. The FAB recorded for 2017 is negative \$26.4 million. The cause of this large reduction in the FAB is not at all

¹³⁰⁵ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 397.

¹³⁰⁶ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, pp. 436-437

¹³⁰⁷ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 54.

¹³⁰⁸ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 147.

related to the distribution of credits. Rather, it is due to AusNet receiving a large tax refund during that financial year.

It considered this highlights the dangers of using a high-level analysis of FAB to estimate the distribution rate for any firm as not every reduction in the FAB is caused by the distribution of credits.¹³⁰⁹ Moreover, it considered the estimates are unstable and can be materially different depending on the particular sample period that is used.¹³¹⁰

The CRG proposed that the AER did not consider what would be the payout ratio of a firm whose only assets were regulated. It considered when estimating the distribution rate for a BEE you need to assume only regulated assets.¹³¹¹ The determination should be associated with provision of regulated services, not the risk of the service providers or an economy-wide index.¹³¹² If the distribution rate of a BEE was estimated based on firms' behaviour, the CRG suggested the distribution rate of SKI should be taken into account as it is the only firm with essentially all its assets in the RAB. The CRG considered this suggests a distribution rate of 1.¹³¹³

11.5.3.4 AER consideration

We agree with the ENA that the distribution rate estimate of an efficient regulated firm, based on the comparable firms from the regulated energy industry, is subject to some limitations. This includes:

- judgement on the FAB value is required in the cases where the FAB data is missing¹³¹⁴
- in some cases, it requires judgement on what a firm would do if it was a regulated firm operating efficiently
- the sample size is relatively small, and hence the choice of whether or not to include certain marginal cases is likely to have a material impact on the resulting estimate¹³¹⁵

Given the underlying limitations of the estimate from the comparable firms, we consider this empirical evidence could only give us guidance on the distribution rate of an

¹³⁰⁹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 148.

¹³¹⁰ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 148.

¹³¹¹ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 32.

¹³¹² The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 32.

¹³¹³ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 32.

¹³¹⁴ We note that Lally considered that the Frontier's claim that Lally "assumes a closing FAB" for one of the comparator firms (DUET) is incorrect. He considered there is no assumption made in relation to the franking account balance for DUET, rather, it is a reasonable conclusion drawn from the available evidence. M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 16-17

¹³¹⁵ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 19.

efficient regulated firm. Therefore, we have placed less weight on it than the alternative estimates.

The ENA considered the analysis of the distribution rate for the comparator firms highlights the dangers of using a high-level analysis of FAB to estimate the distribution rate for any firm as not every reduction in the FAB is caused by the distribution of credits.¹³¹⁶ Moreover, it considered the estimates are unstable and can be materially different depending on the particular sample period that is used.¹³¹⁷ We agree with the ENA that not every reduction in the FAB is caused by the distribution of credits and the estimates can be different depending on the sample period that is used, however, given the reasons discussed in section 11.5.2.4, we do not consider these issues will have a material impact on the distribution rate estimates for the top 50 ASX listed firms.

In response to the CRG's submission, we agree with the CRG that the distribution rate estimate of an efficient regulated firm should be determined based on a firm exclusively providing regulated services. However, as most of the regulated businesses have revenue from unregulated assets, it is not possible for estimation purposes to find a set of firms whose only assets are regulated. We consider the distribution rate of 1 of SKI could only give us some guidance on the possible distribution rate of a regulated firm operating efficiently given it is only a single firm.

11.5.4 Conclusion

We do not consider a distribution rate estimate of 1, based on the comparator firms from the regulated energy industry, gives a reliable estimate of the efficient distribution rate. We consider this estimate could only give us some guidance on what the likely distribution rate of a regulated firm operating efficiently is.

11.6 Further issues on distribution rate

There are some further issues on distribution rate raised in the Independent Panel's report and stakeholder submissions. Our consideration of these issues is discussed in this section.

11.6.1 Independent Panel review

The Independent Panel recommended the AER explain more clearly why it has not considered a distribution rate estimate higher than 0.88.¹³¹⁸ The Independent Panel considered that the industry specific estimates and the estimates of the top 20 ASX listed firms excluding companies with a high level of offshore earnings indicate a distribution rate estimate for a BEE higher than 0.88. It considered it is unclear why the

¹³¹⁶ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 148.

¹³¹⁷ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 148.

¹³¹⁸ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 54.

AER has not considered an estimate higher than 0.88. Rather, the AER adjusted the distribution rate downwards to 0.83.¹³¹⁹

11.6.2 Stakeholder submissions

The CRG proposed that the distribution rate should be based on a business that has only the regulated assets in the RAB. Therefore, it considered that the AER's distribution rate, based on the top 20 ASX listed firms is not representative of a firm providing only regulated services.¹³²⁰

Instead, the CRG proposed that the distribution rate should be estimated from the equation below:¹³²¹

$$\text{Payout ratio} = 1 - \frac{(\text{New or replacement investment} - \text{Depreciation})}{\text{RAB} * \text{WACC}}$$

The CRG considered that because there is clear evidence of excess network capacity, it expected that the need for any new investment should be substantially offset by reduced investment in assets of a class which are under-utilized in the short term. That is, the sum (new or replacement investment minus depreciation) should be close to zero, resulting in a payout ratio for a BEE equal to 1.¹³²²

It considered the AER misunderstood the CRG's argument in the draft decision.¹³²³ The AER in the draft decision considered the CRG's proposed approach was based on the assumption that apart from the revenue compensation a BEE gets from the regulator for asset depreciation, a BEE could only fund its investment through retained earnings. The CRG proposed that it made no such assumption.¹³²⁴ It considered the AER provides no reason for rejecting the CRG's suggestion that the payout rate should be based on the regulated asset base rather than any corporate or economy wide measure.¹³²⁵ It also proposed that the statement below in the AER's draft guideline is incorrect:¹³²⁶

¹³¹⁹ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 54.

¹³²⁰ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 32.

¹³²¹ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 33.

¹³²² The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 33.

¹³²³ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 34.

¹³²⁴ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 34.

¹³²⁵ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 37.

¹³²⁶ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 34.

“The CRG supported a reduction in the MRP (from 6.5 per cent to 5.75 per cent), a reduction in beta (from 0.7 to 0.3), and an increase in gamma from 0.4 to 0.83.”

The CRG proposed a gamma value of 0.9 if there is to be a fixed distribution rate for the duration of this determination, which it considered would cover the possibility that over the period there may be some need for net new investment in the networks.¹³²⁷

The ENA had considered the CRG's proposed approach for estimating the distribution rate.¹³²⁸ It considered this approach is based on the notion that a BEE is allowed to earn a profit of $RAB \times WACC$, from which it funds net new investment (Investment-Depreciation), distributing the remainder to shareholders in the form of dividends. The ENA considered that there are some problems with this approach:¹³²⁹

- It ignores the payment of interest on debt. However, the majority of the $RAB \times WACC$ allowance is paid to debt holders as interest – it is not available to pay dividends to shareholders.
- It ignores the RAB roll-forward model. However, another significant part of the $RAB \times WACC$ allowance, namely compensation for expected inflation, is rolled forward into the RAB and is not available to be paid out as a dividend to shareholders.

In coming to the final distribution rate of a BEE, the AEC in its submission to the AER considered an element of conservatism may be appropriate in estimating the distribution rate.¹³³⁰ This is because the distribution rate used to estimate gamma is also used in the PTRM to determine cash flow requirements and equity raising requirements. The distribution rate estimate also influences financial metrics, so to the extent these are used as a cross check on the benchmark credit rating, then it is relevant.¹³³¹

11.6.3 AER consideration

We have considered the CRG's submission on the distribution rate. We agree with the CRG that the distribution rate estimate for an efficient regulated network service provider should be based on taxable income from the provision of network services that are regulated. However, as most of the regulated energy businesses have unregulated assets, it is difficult to find a set of comparable firms that provide regulated network services.

As the regulated energy businesses in Australia are listed or owned by listed companies and listed companies appear to have higher distribution rate than the

¹³²⁷ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 38.

¹³²⁸ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 157.

¹³²⁹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 157.

¹³³⁰ AEC, *Draft rate of return guideline response*, September 2018, pp. 18-19

¹³³¹ AEC, *Draft rate of return guideline response*, September 2018, pp. 18-19

unlisted firms based on Lally's advice, we expect a firm operating efficiently in the provision of regulated network services will seek to distribute a large proportion of its credits to its shareholders in a manner consistent with the estimated aggregate distribution rate of listed firms. Given that the top 50 ASX listed firms account for a large proportion of the market capitalisation of listed firms, we therefore consider a distribution rate estimate based on the top 50 ASX listed firms is appropriate for a regulated network service provider operating efficiently.

We have considered the CRG's proposed approach for estimating the distribution rate. We agree with the ENA that this formula is based on the notion that an efficient regulated network service provider is allowed to earn a profit of $RAB \times WACC$, from which it funds net new investment and distributes the remaining amount to shareholders or to other businesses units within the corporation.¹³³² As we noted in the draft decision, we consider an efficient network service provider may fund its net investment from different source of finance and not necessarily from its profit on RAB ($RAB \times WACC$). We also agree with the ENA that there are potentially some other problems with this approach, particularly that it appears to ignore the payment of interest on debt.¹³³³ Lally considered that there is no set of assumptions that could have produced such a formula and hence no weight should be given to the CRG's proposed formula.¹³³⁴ We acknowledge the CRG's argument on a distribution rate of close to 1 for a regulated firm operating efficiently. This is because it considered there is clear evidence of excess network capacity and therefore no net new investment is required in the short term, which resulting in a payout ratio in an efficiently financed firm equal to 1.¹³³⁵ However, in the medium to long term, the CRG considered a BEE may increase net investment and reduce the payout ratio.¹³³⁶ It suggested a gamma value of 0.9 if there is to be a fixed gamma for the duration of the determination. This implies a proposed distribution rate of 0.9, which is consistent with the rounded distribution rate estimate from the financial reports of the top 50 ASX listed firms with no adjustment for foreign operations.

We consider a distribution rate of 1 is likely to be too high as firms may have to withhold funds for the purpose of future investment or meeting short/long term liabilities. In the draft decision, we proposed a distribution rate estimate of 0.88 for an efficient regulated network service provider. The Independent Panel recommended the AER explain more clearly why it had not considered a distribution rate estimate higher than 0.88.¹³³⁷

¹³³² The CRG proposes that the firm's profit on RAB will be $RAB \times WACC$.

The CRG, Submission on rate of return guideline review, 4 May 2018, p. 59.

¹³³³ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 157.

¹³³⁴ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 25-26

¹³³⁵ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 33.

¹³³⁶ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 33.

¹³³⁷ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 54.

In this final decision, we have reconsidered the merits of the evidence before us. In particular, we have commissioned Lally to extend his distribution rate analysis to the top 50 ASX-listed firms and examine the effect of foreign operations on the distribution rate. We consider the distribution rate estimate of the top 50 ASX listed firms will give us an appropriate estimate of the distribution rate for an efficient regulated network service providers. While recognizing the underlying limitations associated with this approach, we have also considered the distribution rate estimate of 1 based on the comparator firms and the CRG's proposed medium to long term distribution rate of 0.9. We consider a distribution rate estimate of 1 based on the comparators is not warranted given the sample size and reliability. The CRG's proposed medium to long term distribution rate of 0.9 is consistent with the rounded distribution rate estimate from the financial reports of the top 50 ASX listed firms with no adjustment for foreign operations, although we note our estimate does not rely on the CRG estimate.

Having had regard to all the evidence, we consider a distribution rate estimate of 0.9 will provide service providers with a reasonable opportunity to recover at least efficient costs over the regulatory period.

In response to the CRG's submission that the statement in the AER's draft decision indicating the CRG's proposed a gamma of 0.83 was incorrect, we acknowledge that it was an error and the CRG proposed a gamma of close to 1 in its May 2018 submission.¹³³⁸

11.7 Conclusion

Having considered stakeholder submissions and the expert's advice on the estimates of the distribution rate, we propose to adopt a rounded distribution rate estimate of 0.9 for an efficient regulated network service provider. This estimate is primarily based on the distribution rate estimate of the top 50 ASX listed firms without adjustment for foreign operations and rounding to the nearest 0.05. We consider it appropriate to round this estimate to the nearest 0.05 consistent with Lally's rounding methodology adopted in his most recent report.¹³³⁹

11.8 Utilisation rate

11.8.1 Draft decision

In estimating the utilisation rate, we considered the strengths and limitations of different sources of information. This included:

- The equity ownership approach that uses the ABS data.¹³⁴⁰
- Estimates based on ATO tax statistics.¹³⁴¹

¹³³⁸ CRG, Submission to the AER on its Rate of Return Guideline Review, May 2018, p. 62.

¹³³⁹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹³⁴⁰ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, pp. 442-445

¹³⁴¹ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 446.

- Estimates from implied market value studies.¹³⁴²

We considered the current evidence suggests a utilisation rate of approximately 0.6. In coming to a utilisation rate of 0.6, we placed:

- Significant reliance upon the equity ownership approach, which suggested a range for the utilisation rate estimate of 0.6 to 0.7 for all equity
- Some reliance upon tax statistics, which suggested an estimate for the utilisation rate of 0.610 based on dividend data for all equity
- Limited reliance upon implied market value studies, which suggested a range for the utilisation rate estimate of 0 to 0.5. In particular, the adjusted estimate from SFG's dividend drop off study suggested a utilisation rate of 0.4¹³⁴³

11.8.2 Utilisation rate from the equity ownership approach

11.8.2.1 Draft decision

We proposed to place significant reliance upon the equity ownership approach when considering the estimates of the utilisation rate.¹³⁴⁴ The December 2017 ABS data release indicated a utilisation rate estimate range of 0.6 to 0.7 for all equity over the period September 2000 to December 2017. The point estimate for the December 2017 quarter indicated a utilisation rate of 0.65.¹³⁴⁵

11.8.2.2 Independent Panel review

The Independent Panel accepted the arguments set out in the Explanatory Statement in relation to the ABS data and its desirable characteristics, relating to reliability, accessibility and timeliness.¹³⁴⁶

11.8.2.3 Stakeholder submissions

¹³⁴² The AER, *Draft rate of return guidelines explanatory statement*, July 2018, pp. 446-450

¹³⁴³ Since the 2013 Guidelines we have considered that implied market value studies support an estimate of the utilisation rate between 0 and 0.5. The SFG dividend drop off study is one common type of implied market value studies that was adopted by most businesses. The businesses previously proposed a utilisation of 0.35 from SFG's study. We consider implied market value studies, if they are to be used at all, need to be adjusted for the incorrect estimates of the post company pre-personal tax value of cash dividends which would expect to also result in an incorrect estimate of the value of imputation credits. Based on Handley and Lally's advice, we consider the estimate from SFG's dividend drop off study should be interpreted as an estimate of around 0.4. Our detailed discussion on implied market value studies is set out in the attachment 4 to our determination for ElectraNet. The AER, *Draft decision for ElectraNet transmission determination 2018 to 2023, Attachment 4- Value of imputation credits*, October 2017

¹³⁴⁴ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 399.

¹³⁴⁵ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 442.

¹³⁴⁶ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 55.

The CCP considered the AER's approach of principally relying on ownership data for 'all equity' based on ABS equity ownership data is reasonable on both theoretical and practical grounds, as the ABS data appears to be of superior robustness than other sources of data.¹³⁴⁷ However, some businesses considered there are a number of problems with this approach.

The ENA proposed the problems with the equity ownership approach to estimating the utilisation rate include:¹³⁴⁸

- There is an internal inconsistency between the AER estimating the proportion of imputation credits distributed to one group of shareholders and estimating the proportion of imputation credits redeemed by a different group of shareholders.
- Not all imputation credits distributed to resident investors are redeemed. Examples include imputation credits unable to be claimed by domestic resident investors due to the operation of the 45-day rule and any law change that would prevent the redemption of excess credits. As a result the ENA considered this approach can only be used as an upper bound and not a point estimate.

The ENA also proposed a number of problems with the utilisation rate estimates from the ABS data:¹³⁴⁹

- The equity ownership estimates are based on survey data collected by the ABS which requires filtering and adjustment to "clean" the data. This data is the subject of express data quality warnings by the ABS.
- There is still the same mis-match between components of the updated ABS data, and there are still the same problems with estimating the market value of equity for some sectors.
- The historical estimates for some sectors have changed materially in the data updates made in the Sept 2017 ABS release. The fact that an historical number can be materially changed almost 20 years after the event is clearly troubling. This is especially so when the change is not based on new data, but rather the application of different assumptions for how the same data should be processed into an estimate.
- The ABS data revision to the estimates is based on a 'backcasting' exercise whereby estimated splits between domestic and foreign equity from recent data is 'backcast' to the historical data, replacing the estimates that were made at the time the historical data was collected.
- The revised estimates result in very little volatility in the estimates for listed equity and more volatility in the estimates for all equity, when the reverse would be expected ex ante.

¹³⁴⁷ CCP16, *Submission to the AER on its draft rate of return guideline*, September 2018, p. 51.

¹³⁴⁸ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 140.

¹³⁴⁹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, pp. 150-151

- The plausible impact of the GFC that was evident in the 2014 data has now been removed in the Sept 2017 ABS revision. That is the GFC impact has now been removed from the historical record.

The ENA submitted that the recent information released by the ABS raises more questions about the reliability of the equity ownership estimates than were apparent at the time of the 2013 Guideline. The ENA submitted that this data should receive relatively less weight, accordingly. It also considered the evidence does not support the AER abandoning its current approach in favour of placing 100% weight on a single equity ownership estimate.¹³⁵⁰

The ENA considered if the AER maintains its reliance on the equity ownership estimates, the Guideline should set out a process for how the allowed gamma value would change if the law is changed to prevent shareholders who have no personal tax obligations from redeeming credits.¹³⁵¹ It considered the simplest approach would be to set two figures for gamma- one to be adopted if the existing law is maintained and one to be adopted if the proposed policy becomes law.¹³⁵²

APA and APGA proposed the ABS has reservations about the quality of the equity ownership statistics used in calculating the estimate of the utilisation rate.¹³⁵³ APA and APGA quoted an explanation of the equity ownership statistics from the ABS website, in which the ABS advised that the estimated market value of equity issued by some sectors is considered to be of poor quality.¹³⁵⁴

11.8.2.4 AER consideration

We have considered stakeholder submissions on the equity ownership approach for estimating the utilisation rate. We do not agree with the ENA that there is internal inconsistency in the AER's approach.¹³⁵⁵ As discussed in section 11.3, we consider it is not necessary to estimate the distribution rate and utilisation rate from the same group of investors/firms. This is because we consider the utilisation rate is an economy wide parameter whereas the distribution rate is firm specific. This is supported by Lally.¹³⁵⁶

The ENA considered that the equity ownership approach can only be used as an upper bound because not all credits distributed to resident investors are redeemed.¹³⁵⁷

¹³⁵⁰ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 141.

¹³⁵¹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, pp. 149-150

¹³⁵² ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 150.

¹³⁵³ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 47; APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, p. 38.

¹³⁵⁴ APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 47; APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, p. 38.

¹³⁵⁵ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 140;

¹³⁵⁶ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 8.

¹³⁵⁷ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 141.

Examples include the 45-day rule and any future law change that would prevent investors from redeeming credits.¹³⁵⁸

With regard to the impact of the 45-day rule, Lally considered it is implausible that there is any material group of Australian investors who holds Australian stocks for less than 45 days around an ex-dividend date.¹³⁵⁹ This is because he considered the penalty from doing so would be large (loss of the imputation credits) and the disadvantage from simply expanding their ownership period enough to avoid the 45 day rule would seem to be less substantial.¹³⁶⁰ Furthermore, Lally considered any overestimate of the utilisation rate that results from ignoring such investors is likely to be dwarfed by the underestimate of the utilisation rate that results from assuming that no foreign investors can use the credits.¹³⁶¹

We recognise the equity ownership approach does not take into account the existence of some domestic investors that do not hold their shares for 45 days at risk over the ex-dividend date (the 45 day rule). However, we agree with Lally that the 45 day rule is unlikely to have a material impact on the utilisation of imputation credits by domestic investors and there is no data that has been presented that demonstrates a material impact.

In terms of any future change in the law that might prevent investors from redeeming excess credits, we consider the likely impact will be relatively small based on Lally's analysis which indicates there is unlikely to be any material impact on the market utilisation rate from the proposal to eliminate tax refunds for superannuation funds and individuals.¹³⁶² This is because Lally considered:¹³⁶³

- Super funds can use the imputation credits generated from receiving franked dividends to offset against the gross tax obligations generated from receiving unfranked dividends, and/or capital gains on shares, and/or other sources of taxable income. If the imputation credits is fully offset against the gross tax obligations of the fund, the proposed policy of annulling refunds would have no effect on these funds.
- The APRA reports indicate funds with more than four members paid taxes in aggregate in each of the last two years rather than receiving refunds, which is consistent with the point made above.
- One would expect a fund to alter their portfolios if it was receiving refunds in the event of the proposed policy being adopted.

We agree with Lally on these points and consider the impact of any law change is likely to be immaterial because one can easily adjust their portfolio to mitigate the impact from not receiving refunds. In addition, we consider there are too many uncertainties

¹³⁵⁸ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 141.

¹³⁵⁹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 20.

¹³⁶⁰ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 20.

¹³⁶¹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 20.

¹³⁶² M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 25.

¹³⁶³ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, pp. 22-25

related to such a law change and its impact on the value of imputation credits to investors is unclear. For these reasons, any legal changes or proposals for change that will impact the estimated value of imputation credits in the coming years will be considered at the next Instrument review to be completed in approximately four years' time.

The ENA and some other stakeholders also expressed their concerns about the utilisation rate estimates from the updated ABS data. Our responses to the stakeholders' concerns are summarised in Table 29 below.

Table 29 AER responses to stakeholder submissions on the utilisation rate estimate from the equity ownership approach

Stakeholder submission	AER consideration
<p>The equity ownership estimates are based on survey data collected by the ABS which requires filtering and adjustment to "clean" the data. It is the subject of express data quality warnings by the ABS.¹³⁶⁴</p>	<p>We consider such data issues would also apply to the alternative approaches. For example the estimates based on ATO data also require filtering that may be subject to sampling error.</p>
<p>There is still the same mis-match between components of the updated ABS data, and there are still the same problems with estimating the market value of equity for some sectors.¹³⁶⁵</p>	<p>It was unclear what the mismatch the ENA was referring to is. In the submission, the ENA also did not explain what the problems with estimating the market value of equity are. We sought clarification from the ENA on both points. The ENA provided the following clarification:¹³⁶⁶</p> <p>"The ABS Survey of International Investment provided data of the investments of non-residents in listed and unlisted equity of "Other private non-financial corporations" (OPNFC). This class accounts for a substantial share of Australian equity measured. The survey disagreed with the previous estimates of rest of world (ROW) investment in listed OPNFC. This conflict resulted in a "backcast back to the mid-2000s" for listed and unlisted OPNFC equity. This highlights the difficulty in estimating the value of equity held by ROW.</p> <p>Consequently, there is likely a mismatch of equity to various sectors, for example listed vs unlisted OPNFC equity owned by ROW. In addition, there are several instances of blank observations in the 5232.0 series. These blank cells have the comment "not available for publication but included in totals where applicable, unless otherwise indicated". The refined approach of the AER is sensitive to how the equity is allocated to these blank cells, hence there will be some mismatch between ownership sources for some equity classes."</p> <p>We acknowledge the updated ABS data indicates different estimates of listed and unlisted OPNFC equity owned by ROW from the old data. We also acknowledge the</p>

¹³⁶⁴ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 150.

¹³⁶⁵ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 151.

¹³⁶⁶ ENA, response by email to the AER: AER questions in relation to ENA submission on the draft AER Rate of Return Guideline, 9 November 2018

changes in the ownership estimates are across different sectors. However, given that the purpose for the data revision is to improve the data quality, we consider the updated data should give more reliable utilisation estimates than the old data.

With regard to the blank observations in the ABS series, we note that this only appears to some sectors that the data is missing for some quarters. However, as our approach is to examine the utilisation rate estimates for each of the quarter over the period September 2000 and June 2018, we consider a lack of the data for some quarters will only impact the utilisation rate estimates for those quarters. Moreover, even though the utilisation rate estimates for those quarters may be affected, we consider the impact on the utilisation rate estimates is likely to be immaterial.

The historical estimates for some sectors have changed materially in the update. The fact that an historical number can be materially changed almost 20 years after the event is clearly troubling. This is especially so when the change is not based on new data, but rather the application of different assumptions for how the same data should be processed into an estimate.¹³⁶⁷

We acknowledge some of the historical number have changed material after the data revision, which may suggest that the ABS data is subject to some limitations. However, we consider the updated ABS data is likely to be more reliable than the data released earlier by the ABS, given that the purpose for the ABS data revision is to improve the data quality. We therefore consider it is reasonable to use the utilisation rate estimate based on the updated data. Moreover, we consider there are less concerns with the ABS point estimates for the recent quarters given that these estimates are based on new data. The most recent data suggests a point estimate of the utilisation rate of 0.638 for all equity.

The revision to the estimates is based on a 'backcasting' exercise whereby estimated splits between domestic and foreign equity from recent data is 'backcast' to the historical data, replacing the estimates that were made at the time the historical data was collected.¹³⁶⁸

We acknowledge that some of the data that is used in the utilisation rate calculation is based on a 'backcasting' exercise. However, the data for December 2017, March and June 2018 is not based on the 'backcasting' exercise. The most recent June 2018 release indicates utilisation rate estimates of 0.644, 0.643 and 0.638 for those quarters respectively. These estimates support our proposed utilisation rate estimate of 0.65 for an efficient regulated network service provider once rounded to the nearest 0.05.

The revised estimates result in very little volatility in the estimates for listed equity and more volatility in the estimates for all equity, when the reverse would be expected ex ante.¹³⁶⁹

We consider this is an observation drawn from the current data, which suggests more volatility in the estimates for all equity than for listed equity. The ENA did not explain why it considered the reverse would be expected.

The plausible impact of the GFC that was evident in the 2014 data has now been removed in the 2017 revision. That is the GFC impact has now been removed from the historical record.¹³⁷⁰

The impact of GFC on Australia is generally considered to have been less severe than the impact on the rest of the world.¹³⁷¹ Given this, it is possible there could have been a limited or even a positive impact on the domestic ownership share of listed Australia equity (potentially positive if foreign owners raised cash from selling

¹³⁶⁷ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 151.

¹³⁶⁸ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 151.

¹³⁶⁹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 151.

¹³⁷⁰ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 151.

¹³⁷¹ <https://www.rba.gov.au/education/resources/explainers/the-global-financial-crisis.html>

Australian listed equities to Australian investors). We don't consider there is any compelling reason to expect the GFC to have necessarily reduced the Australian ownership share of listed equity, although we accept it is possible. Overall, we have no concerns with the Sept 2017 ABS revisions being implausible or illogical.

The ABS has reservations about the quality of the equity ownership statistics used by the AER in calculating the utilisation rate. APA and APGA quoted an explanation of the equity ownership statistics from the ABS website, in which the ABS advises the estimated market value of equity issued by some sectors is considered to be of poor quality.¹³⁷²

We have considered the ABS's advice quoted by APA and APGA. We note this advice was published in June 1992, which we consider is likely to be out of date. It is not clear how relevant this advice is to the recent data publications and the stakeholders have not provided evidence they have approached the ABS to confirm if the concerns raised in 1992 still exist. We acknowledge that there might be some issues with the estimated market value of equity issued by some sectors that could potentially cause some variation in the market value estimates of equity held by the rest of the world. However, it is unclear what the likely impact on the estimated utilisation rate is, how material it is likely to be, and if it causes any material bias in the overall estimates. We recognize the ABS data is subject to merits and shortcomings. However, we consider it is superior to other sources of data and is well aligned with the interpretation of the utilisation rate in the Monkhouse framework.

Having considered the stakeholder submissions and expert's advice, we acknowledge there are likely to be some shortcomings with the ABS data (as there are with nearly all data sets). Nonetheless, we do not consider any new arguments in the stakeholder submissions give us reason to depart from our draft decision and to place less weight on the utilisation rate estimate from the equity ownership approach. We agree with the CCP that the approach of primarily relying on the ABS ownership data for 'all equity' is reasonable on both theoretical and practical grounds, as the ABS data appears to be of superior robustness than other sources of data.¹³⁷³

Moreover, we consider the equity ownership approach based on the ABS data:

- 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

This approach is also supported by Lally.¹³⁷⁴ He considered the utilisation rate in accordance with a rigorous derivation of the Officer model is a weighted average over

¹³⁷² APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 47; APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, p. 38.

¹³⁷³ CCP16, *Submission to the AER on its draft rate of return guideline*, September 2018, p. 51.

¹³⁷⁴ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

the utilisation rates of all investors in the Australian market.¹³⁷⁵ If the AER recognizes the existence of foreign investors, Lally considered the utilisation rate is equal to the proportion of Australian equities owned by local investors and therefore one should use the equity ownership approach for estimating the parameter.¹³⁷⁶ The recent September 2017 estimate and the averages of the point estimates for each quarter over the last five and ten years based on this approach all suggest an estimate of 0.65 rounded to the nearest 0.05.¹³⁷⁷ Therefore, Lally considered an appropriate utilisation estimate is 0.65.¹³⁷⁸

We have updated the ABS data to the most recent June 2018 release.¹³⁷⁹ The most recent data indicates a utilisation rate of a range of 0.612 to 0.697 for the period September 2000 to June 2018 for all equity. The updated averages of the point estimates for each quarter over the last five and ten years based on the June 2018 release are 0.646 and 0.643. The point estimate for June 2018 is 0.638. This is a slight decrease from a point estimate of 0.65 for December 2017 used in our draft decision.¹³⁸⁰ Overall, we consider the most recent point estimate and the averages of the point estimates for each quarter over the last five and ten years based on the updated ABS data support a rounded utilisation rate estimate of 0.65.

We have also considered the ENA's proposal that the guideline should set out a process for how the allowed gamma value would change if the law is changed to prevent shareholders who have no personal tax obligations from redeeming credits.¹³⁸¹ We are aware of the proposed law change by the Federal Labour Party that has announced that this policy would apply from 1 July 2019 if the party succeeds in winning power at the next general election.¹³⁸² As discussed above, any legal changes that will impact the estimated value of imputation credits will be considered at the next Instrument review to be completed in approximately four years' time.

11.8.2.5 Conclusion

We propose to estimate the utilisation rate estimate based on estimates from the equity ownership approach. The most recent point estimate for June 2018 and the averages of the point estimates for each quarter over the last five and ten years based on the updated ABS data suggest a utilisation rate estimate of 0.65 rounded to the nearest 0.05 .

¹³⁷⁵ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹³⁷⁶ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹³⁷⁷ Lally referred to the September 2017 estimate as this was the most recent estimate he had access to when writing his report. However, we note that the updated ABS data to the most recent June 2018 release, not available at the time Lally drafted his report, also supports a rounded utilisation rate of 0.65.

¹³⁷⁸ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 31.

¹³⁷⁹ <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5232.0Jun%202018?OpenDocument>

¹³⁸⁰ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 442.

¹³⁸¹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, pp. 149-150

¹³⁸² <https://www.chrisbowen.net/issues/labors-dividend-imputation-policy/>

11.8.3 Utilisation rate from implied market value studies

11.8.3.1 Draft decision

In the draft decision, we considered implied market value studies for estimating the utilisation rate and proposed to place limited reliance upon these studies.¹³⁸³ This included particular consideration of dividend drop off studies, a common type of implied market value study. This is because we considered the implied market value studies could be subject to a number of limitations and the estimates of the utilisation rate based on these studies could be unreliable.¹³⁸⁴

11.8.3.2 Independent Panel review

The Independent Panel recommended the AER adopt a proactive approach to improving the quality and relevance of dividend drop off studies.¹³⁸⁵ However, the Independent Panel noted that if the AER felt confident in the ABS data relating to the equity ownership approach, then the need to explore an alternative would be reduced.¹³⁸⁶ If on the other hand, the AER considered the utilisation rate estimate from the ABS data suffered a lack of 'precision', the Independent Panel recommended the AER explore an alternative or at least a complementary approach.¹³⁸⁷

The Independent Panel also recommended the AER explain more clearly how SFG's 2016 dividend drop-off study estimate of 0.4 (after the adjustment suggested by Lally and Handley) has informed a utilisation rate estimate of 0.6.¹³⁸⁸

11.8.3.3 Stakeholder submissions

The ENA considered there is a clear distinction between the AER's cash flow interpretation of gamma (which requires a cash flow estimate) and the market value interpretation of gamma (which requires a market value estimate). It considered the Independent Panel report is unaware of this distinction in recommending that dividend drop-off analysis be used in informing the gamma value.¹³⁸⁹

11.8.3.4 AER consideration

¹³⁸³ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 439.

¹³⁸⁴ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 447.

¹³⁸⁵ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, pp. 51-52

¹³⁸⁶ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 56.

¹³⁸⁷ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 56.

¹³⁸⁸ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 56.

¹³⁸⁹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, pp. 43-44

Having considered the Independent Panel's recommendation that the AER should adopt a proactive approach to improving the quality and relevance of dividend drop off studies, we have given further consideration to implied market value studies, and in particular dividend drop off studies, in estimating the utilisation rate.

11.8.3.4.1 Dividend drop off studies

Implied market value studies seek to infer from market prices the value of distributed imputation credits. A wide range of such studies have been conducted over time, employing a variety of techniques. A common type of implied market value study is a dividend drop off study. These studies compare the price of a security with and without the entitlement to a dividend. Econometric techniques are then used to infer the value of the imputation credits attached to these dividends. More specifically the dividend drop off studies involve comparing the share price between:

- the cum-dividend date—the last day on which investors owning shares will be eligible to receive dividends and the attached imputation credits, and
- the ex-dividend date—the first day on which investors owning shares will not be eligible to receive dividends and attached imputation credits.

That is, an investor that buys a share on the cum-dividend date will be eligible to receive a dividend from that company. An investor who buys a share on the ex-dividend date will not. The difference in these prices should therefore reflect investors' valuation of the combined package of dividends and imputation credits, all other things being equal. Dividend drop off studies often will report the results as a dividend drop off ratio. This is the reduction in the share price as a proportion of the face value of cash dividends paid out.

Table 30 identifies the dividend drop off studies that we are aware of. Among all the dividend drop off studies, the SFG dividend drop off study was the most widely adopted by service providers before the Federal Court decision that the Court found it was not an error of construction for the AER to focus on the 'utilisation' interpretation of gamma.¹³⁹⁰

Table 30 Summary of available dividend drop off studies

Authors	Data range	Assessment relative to other studies in that class
Dividend drop off study – Compare share prices before and after dividend events (with and without imputation credits).		
Frontier (2016) ¹³⁹¹	2001-2016	Updates SFG (2011) – same author, longer data series.

¹³⁹⁰ Federal Court of Australia, *Australian Energy Regulator v Australian Competition Tribunal (No 2) [2017] FCAFC 79*, May 2017, p. 216; The AER, *Final decision: AusNet services transmission determination 2017-2022, Attachment 4- Value of imputation credits*, April 2017

¹³⁹¹ Frontier, *An updated dividend drop-off estimate of theta: Report prepared for AGN, MultiNet Gas, AusNet Transmission, AusNet Gas Distribution and TransGrid*, September 2016.

Authors	Data range	Assessment relative to other studies in that class
Vo et al (2013) ¹³⁹²	2001-2012	Builds on SFG (2011), includes additional econometric permutations and sensitivity analysis.
SFG (2013a) ¹³⁹³	2001-2012	Updates SFG (2011) – same author, longer data series.
SFG (2011) ¹³⁹⁴	2001-2010	Study commissioned by the Australian Competition Tribunal.
Minney (2010) ¹³⁹⁵	2001–2009	Partitions by firm size; sub-periods 2001–2005 and 2006–2009.
Beggs and Skeels (2006) ¹³⁹⁶	1986-2004	Key study in the AER's 2009 review of rate of return parameters. Data calculated yearly.
Hathaway and Officer (2004) ¹³⁹⁷	1986-2004	Study partitions by firm size, dividend yield level.
Bellamy and Gray (2004) ¹³⁹⁸	1995-2002	Several regression forms and sample selections. Partitions by size and time period (pre and post 45-day holding rule). Use of simulation to inform regression equation.
Bruckner et al (1994) ¹³⁹⁹	1987-1993	Early study with limited data; sub-periods 1987–1990 and 1991–1993.
Brown and Clarke (1993) ¹⁴⁰⁰	1973–1991	Compares dividend drop off before and after imputation; presents yearly figures and sub-periods.

Source: As specified in table.

Table 31 Estimates of the utilisation rate from dividend drop off studies

Authors	Pre-2000 results	Post-2000 results	Notes
Dividend drop off study			

¹³⁹² D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', *ERA working paper*, April 2013.

¹³⁹³ SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013.

¹³⁹⁴ SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7*, 21 March 2011.

¹³⁹⁵ A. Minney, 'The valuation of franking credits to investors', *JASSA: The FINSIA journal of applied finance*, no. 2, 2010, pp. 29–34.

¹³⁹⁶ D. Beggs and C. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, vol. 82, 2006, pp. 239–252.

¹³⁹⁷ N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004.

¹³⁹⁸ D. Bellamy and S. Gray, 'Using stock price changes to estimate the value of dividend franking credits', *working paper, University of Queensland Business School*, March 2004.

¹³⁹⁹ P. Bruckner, N. Dews and D. White, 'Capturing value from dividend imputation: How Australian companies should recognize and capitalise on a major opportunity to increase shareholder value', *McKinsey and Company report*, 1994.

¹⁴⁰⁰ P. Brown and A. Clarke, 'The ex-dividend day behaviour of Australian share prices before and after dividend imputation', *Australian journal of management*, vol. 18, June 1993, pp. 1–40.

Authors	Pre-2000 results	Post-2000 results	Notes
Frontier (2016) ¹⁴⁰¹		0.35 (2001–2016)	0.26 to 0.41 (95 per cent confidence interval for all of the specifications).
Vo et al (2013) ¹⁴⁰²		0.35–0.55 (2001–2012)	Range derived from large number of permutations and sensitivity tests.
SFG (2013a) ¹⁴⁰³		0.35 (2001–2012)	Author's point estimate across a number of different regression forms.
SFG (2011) ¹⁴⁰⁴		0.35 (2001–2010)	
Minney (2010) ¹⁴⁰⁵		0.39 (2001–2009)	Average of results from 2001–2005 and 2006–2009 sub-periods. For the most recent sub-period (2006–2009), utilisation rate is 0.53.
Beggs and Skeels (2006) ¹⁴⁰⁶	0.20 (1992–1997)	0.57 (2001–2004)	Several other pre-2000 periods are presented.
Hathaway and Officer (2004) ¹⁴⁰⁷	0.49 (1986–2004)		Authors suggest that estimate has increased post-2000.
Bellamy and Gray (2004) ¹⁴⁰⁸	0.36 (1995–2002)		Range of 0.0–0.60 is also presented.
Bruckner et al (1994) ¹⁴⁰⁹	0.69 (1991–1993)		Also present an earlier period (1987–1990).
Brown and Clarke (1993) ¹⁴¹⁰	0.80 (1988–1991)		

Source: As specified in table.

¹⁴⁰¹ Frontier, *An updated dividend drop-off estimate of theta: Report prepared for AGN, MultiNet Gas, AusNet Transmission, AusNet Gas Distribution and TransGrid*, September 2016.

¹⁴⁰² D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', *ERA working paper*, April 2013.

¹⁴⁰³ SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013, p. 1.

¹⁴⁰⁴ SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7*, 21 March 2011, p. 3.

¹⁴⁰⁵ A. Minney, 'The valuation of franking credits to investors', *JASSA: The FINSIA journal of applied finance*, no. 2, 2010, p. 32.

¹⁴⁰⁶ D. Beggs and C. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, vol. 82, 2006, p. 247.

¹⁴⁰⁷ N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004, p. 21.

¹⁴⁰⁸ D. Bellamy and S. Gray, 'Using stock price changes to estimate the value of dividend franking credits', *working paper, University of Queensland Business School*, March 2004, pp. 5 and 21.

¹⁴⁰⁹ P. Bruckner, N. Dews and D. White, 'Capturing value from dividend imputation: How Australian companies should recognize and capitalise on a major opportunity to increase shareholder value', *McKinsey and Company report*, 1994, p. 27.

¹⁴¹⁰ P. Brown and A. Clarke, 'The ex-dividend day behaviour of Australian share prices before and after dividend imputation', *Australian journal of management*, vol. 18, June 1993, p. 1.

Table 31 reports estimates of the utilisation rate from the set of available dividend drop off studies. As a high level summary table, it attempts to report the single utilisation rate preferred by the authors for the scenario most relevant to our rate of return framework. As is evident in the table, dividend drop off studies generate a wide range in the estimates of the utilisation rate.

11.8.3.4.2 Limitations of dividend drop off studies

In the draft decision, we considered the limitations of implied market value studies for estimating the utilisation rate. We note that a number of service providers previously submitted that ‘several of the general limitations [of implied market value studies] do not apply to the SFG study’.¹⁴¹¹ Namely, the service providers considered that the SFG dividend drop off study does not produce nonsensical results and is not subject to problematic estimation methodologies.¹⁴¹² However, we consider that there are several issues inherent in the dividend drop off approach that cannot be overcome.

Firstly, the market value estimates of the “value” of imputation credits under the implied market value approach (including dividend drop off studies) are inconsistent with Officer’s framework unless they are adjusted for the impact of differential taxation on capital gains and dividend income. As discussed in section AER consideration 11.2.4, the key implication of Officer’s framework is that the value of imputation credits is a post company tax before personal taxes and transaction costs value flows to investors through the utilisation of imputation credits.¹⁴¹³ We adopted this interpretation of the value of imputation credits in our previous regulatory decisions and draft decision. Under this interpretation, an ‘eligible’ investor can use each dollar of imputation credit received to reduce the tax payable or get a refund.¹⁴¹⁴ Therefore, we consider that eligible investors have a utilisation rate of 1. Conversely, ‘ineligible’ investors cannot utilise imputation credits and have a utilisation rate of 0. It follows that the utilisation rate reflects the extent to which investors can utilise the imputation credits they receive

¹⁴¹¹ AusNet Transmission, *Transmission Revenue Review 2017-2022*, October 2015, pp. 301, 303, 306; Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 13-16; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, pp. 117-118, 125-126; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, pp. 7-86, 7-87, 7-93; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, pp. 87-88, 94; CitiPower, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 365-366, 372; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, pp. 94-95, 102; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 359-360, 366.

¹⁴¹² Australian Gas Networks, *Attachment 11 Response to Draft Decision: Cost of Tax*, January 2016, pp. 13-16; ActewAGL, *Appendix 5.01 Detailed response to rate of return, gamma and inflation*, January 2016, p. 117; AusNet Electricity Services, *Revised Regulatory Proposal*, January 2016, p. 7-86; United Energy, *Response to AER Preliminary Determination Re: Rate of return and gamma*, January 2016, p. 87; CitiPower, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 365-366; Jemena Electricity Networks, *Attachment 6-1 Rate of return, gamma, forecast inflation, and debt and equity raising costs*, January 2016, p. 94; Powercor, *Revised Regulatory Proposal 2016-2020*, January 2016, pp. 359-360; Multinet, *Corporate Income Tax Overview*, December 2016, p. 18; AusNet Services Gas Distribution, *Gas Access Arrangement Review 2018-2022*, December 2016, p. 249.

¹⁴¹³ Post-tax refers to after company tax and before personal tax.

¹⁴¹⁴ This is the return to eligible investors before administrative costs, personal taxes and diversification costs.

to reduce their tax or obtain a refund. This interpretation of the value of imputation credits is supported by the Tribunal and the Full Federal Court.¹⁴¹⁵

Whereas the implied market value studies seek to infer the value of distributed imputation credits from market prices, that is, the price that the marginal investor would be prepared to pay for a credit if there was a market for them. The estimates of the value of distributed imputation credits from implied value market studies can be influenced by factors, such as differential personal taxes and risk that is not consistent with our post company tax and pre personal tax and cost framework. The ENA also consider that there is a clear distinction between the AER's cash flow interpretation of gamma and the market value interpretation of gamma.¹⁴¹⁶ It considered dividend drop-off analysis is a method used to estimate the market value of distributed credits rather the 'utilisation' value applied under the AER's current interpretation of gamma.¹⁴¹⁷

Most of the stakeholders have adopted our 'cash flow' interpretation of the value of imputation credits after the Full Federal Court's decision.¹⁴¹⁸ Under this interpretation, we are not aware of any stakeholders proposing to estimate gamma from dividend drop off studies.

Lally and Handley suggested that dividend drop off studies could give a utilisation rate that is on a post company tax and pre-personal taxes and costs basis as long as we divide the estimate of the utilisation rate from these studies by the corresponding estimated value of cash dividend.¹⁴¹⁹ It indicates a utilisation rate estimate of around 0.4 after the adjustment.

However, as discussed in the draft decision, we do not consider this adjustment will fully account for the potential effect of personal taxes and costs associated with utilising imputation credits and give a reliable estimate for the utilisation rate.¹⁴²⁰ We consider the adjustment suggested by Lally would only address factors which affect both dividends and imputation credits to the same proportionate degree. There are factors identified by SFG which could affect investors' valuation of imputation credits (as reflected in share prices) but would not affect investors' valuation of dividends.¹⁴²¹

¹⁴¹⁵ Federal Court of Australia, *Australian Energy Regulator v Australian Competition Tribunal (No 2)* [2017] FCAFC 79, May 2017; Federal Court of Australia, *SA Power Networks v Australian Competition Tribunal (No 2)* [2018] FCAFC 3, Jan 2018; Australian Competition Tribunal, Tribunal decision in *ActewAGL – re Application by ActewAGL*[2017] ACompT 2, October 201

¹⁴¹⁶ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, pp. 43-44

¹⁴¹⁷ ENA, AER review of the rate of return guideline response to draft guideline, 25 September 2018, pp. 43-44

¹⁴¹⁸ NSG, *Letter on the Australian Energy Regulator's draft rate of return guideline*, 25 September 2018, p. 17; ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 140; Evoenergy, *Review of rate of return guideline-draft decision*, 25 September 2018; South Australian Centre for Economic Studies, *Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report*, July 2018, p. 8.

¹⁴¹⁹ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 43–44; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 16; M. Lally, *The estimation of gamma*, 23 November 2013, p. 21.

¹⁴²⁰ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 448.

¹⁴²¹ Gray for SFG identified some factors that would affect just imputation credits.

Therefore, we do not consider that the proposed adjustment—which only addresses factors which affect both dividends and imputation credits—would exclude the effect of the factors identified by SFG as affecting just imputation credits.

Secondly, Lally considered that there is an additional inconsistency between estimates from dividend drop off studies and the Officer model.¹⁴²² He considered that Officer's model assumes investors choose portfolios now and hold them for some period¹⁴²³. This implies that the value of imputation credits should be determined by those long term investors rather than the marginal investors who trade around the ex-dividend dates. Lally also considered that there is no place in the model for arbitrageurs, whereas the estimate of the utilisation rate from market value studies is likely to be significantly affected by the actions of tax arbitrageurs.¹⁴²⁴

Finally, we consider there are other practical issues associated with estimating the utilisation rate from dividend drop off studies. This includes how to separate the value of dividends from the value of imputation credits (this is referred to as the 'allocation problem'). As imputation credits are only distributed with franked dividends, even if we assume that the value of the combined package of dividends and imputation credits can be 'observed', all dividend drop off studies still have value separation issues. Some academic papers discussed about this separation issue and also identified a number of practical and methodological issues with these studies. The issues was considered in detail in Appendix A 15.6 of Attachment 4 to our final determination for Ausnet Services.¹⁴²⁵

Have had regard to the Independent Panel's recommendation that the AER should adopt a proactive approach to improving the quality and relevance of dividend drop off studies, we have reconsidered dividend drop off studies in estimating the utilisation rate. We have identified the available dividend drop off studies in this final decision, while recognizing some issues are inherent in these studies and so far none of the experts has provided recommendations on how to solve them. Given the difficulties in performing the task and the underlying issues with this approach, we have had regard to the estimates from implied market studies but do not consider they warrant making any adjustment to the estimate of the utilisation rate based on ABS data.

The Independent Panel also considered that if the AER feels confident in the ABS data relating to the equity ownership approach, then the need to explore an alternative is reduced.¹⁴²⁶ If on the other hand side, the AER considers the utilisation rate estimate

SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 65.

¹⁴²² M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 25.

¹⁴²³ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 25.

¹⁴²⁴ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 25.

¹⁴²⁵ The AER, *Final decision: AusNet services transmission determination 2017-2022, Attachment 4- Value of imputation credits*, April 2017, pp. 177-185.

¹⁴²⁶ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 56.

from the ABS data is lack of 'precision', the Independent Panel recommended the AER explore an alternative, or at least a complementary approach.¹⁴²⁷

We recognise that each data source has its own merits and shortcomings with no exception for the ABS data. Nevertheless, we consider the equity ownership approach provides a sufficiently reliable estimate of the utilisation rate, particularly given that the alternative approaches are less satisfactory. We have also considered the new ATO estimates of the redemption rate of distributed imputation credits of between 0.5 and 0.59. However, given that the underlying uncertainties associated with these estimates and stakeholders have not had an opportunity to comment on it, we consider no adjustment to the estimate of 0.65 based on the ABS data appropriate based on this new data.

11.8.4 Conclusion

We consider estimates of the utilisation rate from implied market studies and from ATO redemption rate data do not warrant an adjustment to the estimate of 0.65 based on ABS data. We have placed no reliance on estimates from the implied market value approach, or on ATO estimates of the redemption rate, when estimating the utilisation rate.

11.9 Further issues on utilisation rate

11.9.1 Independent Panel review

The Independent Panel recommended the AER to explain more clearly why it has not considered a utilisation rate estimate higher than 0.6.¹⁴²⁸ It stated:¹⁴²⁹

"If the AER had no regard for ATO data and DDO studies, the choice of the utilisation rate would be clear – the ABS data shows a range of 0.6 to 0.7 and the most recent estimate is 0.65. It is questionable whether the inclusion of two additional sources, each of which is described in the Explanatory Statement as deserving of lesser weight, is sufficient justification for choosing an estimate at the lower end of the range, especially when one of the lesser weight estimates (the DDO at 0.4) appears to be implausibly low compared to the preferred estimate (ABS)."

11.9.2 Stakeholder submissions

Stakeholders submitted divergent views on the estimate of the utilisation rate.

¹⁴²⁷ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 56.

¹⁴²⁸ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 57.

¹⁴²⁹ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 57.

The CRG proposed a utilisation rate of 1 because it considered an efficiently financed firm would source its equity finance from domestic shareholders who are able to use their imputation credits.¹⁴³⁰ If the regulated firms argue that they are using foreign sourced of funding, the CRG considered it is either because:¹⁴³¹

- The cost of equity from foreign sources is lower than domestic sources. In this case, the CRG considered its suggested method for calculating gamma is almost certainly biased towards overstating their cost of equity finance.

or

- The firms are not efficiently financed. In this case, the CRG considered that public policy should have no place in rewarding firms for poor financial practice.

It proposed that the AER has held to the principle that the most efficient source of funding is from Australia when it comes to estimation of the risk-free rate, the MRP and the cost of debt. Yet, it departs from this principle when it comes to its estimate of gamma.¹⁴³²

The AEC considered that the AER's estimated utilisation rate of less than 1 is pragmatic given that in reality, foreign investment is a feature of the Australian share market and of the unlisted sector.¹⁴³³

The CCP considered there is a case that the data supports a utilisation rate of 0.65.¹⁴³⁴

11.9.3 AER consideration

We acknowledge the CRG's proposed utilisation rate estimate of 1 based on the assumption that a BEE would use the most efficient source of funding from Australian sources. However, we consider the relevant market is a domestic market in the presence of foreign investors, a market which we have used to estimate both the return on equity and the value for imputation credits. We agree with the AEC there is clear evidence of foreign investment in Australian equity and given foreign investors are unable to redeem imputation credits, we consider an estimate of the utilisation rate from the equity ownership approach (that incorporates foreign investment in Australian equity) is more reflective of the reality (where Australian firms do raise equity capital from foreign investors who cannot claim imputation credits).

In the overview report to the AER, Lally agreed with the AER that in the presence of foreign investors, the utilisation rate is equal to the proportion of Australian equities

¹⁴³⁰ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 35.

¹⁴³¹ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 35.

¹⁴³² The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 35.

¹⁴³³ AEC, *Draft rate of return guideline response*, September 2018, p. 18.

¹⁴³⁴ CCP16, *Submission to the AER on its draft rate of return guideline*, September 2018, p. 53.

owned by local investors.¹⁴³⁵ He considered we should use the data from the ABS to estimate the utilisation rate if the empirical reality of foreign investors is to be incorporated in the model.¹⁴³⁶ We note Lally recommended as a first preference we use a utilisation rate of 1 because it is consistent with the Officer model that assumes complete segmentation of national equity market.¹⁴³⁷ We have considered his recommendation but consider it appropriate to incorporate the empirical reality that foreign investors do hold Australian equity and the fact that those investors cannot claim imputation credits.

Having had regard to the expert's advice and stakeholder submissions, we consider our equity ownership approach for estimating the utilisation rate, which incorporates the presence of foreign investors in Australian equity market, remains appropriate.

In reaching our final decision on the utilisation rate estimate for an efficient regulated network service provider, we have carefully considered the comments of the Independent Panel, the new notes from the ATO and the submissions from stakeholders. We have had regard to the strengths and limitations of different sources of information, in particular, we have reconsidered the estimates from implied market value studies in this final decision in light of the Independent Panel's recommendation.

This re-examination, and new evidence and advice considered since the draft decision, has led us to depart from the utilisation rate estimate of 0.6 proposed in the draft decision. We have used a utilisation rate estimate of 0.65 for an efficient regulated network business in calculating the value of gamma used in the Instrument. This is based on the equity ownership approach, which suggests the most recent June 2018 point estimate of 0.65 rounded to the nearest 0.05. The averages of the point estimates for each quarter over the last five and ten years based on the updated ABS data also support a rounded estimate of 0.65. We depart from the draft decision and place no weight or reliance on the estimates from the ATO public data and implied market value studies given the reasons discussed in section 11.4.4 and 11.8.3.4.

Further, we consider it appropriate to round the utilisation rate estimate to the nearest 0.05 based on Lally's advice that the extent to which parameter values should be rounded should be based upon the degree of precision in the estimate.¹⁴³⁸ Since the parameter sought is the expected value over the next regulatory cycle, Lally considered there are some uncertainties arising from how much historical data to use, the definition and the data quality. Taking account of all this, he considered an appropriate estimate is 0.65 rounded to the nearest 0.05.¹⁴³⁹ This is consistent with our utilisation rate estimate of 0.65.

¹⁴³⁵ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 18; M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹⁴³⁶ M. Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, p. 18; M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹⁴³⁷ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 4.

¹⁴³⁸ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 34.

¹⁴³⁹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 34.

11.10 Conclusion

We have determined a utilisation rate of 0.65 for this final decision for use in the Instrument.

11.11 Further issues on value of imputation credits

We consider some further issues proposed in stakeholder submissions on the overall value of imputation credits in this section.

11.11.1 Draft decision

Our draft decision was to set a value of imputation credits (or gamma value) of 0.5 from a range of 0.3 to 0.6.¹⁴⁴⁰

Our estimate of 0.5 was rounded to one decimal place from an estimate of 0.53 based on the product of an estimated utilisation rate of 0.6 and an estimated payout ratio (or distribution rate) of 0.88. Given the precision of the underlying data we considered rounding the value of imputation credits to one decimal place was appropriate.¹⁴⁴¹

We used a payout ratio of 0.83 in the draft instrument to be internally consistent with our rounded gamma value of 0.5 and our utilisation rate of 0.60.¹⁴⁴²

11.11.2 Independent Panel review

The Independent Panel was unconvinced about the practice of rounding the value of gamma to one decimal place.¹⁴⁴³ It recommended the AER review its rounding policy in relation to gamma, including considering whether to round to the nearest five per cent or to round to two decimal places.¹⁴⁴⁴

11.11.3 Stakeholder submissions

Stakeholders submitted divergent views on the final estimate of the value of imputation credits.

The CCP proposed that there are strong arguments for adopting higher values for both the utilisation rate and distribution rate.¹⁴⁴⁵ It considered there is a case that the data supports a utilisation rate of 0.65 and a distribution rate of 0.88 with a gamma value of

¹⁴⁴⁰ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 388.

¹⁴⁴¹ The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 388.

¹⁴⁴² The AER, *Draft rate of return guidelines explanatory statement*, July 2018, p. 388.

¹⁴⁴³ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 58.

¹⁴⁴⁴ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, p. 58.

¹⁴⁴⁵ CCP16, *Submission to the AER on its draft rate of return guideline*, September 2018, p. 53.

0.57.¹⁴⁴⁶ It disagreed with the AER's 'goal seek' approach of first rounding down the utilisation rate, then combining that with a rounded target gamma value of 0.5 to arrive at a distribution rate of 0.83.¹⁴⁴⁷

The CRG proposed a gamma estimate of 0.9 if there is to be a fixed gamma for the duration of this determination.¹⁴⁴⁸ It considered the AER's proposed gamma estimate of 0.5 appears to be biased towards a low value for gamma and that it has chosen to ignore the evidence provided by Lally. This raises the question as to whether this is a case of concern for "incrementalism" over-riding evidence and objectivity.¹⁴⁴⁹

In contrast, the businesses argued for a lower estimate of gamma:

- The ENA proposed the best estimate of gamma is 0.34 to 0.39 for listed equity based on the AER's previous approach.¹⁴⁵⁰ It considered that the ATO data produces a lower bound of 0.34 because it includes unlisted equity and the distribution rate for unlisted firms may exceed that for listed firms.¹⁴⁵¹ Whereas the distribution rate estimate based on the top 20 ASX listed firms and the utilisation rate estimate based on the equity ownership approach produce an upper bound estimate of gamma of 0.39.¹⁴⁵² This is because it considered the FAB used in the distribution rate calculation can fall for reasons other than the distribution of credits to shareholders and not all resident investors can redeem all the credits that they receive.¹⁴⁵³ The ENA also considered that combining two estimates from two different methodologies using two different data sources results in a compounding of estimation error.¹⁴⁵⁴
- Evoenergy proposed a gamma of 0.39 from pairing the AER's preferred estimate of the distribution rate of 0.83 for listed equity with the AER's preferred estimate of the utilisation rate of 0.47 for listed equity (the equity ownership midpoint estimate).¹⁴⁵⁵ However, if the AER were to alter its estimate of gamma from the prevailing value of 0.4, Evoenergy considered the evidence supports a range of 0.34 to 0.39.¹⁴⁵⁶
- APAG proposed to maintain a gamma of 0.4 until there is compelling evidence that finance theory or market conditions necessitate a change.¹⁴⁵⁷

¹⁴⁴⁶ CCP16, *Submission to the AER on its draft rate of return guideline*, September 2018, p. 53.

¹⁴⁴⁷ CCP16, *Submission to the AER on its draft rate of return guideline*, September 2018, p. 53.

¹⁴⁴⁸ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 38.

¹⁴⁴⁹ The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 37.

¹⁴⁵⁰ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 2, p. 157.

¹⁴⁵¹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 156.

¹⁴⁵² ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 156.

¹⁴⁵³ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 156.

¹⁴⁵⁴ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p. 156.

¹⁴⁵⁵ Evoenergy, *Review of rate of return guideline-draft decision*, 25 September 2018

¹⁴⁵⁶ Evoenergy, *Review of rate of return guideline-draft decision*, 25 September 2018

¹⁴⁵⁷ APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, p. 36.

SACES considered a gamma estimate of 0.5 in the draft decision is reasonable in light of the AER's considerations.¹⁴⁵⁸

11.11.4 AER consideration

In light of the Independent Panel's recommendation and the CCP's submission, we have reconsidered our rounding policy in relation to gamma. We propose to round the distribution rate and utilisation rate to the nearest 0.05 and the product of these rounded values produce the value of imputation credits (or gamma). This is based on Lally's advice that rounding should occur for the distribution rate and utilisation rate given that gamma is the product of the two sub-parameters and these two sub-parameters are individually estimated rather than gamma.¹⁴⁵⁹ We agree with Lally on this point and consider rounding should be applied to the sub-parameters and gamma is the product of the two rounded sub-parameters.

Furthermore, Lally considered the extent to which parameter values should be rounded should be based upon the degree of precision in the estimate.¹⁴⁶⁰ In respect of the distribution rate, he considered an appropriate estimate is 0.95 rounded to the nearest 0.05. In respect of the utilisation rate, if account is taken of foreign investors, Lally considered an appropriate estimate is 0.65 rounded to the nearest 0.05.¹⁴⁶¹ We have considered Lally's recommended rounding to the nearest 0.05 and consider it appropriate to round the sub-parameters to the nearest 0.05 based on his advice. The rounded utilisation rate of 0.65 and distribution rate of 0.9 give an estimate of gamma of 0.585.

We have considered the CRG's submission and its proposed gamma of 0.9, which it considered would cover the possibility that over the period there may be some need for net new investment in the networks.¹⁴⁶² As discussed in section 11.9 and 11.6, we do not consider its proposed approach will give a reliable estimate of the value of imputation credits. In setting the value of gamma, we need to ensure that it is:

- Not too high, in that it contributes to providing a reasonable opportunity to recover at least efficient corporate tax costs
- Not too low, in that it contributes to a return that is not excessive and is commensurate with the relevant risks.

We consider that finding the right balance is best served by having regard to the merits of the full range of relevant evidence. We explain our consideration of, and reliance upon, the range of relevant evidence in this explanatory statement. We have

¹⁴⁵⁸ South Australian Centre for Economic Studies, *Review of issues raised by Frontier Economics in connection with Ausgrid's 2019–24 regulatory proposal draft report*, July 2018, p. 9.

¹⁴⁵⁹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹⁴⁶⁰ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹⁴⁶¹ M. Lally, *Estimation of gamma- review of recent evidence*, December 2018, p. 5.

¹⁴⁶² The CRG, *Submission to the Australian Energy Regulator – response to the rate of return draft decision*, September 2018, p. 38.

determined a value of imputation credits that we consider will provide the opportunity for service providers to recover at least efficient costs commensurate with relevant risks.

We have also considered the estimates of gamma of below 0.5 proposed by the businesses. In particular, we have had regard to the ENA's proposed gamma of 0.34 to 0.39. We consider the estimate of 0.34 based on ATO public data gives a too low gamma estimate because this estimate includes unlisted firms that are considered not representative of an efficient regulated network service provider and the distribution rate of unlisted firms is likely to be lower than listed firms. If unlisted firms were included in the gamma calculation, this will underestimate the appropriate gamma estimate for an efficient regulated network service provider. Moreover, we do not consider a gamma estimate of 0.39 based on a distribution rate of 0.83 and a utilisation rate of 0.47 is an upper bound because:

- The distribution rate of 0.83 proposed in the draft decision was based on the estimated distribution rate of the top 20 ASX listed firms of 0.88, which was rounded down to 0.83 to be consistent with our rounded gamma value of 0.5 and our utilisation rate of 0.6. The Independent Panel considered the AER's rounding policy in relation to gamma is not well explained and there would be merit in extending the analysis beyond the top 20.¹⁴⁶³ In light of the Independent Panel's recommendation, we have reconsidered our rounding policy adopted in the draft decision and commissioned Lally to expand his analysis to the top 50 ASX listed firms. Lally's most recent analysis on the top 50 ASX firms indicates a distribution rate estimate of 0.89 without adjustment for foreign operations.¹⁴⁶⁴ We consider it appropriate to round the distribution rate to the nearest 0.05 based on Lally's advice, which suggests an estimate of 0.9.
- The utilisation rate estimate of 0.47 is based on March 2017 ABS data release for listed equity, which is before the ABS reviewed its data sets. We consider this data is out of date. Instead, we consider most recent updated ABS data should be used in estimating the parameter.
- The utilisation rate estimate of 0.47 is based on listed equity, which we consider will not give a reliable utilisation rate estimate for an efficient regulated network service provider for the reason discussed in section 11.3.4. We consider the utilisation rate estimate should be based on all equity, which suggests a rounded estimate of 0.65 based on the most recent point estimate and the averages of the point estimates for each quarter over the last five and ten years.
- The distribution rate from the financial reports of the top 50 firms is not an upper bound for the reasons discussed in section 11.5.2.4. The utilisation rate based on the equity ownership approach is not an upper bound for the reasons discussed in section 11.8.2.4.

¹⁴⁶³ Independent panel, *Review of the Australian Energy Regulator's rate of return draft guidelines*, 7 September 2018, pp. 53, 58

¹⁴⁶⁴ M. Lally, *Estimating the distribution rate for imputation credits for the top 50 ASX companies*, October 2018

Overall, having had regard to the merits and shortcomings of each empirical evidence, we consider the approach adopted in this final decision for estimating gamma is appropriate. We consider an estimate of the value of imputation credits below 0.585 would be expected to result in excess compensation for a regulated network service provider operating efficiently and that this would not be in the long term interest of consumers.

12 Overall rate of return

In the preceding sections we set out:

- our approach to estimating the rate of return as a weighted average of the return on equity and return on debt,
- our foundation model approach to estimating the return on equity, and
- our trailing average portfolio approach to estimating the return on debt.

In this section we have regard to further information that does not relate to individual parameters of our return on equity or return on debt but may inform the overall rate of return. Stakeholders have submitted that the following material may be relevant to the overall rate of return:¹⁴⁶⁵

- historical profitability measures and RAB multiples
- investment trends and results on RAB values and asset utilisation
- financeability assessments.

12.1 Historical profitability and RAB multiples

Analysis of historical profitability refers to the use of financial statements to compare:

- free cash flows to equity, with the
- estimated cash flows to equity (inputted into the rate of return building block).

RAB multiples are the enterprise value of a firm divided by its Regulatory Asset Base (RAB). It can be calculated using two main sources of data to evaluate the market value of equity in service providers:

- Acquisition data – the purchase price when a transaction¹⁴⁶⁶ of the service providers occurs, or
- Trading data – the existing share price of a business that has an equity ownership in a service provider.

Subject to satisfying several conditions, a RAB multiple of 1 may indicate that the present value of the future stream of expected cash-flows of the firm is equal to its

¹⁴⁶⁵ Energy Networks Australia made a late submission about the comparison of our allowed rate of return against overseas regulators' decisions. This submission was made as a follow up to a question raised at ENA's presentation of its submission to the AER Board. ENA did not submit that overseas regulators' decisions should be considered to inform our overall rate of return, but did submit that overseas regulators' decisions should be considered when estimating the allowed return on equity. We address the role of overseas regulators' decisions for the return on equity in section 3. See: ENA, *Response to AER Board Questions – International comparisons*, 23 October 2018.

¹⁴⁶⁶ A transaction may only involve the purchase of a certain portion of equity in a service provider, in which case, an implied RAB multiple can be calculated based on the price paid for the percentage of shares acquired.

RAB. This means that investors are compensated exactly at a level to encourage efficient investment.

Both profitability measures and RAB multiples are measures of a firm's returns. However, profitability measures are backward-looking measures of actual returns whereas RAB multiples are forward-looking measures of expected returns.

They are also both measures of overall returns resulting from a service providers' operations and not solely from the allowed rate of return. Returns in addition to the regulatory allowance may result from unregulated activities or outperformance of regulatory benchmarks. RAB multiples and historical profitability measures may then be indicative of other elements of the firm's cash flows and not provide a definitive answer to the specific return investors require.

Overall, we consider that the substantial difficulty in disaggregating the information contained in RAB multiples and historical profitability measures means that this information cannot currently be used to reliably determine the degree of correspondence with the allowed rate of return.

12.1.1 Draft decision

We determined that these measures cannot be used to directly determine parameter estimates for the allowed rate of return. We considered there was significant subjectivity and uncertainty in assumptions required to disaggregate the effect of the allowed rate of return on RAB multiples and historical profitability measures from the effects of other elements of a service providers' cash flows. Given this subjectivity and uncertainty, our draft decision was that the use of this information is not an appropriate method to inform our decision on the rate of return.

However, we considered that there may be useful information within the trends in RAB multiples and historical profitability measures over time. Comparisons of RAB multiples and historical profitability measures can provide information on the performance of the regulatory system as a whole. This information may be helpful in considering whether the business' actual rate of return has been systematically lower or higher than the allowed rate of return.

We considered that RAB multiples and historical profitability may provide useful contextual information and cause for further examination of the material we rely on when estimating rate of return parameters (and other elements of the regulatory regime that are beyond the scope of this review). We noted that we have explored a number of elements of business cash flows:

- as part of this review through
 - further consideration of the impact of regulation on equity beta estimates within our comparator set,
 - examination of service providers' actual debt issuances, and
 - further consideration of the most appropriate third-party debt data to reflect our benchmark credit rating.

- through other reviews we are currently undertaking such as our review of our regulatory tax approach and review of profitability measures for gas and electricity businesses.¹⁴⁶⁷

We stated that we intend to monitor RAB multiples and historical profitability as part of our separate review into reporting profitability measures. We considered this information may assist us in gauging the overall impact of all our decisions (including expenditure allowances) on investment in network businesses.

12.1.2 Independent panel review

The Independent Panel recommended that we:¹⁴⁶⁸

Explain more clearly:

- why the AER intends to disregard RAB multiples
- how and when the ‘monitoring’ and ‘gauging’ of RAB multiples will take place, what questions the AER will seek to answer, and what actions the AER will take once it has answered those questions.

Explain more clearly why the AER has singled out debt from the other building blocks in suggesting that profitability may inform decisions on the cost of debt.

12.1.3 Stakeholder submissions

All stakeholders that submitted on the matter acknowledged the need to disaggregate RAB multiples and historical profitability in order to draw inferences about the rate of return.¹⁴⁶⁹ NERA, in a report jointly commissioned by the CRG and ENA, submitted that RAB multiples may be a direct measure of ratio of the allowed rate of return to the expected return required by investors “under a set of extremely tight assumptions, that are unlikely to hold in practice”.¹⁴⁷⁰ NERA also stated:¹⁴⁷¹

Various factors affect market value besides the allowed rate of return but they may be quite difficult to adjust for and transaction or firm-specific. Adjustments

¹⁴⁶⁷ <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-regulatory-tax-approach-2018>; <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/profitability-measures-for-electricity-and-gas-network-businesses> \

¹⁴⁶⁸ Independent Panel Report, *Review of the Australian Energy Regulator’s Rate of Return Guidelines*, September 2018, p.16

¹⁴⁶⁹ NERA Economic Consulting (NERA), *RAB growth since the AER’s 2013 Rate of Return Guideline*, p. 25 September 2018, p. v; NSG, p.3; Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. 4; ENA, p. 160; AEC, Draft rate of return guidelines response, September 2018, p. 15; Consumer Challenger Panel 16, Submission to the AER on its Rate of Return Guideline Review Concurrent Evidence Sessions, 4 May 2018, p.32.

¹⁴⁷⁰ NERA Economic Consulting (NERA), *RAB growth since the AER’s 2013 Rate of Return Guideline*, p. 25 September 2018, p. v.

¹⁴⁷¹ NERA Economic Consulting (NERA), *RAB growth since the AER’s 2013 Rate of Return Guideline*, p. 25 September 2018, p. v.

can also result in wide ranges. This raises questions about the robustness of drawing inferences from RAB multiples.

Similarly, the AEC submitted:¹⁴⁷²

Disaggregating the impact of outperformance on, say, opex or tax, from outperformance due to an unduly generous rate of return is extremely challenging.

There was a difference of opinion among stakeholders about the weight to be afforded to information from RAB multiples and historical profitability given this difficulty in disaggregating the factors that may be driving the measures. The NSG, ENA, and AEC submitted that RAB multiples and historical profitability measures should not have a role in estimating the rate of return.¹⁴⁷³

NERA noted that it may be argued that the size of recent RAB multiples and historical profitability measures, together with a continued ability of service providers to raise capital, suggest that realised returns are at least sufficient. However, NERA also noted that the difficulty in separating realised returns into allowed returns and other returns makes it difficult to conclude that the allowed return is sufficient.¹⁴⁷⁴

The CRG submitted that AER needs to make better use of actual returns data and find ways to uncover this data if currently not available.¹⁴⁷⁵

The CCP submitted that information such as RAB multiples should be used as a cross-check or constraint on the overall rate of return. The CCP submitted that the recent high RAB multiples support the modest reduction in the rate of return resulting from initial parameter estimates.¹⁴⁷⁶ The CCP submitted that evidence from historical profitability indicates that:¹⁴⁷⁷

1. The regulatory framework provides for returns that persistently and significantly exceed the allowed rate of return.
2. Incentive payments are positive for all but two of the service providers, raising questions as to whether the incentive mechanisms are appropriately calibrated and cost estimates unbiased.

¹⁴⁷² AEC, Draft rate of return guidelines response, September 2018, p. 15.

¹⁴⁷³ ENA, pp. 159,160; AEC, Draft rate of return guidelines response, September 2018, p. 15.

¹⁴⁷⁴ NERA Economic Consulting (NERA), *RAB growth since the AER's 2013 Rate of Return Guideline*, p. 25 September 2018, p. v.

¹⁴⁷⁵ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. 49

¹⁴⁷⁶ Consumer Challenger Panel 16, Submission to the AER on its Rate of Return Guideline Review Concurrent Evidence Sessions, 4 May 2018, p.34

¹⁴⁷⁷ Consumer Challenger Panel 16, Submission to the AER on its Rate of Return Guideline Review Concurrent Evidence Sessions, 4 May 2018, p.32

3. Other factors are a very significant positive contributor to the excess returns, and warrant further investigation. An important factor may be the difference between allowed and actual debt costs.

12.1.4 AER consideration

In order to use historical profitability and/or RAB multiples in a deterministic way to inform our rate of return we would need to be able to reliably take into account the following factors (including any interactions between the factors):¹⁴⁷⁸

- Outperformance in regulatory benchmarks, including expenditure allowances (operating expenditure and capital expenditure) and tax allowances; and for historical profitability measures, demand forecasts
- Unregulated revenue – potential growth and cost efficiencies that can be achieved
- Economic circumstances at the time
 - For RAB multiples we would need to consider differences between the rate of return set at the time of the business' determination versus market conditions when the transactions took place.
 - For historical profitability we would need to consider the extent to which historical returns reflect investor expectations about future returns

In addition, for RAB multiples we would also need to consider:

- Control premium – if the acquisition results in a majority share ownership; also value may be placed on perceived real options which may be easier to exercise with a majority share ownership
- Possibility of over-optimism in assumptions.

However, there is much subjectivity and no agreement from experts on the appropriate assumptions to use to disaggregate historical profitability and RAB multiples.¹⁴⁷⁹ We also note recent developments in the UK, with the decomposition of RAB multiples for particular utilities, where there has been contention regarding the assumptions that should be used and the appropriate factors to consider.¹⁴⁸⁰

For historical profitability, we note that if disaggregation of profitability measures can be reliably undertaken then it may provide information on efficient gearing levels and efficient capital, operating, debt, and tax expenditure, but it cannot provide information on the required return on equity. This is because, after accounting for outperformance of regulatory allowances, a service provider's return is set by regulation.

¹⁴⁷⁸ The various possible causes of RAB multiples differing from 1 are set out in greater detail in: Biggar, *Understanding the role of RAB multiples in regulatory processes*, February 2018.

¹⁴⁷⁹ CEPA, *Joint Expert Report*, 21 April 2018, pp. 35-36.

¹⁴⁸⁰ CCP, *Submission in response to draft decision*, September 2018, p. 33.

In addition, transactions that provide data on acquisition multiples are relatively infrequent and there is a risk of inappropriately applying circumstances from one transaction generally across all the service providers. For example, if a buyer paid a relatively large premium because it considered it could extract value through improved efficiencies then it may be inappropriate to apply this across the board to other service providers as though the rate of return was too generous.¹⁴⁸¹

We note that there are few acquisition multiples, particularly under the 2013 Guidelines, to draw definitive conclusions. Therefore, we agree with the view expressed at the Concurrent Expert Evidence Session, and so we would be cautious about applying findings from an investigation of any sample set with few observations, into a rate of return instrument that would apply to all the service providers.

Also, for analysis of RAB multiples, we note that data on private acquisition multiples may not be reflecting the same factors as trading multiples. Trading multiples are likely to include shareholders' views of managements' ability to deliver outperformance, whereas with acquisition multiples the purchaser would be assessing their own ability to deliver outperformance.

Given the subjectivity and uncertainty in assumptions required to disaggregate RAB multiples and historical profitability measures we do not consider that they can be used in a deterministic way to inform the allowed rate of return. However, trends in RAB multiples and historical profitability may provide useful contextual information about the allowed rate of return. As noted by NERA, we consider that the size of recent RAB multiples and historical profitability measures, together with a continued ability of service providers to raise capital, suggest that realised returns have been at least sufficient.¹⁴⁸²

For historical profitability measures, we consider that it is important to collect information on the actual profitability of the network businesses that we regulate. We will also monitor trading multiples and acquisition multiples that may occur from time to time. Over time we expect that this can help inform us on the effectiveness of our regulatory framework and identify areas that require further investigation. For example, careful consideration of profitability measures may be helpful in identifying whether the business' actual cost of debt has been systematically lower or higher than the cost of debt applied in the rate of return.¹⁴⁸³

12.1.5 Conclusion

¹⁴⁸¹ AER, Concurrent Expert Evidence Session 1 – Proofed Transcript, March 2018, p 115.

¹⁴⁸² NERA, *RAB growth since the AER's 2013 Rate of Return Guideline*, ENA & AER Rate of Return Consumer Reference Group Joint Project, 25 September 2018, p. v.

¹⁴⁸³ In response to the Independent Panel, we highlight the return on debt building block as this building block is within the scope of the rate of return guidelines. Monitoring of historical profitability and RAB multiple trends may also assist in our understanding of the effectiveness of our regulatory framework for setting other building blocks, but adjustments to our methods for determining those other building blocks is outside the scope of these guidelines.

The substantial difficulty in disaggregating the information contained in RAB multiples and historical profitability measures means that this information cannot currently be used to reliably determine the degree of outperformance of the allowed rate of return. However, they may provide contextual information that can assist our investigation of other evidence and our risk-cost trade-off assessment.

12.2 Investment trends

In section 2 we set out the role that the allowed rate of return plays in achieving the legislative objectives, including in achieving efficient investment in electricity and gas network services. Some stakeholders submitted that past investment trends may provide useful information on the extent to which the level of the allowed rate of return in past regulatory determinations promoted efficient investment, discouraged efficient investment, or encouraged inefficient investment.

12.2.1 Draft decision

The draft decision did not separately discuss the role of past investment trends in setting the allowed rate of return, but did consider the role of RAB multiples and historical profitability, for which past investment may be a contributing factor.

12.2.2 Independent panel review

The Independent Panel did not comment on the role of investment trends in determining an allowed rate of return.

12.2.3 Stakeholder submissions

The CRG submitted that RABs have increased significantly while utilisation has declined and under-investment in networks compared to allowances has not resulted in a decline in network reliability. The CRG considers plateauing RAB levels inconsistent with declining consumption and expresses concern at projected RAB growth in recent regulatory proposals submitted by NSW electricity networks.¹⁴⁸⁴

Sapere Research Group noted that the ACCC Electricity Supply Prices Inquiry found that RABs for NSW, ACT and Queensland businesses should be economically optimised (reduced).¹⁴⁸⁵ Sapere Research Group submitted that any excess in current RABs are in part a product of historical economic profits creating strong incentives to over-invest in capacity.¹⁴⁸⁶

¹⁴⁸⁴ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. vii.

¹⁴⁸⁵ Sapere Research Group, *Regulated Australian Networks – Analysis of rate of return data published by the Australian Energy Regulator*, October 2018, p. 11.

¹⁴⁸⁶ Sapere Research Group, *Regulated Australian Networks – Analysis of rate of return data published by the Australian Energy Regulator*, October 2018, p. 11.

Energy Networks Australia submitted that RAB growth has been modest since 2014 and lower than allowed by the AER, with service providers overwhelmingly underspending capex allowances.¹⁴⁸⁷

The Network Shareholder Group submitted that over-investment between 2007 and 2017 was due to government decisions on reliability standards and inefficient investment by government owned service providers. The Network Shareholder Group further submitted that the majority of over-investment occurred before 2014 and that over-investment has not occurred under private ownership. The Network Shareholder Group states that reducing the rate of return to address perceived historical over-investment would penalise good and bad performers equally and reduce future incentives to outperform the regulatory settings.¹⁴⁸⁸

The Network Shareholder Group submitted that consumption is irrelevant as providers build networks to service peak demand, which fluctuates considerably across Australia and across seasons. While there has been slowing peak demand across the national electricity market this has not occurred uniformly, with the Network Shareholder Group citing recent all-time highs on Energex and Ergon's networks.¹⁴⁸⁹

Energy Networks Australia submitted that the trend of networks underspending capex allowances is inconsistent with the proposition that networks' ongoing capital investments demonstrate an incentive to increase their RABs. It considered this supports the hypothesis either that networks do not consider discretionary capital investments adequately compensated or that other factors are driving capital investment behaviour.¹⁴⁹⁰ Energy Networks Australia did not propose that the material reduction in investment since 2013 relates entirely to reductions in allowed returns, but rather considered that evidence is inconsistent with the proposition that the allowed returns since 2013 have been so high as to drive inefficiently high levels of capital expenditure.¹⁴⁹¹

The Network Shareholder Group submitted that rates of return have not been excessive and have not driven over-investment, claiming that underspent capex allowances indicate that perceived incentives for overinvestment under the 2013 Guidelines do not exist in practice.¹⁴⁹² The Network Shareholder states that capital expenditure fell in response to significant reduction in rates of return comprised by the 2013 Guidelines.¹⁴⁹³

Similarly the Joint Energy Businesses submitted that minimal growth in RABs since the 2013 Guidelines indicates the rates of return derived from the 2013 Guidelines may not

¹⁴⁸⁷ Energy Networks Australia, *AER Review of the Rate of Return Guideline*, 25 September 2018, p. 27.

¹⁴⁸⁸ Network Shareholder Group, *Submission to the draft Rate of Return Guideline*, 25 September 2018, p. 6.

¹⁴⁸⁹ Network Shareholder Group, *Submission to the draft Rate of Return Guideline*, 25 September 2018, p. 24.

¹⁴⁹⁰ Energy Networks Australia, *AER Review of the Rate of Return Guideline*, 25 September 2018, p. 28.

¹⁴⁹¹ Energy Networks Australia, *AER Review of the Rate of Return Guideline*, 25 September 2018, p. 30.

¹⁴⁹² Network Shareholder Group, *Submission to the draft Rate of Return Guideline*, 25 September 2018, p. 3.

¹⁴⁹³ Network Shareholder Group, *Submission to the draft Rate of Return Guideline*, 25 September 2018, p. 4.

have been sufficient to encourage efficient investment, and certainly have not resulted in any over-investment in networks.¹⁴⁹⁴

However, the CRG submitted that there are reasons other than the level of the allowed rate of return for networks to underspend their capex allowances and that there is currently no analysis that examines in detail the reasons for underinvestment. The CRG suggested that inaccurate demand forecasts and the effect of the capital expenditure sharing scheme are contributing factors, the latter incentivising networks to over-claim capex allowances.¹⁴⁹⁵ The CRG additionally stated that there is no evidence of under-investment resulting in a decline in network reliability, safety, security, or quality of supply. The CRG submitted that there was actually substantial over-investment between 2009 and 2013.¹⁴⁹⁶

The CCP16 submitted that capex allowed by the AER exceeded actuals under the 2013 Guidelines because of incentives for networks to propose capex that exceeds efficient requirements and then spend less. It claimed that networks have an incentive to spend less than the allowed capex unless the required capex is less than two-thirds of the allowed capex.¹⁴⁹⁷

We received a report from NERA Economic Consulting (NERA) commissioned by Energy Networks Australia and the CRG. The report considered various drivers of RAB growth and whether RAB growth can be used to inform our rate of return decision. NERA concluded that, taken together, the factors it considered suggest that:

- it would be incorrect to interpret RAB growth since 2013, in isolation, as evidence that the allowed rate of return has been set too high¹⁴⁹⁸ and
- the effect of the Rate of Return on capex is ambiguous.¹⁴⁹⁹

NERA concluded that the evidence does not clearly indicate that rates of return have been too high, too low, or at the correct level due to difficulties disentangling realised returns from allowed returns.¹⁵⁰⁰

12.2.4 AER consideration

¹⁴⁹⁴ Joint Energy Business, Submission on AER draft guidelines, September 2018, p.2

¹⁴⁹⁵ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, P. 8.

¹⁴⁹⁶ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. 9.

¹⁴⁹⁷ Consumer Challenge Panel (CCP), *Submission to the AER on its Draft Rate of Return Guideline*, September 2018, p. 28.

¹⁴⁹⁸ NERA Economic Consulting (NERA), *RAB growth since the AER's 2013 Rate of Return Guideline*, p. 25 September 2018, p. i.

¹⁴⁹⁹ NERA Economic Consulting (NERA), *RAB growth since the AER's 2013 Rate of Return Guideline*, p. 25 September 2018, p. iv.

¹⁵⁰⁰ NERA Economic Consulting (NERA), *RAB growth since the AER's 2013 Rate of Return Guideline*, p. 25 September 2018, p. 58.

Stakeholders submitted that we should have regard to trends in capital expenditure (investment), regulatory asset base (RAB) levels, and asset utilisation. We note that

- changes in RAB values are a function of opening RAB values and investment over the period,
- asset utilisation is a function of asset capacity and demand, and asset capacity is a function of investment in initial capacity and investment to maintain/expand capacity.

Therefore, the three factors for consideration are opening RAB values, investment trends, and demand trends. Opening RAB values and demand trends are unrelated to the level of the allowed rate of return (but demand and utilisation trends may be a consideration in a risk-cost trade-off assessment).

Investment trends may provide some indication that the allowed rate of return in past regulatory determinations was too high or too low. An allowed rate of return that is too high may encourage inefficient overinvestment, while an allowed rate of return that is too low may discourage efficient investment. However, this assessment requires evidence that:

- historical investments have not been efficient, and
- inefficiency of historical investments was, at least in part, driven by the allowed rate of return.

It is not clear that investment trends can reliably inform our review of the rate of return. A number of non-rate of return factors can contribute to investment trends with conflicting impact. The influence of these factors and the difficulty disentangling their impacts complicates using investment trends as an indicator of the rate of return.

The NERA report jointly commissioned by the Consumer Reference Group and Energy Networks Australia discussed the following factors that can affect investment trends:¹⁵⁰¹

- peak demand forecasts and outturn demand;
- expected cyclical trends in asset lives and replacement needs;
- changes in the cost of like-for-like replacement of assets;
- service level standards;
- any disparity between the cost of connections and capital contributions;
- depreciation; and
- incentive schemes.

¹⁵⁰¹ NERA Economic Consulting (NERA), *RAB growth since the AER's 2013 Rate of Return Guideline*, p. 25 September 2018, p. ii.

NERA found that these non-rate of return factors would have contrasting effects on investment trends since 2013 so it would be incorrect to interpret certain trends, in isolation, as evidence that the allowed rate of return has been set too high.¹⁵⁰²

The Consumer Reference Group submitted that consumers have received poor value for investment prior to the 2013 Guidelines.¹⁵⁰³ It focused on the substantial RAB growth since 2006, which coincided with a drop in utilisation across the national electricity market and the slowing RAB growth and declining consumption under the 2013 Guidelines.¹⁵⁰⁴

We caution drawing results from comparison over time without appropriate context. For example, a comparison between pre-2013 and post-2013 RAB would need to consider the network reliability standard changes in NSW and QLD in 2005, and the rollout of mandatory smart metering in VIC, over this period.

There were also changes to the regulatory regime including the AER gaining greater remit in 2012 to assess costs proposed by providers, and the introduction of the Capital-expenditure Efficiency Sharing Scheme (CESS) and other incentive schemes.¹⁵⁰⁵ The previously mentioned highly prescriptive and input-focussed network reliability standards in NSW and QLD were also relaxed in 2012.¹⁵⁰⁶ These factors make it difficult to compare investment trends over time to discern the extent of any impact from the rate of return.

12.2.5 Conclusion

We consider that the currently available evidence on investment trends cannot reliably be used to inform the allowed rate of return in any deterministic way. However, they may provide contextual information that can assist our investigation of other evidence and our risk-cost trade-off assessment.

12.3 Financeability metrics

Financeability refers to a service provider's ability to meet its financing requirements and to efficiently raise new capital. In the regulatory context, it often refers to the service provider's ability to achieve the benchmark credit rating applied in the estimation of the rate of return. This is typically assessed through examining the key financial ratios used by credit rating agencies and testing if these ratios support the benchmark credit rating, based on a service provider's allowed cash flows. As it involves testing the benchmark credit rating against allowed cash flows, various

¹⁵⁰² NERA Economic Consulting (NERA), *RAB growth since the AER's 2013 Rate of Return Guideline*, p. 25 September 2018, p. i.

¹⁵⁰³ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. 10.

¹⁵⁰⁴ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, p. vi.

¹⁵⁰⁵ AEMC, *Promoting efficient investment in the grid of the future*, 26 July 2018, p. 19.

¹⁵⁰⁶ ACCC, *Retail Electricity Pricing Inquiry Final Report*, June 2018, p. 166

stakeholders consider it could or should provide a cross-check on the assumptions underpinning those allowed cash flows.

Our 2013 Guidelines do not include a financeability assessment as part of determining the rate of return, nor does it include it as a cross-check on the reasonableness of the rate of return.¹⁵⁰⁷ In subsequent consultations some stakeholders submitted that financeability should be used as a potential test of whether the allowed rate of return is achieving the legislative objectives.¹⁵⁰⁸

Consistent with our draft decision, our final decision is to not use financeability assessments to inform our rate of return. We remain of the view there is no clear guidance on the assumptions that should be used in any financeability assessment as a cross check on the benchmark parameters in the Sharpe-Linter CAPM that we are using in our foundation model. We are of the view the appropriateness of these parameters should continue to be based on the evidence examined in determining these parameters.

Nevertheless, in reaching our final decision we have fully considered the submissions of stakeholders. This includes submissions and any associated calculations indicating some regulated firms will struggle with financial metrics sufficient to maintain an investment grade credit rating under the rate of return instrument. We consider this unlikely because we expect any regulated firms under financial metric pressure from the new rate of return instrument to take countermeasures to protect their credit profiles. Countermeasures could include reducing the proportion of capital expenditures funded by debt, reducing capital or operating expenditures and reducing dividends. Our views on the expected application of countermeasures are consistent with the views of Moody's stated in a Sector Comment released after our draft decision and quoted below.¹⁵⁰⁹ We consider our overall WACC allowance under this final decision will provide sufficient revenue to allow firms to undertake any necessary countermeasures required.

12.3.1 Draft decision

Consistent with our 2013 Guidelines, our draft decision was to not use financeability assessments to inform our rate of return. Key reasons for this included:¹⁵¹⁰

- Financeability assessments by rating agencies involve the overall cash flows of the regulated firm and not just the cash flows from the allowed rate of return
- We did not consider the financeability assessment would be helpful in a regulatory context if it were to be undertaken using the assumptions underpinning the allowed

¹⁵⁰⁷ AER, Rate of Return Guideline - Explanatory Statement, December 2013, p 59.

¹⁵⁰⁸ AER, Issues Paper - Review of the rate of return guidelines, October 2017, p 16.

¹⁵⁰⁹ Moody's Investor Services, Sector Comment Regulated Electric and Gas Networks - Proposed changes to Australia's regulatory rules are credit negative for regulated energy networks, 14 July 2018, p.2

¹⁵¹⁰ AER, Draft Guideline explanatory statement, pp 152-153.

revenue. This was because the cash flows under the financeability assessment match the allowed revenues and there will not be any timing issue.

- We did not consider it would be appropriate to undertake a financeability assessment using the actual costs of a service provider. This was because we aim to provide an efficient allowance and actual costs may not be efficient.

Nevertheless, we did express the view that financeability would be useful for the service providers to consider themselves when determining how best to finance their capital expenditure, particularly if there is a relatively large forward capex program.

Our final decision is consistent with our draft decision.

12.3.2 Independent panel review

The independent panel expressed the view the AER has considered the available information and evidence and explained sufficiently its reasoning for not using financeability assessments to inform the rate of return.¹⁵¹¹

12.3.3 Stakeholder submissions

Submissions on financeability in response to our draft decision were received from APA Group, Energy Networks Australia, the Australian Pipeline and Gas Association, the Australian Energy Council, and in a Joint submission from SA Power Networks, CitiPower, Powercor, Australian Gas Infrastructure Group and United Energy (the Joint Energy Business Submission).

APA submitted that the financial metric of financial funds from operations to debt (FFO/Debt) was more aligned with a BBB credit rating if a 60% gearing assumption was to be used. It also considered the assumptions in the draft instrument may lead to credit downgrading of some regulated service providers, to future refinancing issues and to higher costs which must, in the long term, be borne by energy consumers.¹⁵¹²

Energy Networks Australia expressed the view that our primary concern appeared to be that these assessments are circular and that this was incorrect. It considered that these tests provide a useful check on the appropriateness of the regulatory allowances (including the rate of return).¹⁵¹³

The Joint Energy Business Submission raised concerns about the potential impacts on financeability of the draft instrument and expressed the view that many businesses may face credit rating downgrades from the decision.¹⁵¹⁴

¹⁵¹¹ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, p19.

¹⁵¹² APA, *Review of the rate of return guidelines APA submission responding to AER draft guidelines*, 25 September 2018, p. 6-7

¹⁵¹³ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, pp.161-162

¹⁵¹⁴ Joint Energy Business, *Submission on AER draft guidelines*, September 2018, pp 4-5.

The Australian Energy Council provided some support for the proposition that rating agencies' qualitative assessment of the regulatory regime under which the networks operate tend to result in a higher credit rating than that implied purely by the leverage and coverage metrics.¹⁵¹⁵

The AEC considered that one of the limitations of determining the rate of return as a stand-alone decision across all the regulated networks is that it cannot be cross-checked against the rest of the decisions that go to make up a regulated determination.¹⁵¹⁶ To overcome this limitation, the AEC created a “virtual” network that looks similar to the average regulated network to cross-check the effects of the rate of return decision. The model was designed in a way that the leverage and coverage metrics can be applied to a ratings agency methodology along with a reasonable qualitative assessment to provide an indicative credit rating according to the AEC.¹⁵¹⁷ Overall, the AEC considered the exercise supports the AER’s combination of 60 per cent gearing with a BBB+ benchmark credit rating for determining the cost of debt.¹⁵¹⁸ It also considered the AER’s decision of using a 1/3 weighting of the A- rated data series and a 2/3 rating of the BBB data series appears to be a pragmatic approach for determining the cost of debt for a regulated network business with a BBB+ benchmark credit rating.¹⁵¹⁹

The Australian Pipeline and Gas Association suggested the AER consider the implications of its proposed rate of return allowances on the credit metrics of the member businesses as a way of cross checking the sensibility of its results.¹⁵²⁰ APGA also raised these issues in a presentation to the AER Board on 4 October 2018.¹⁵²¹

The Network Shareholder Group submitted that broker reports after the release of the draft decision indicated the reduced revenue from regulatory changes are impacting forecast credit metrics and putting current credit ratings at risk.¹⁵²²

12.3.4 AER consideration

Firstly, we note the rating agencies assess firms' expected actual (and not regulated) cash flows against firms' actual debt. Firms expected actual cash flows may vary from regulated cash flows due to expectations they will perform better than the regulatory allowance (e.g. by achieving operating or capital expenditure efficiencies). They may also differ due to cash flows associated with non-regulated activities. In addition, actual debt is typically well in excess of 60% of the regulated asset base. This is because our benchmark gearing ratio is based on the market value of debt to the market value of

¹⁵¹⁵ Energy Consumers Australia, Response to the AER Draft Guideline, July 2018,, pp 9-10

¹⁵¹⁶ Energy Consumers Australia, Submission on draft guideline, pp 9-10

¹⁵¹⁷ Energy Consumers Australia, Submission on draft guideline, pp 9-10

¹⁵¹⁸ Energy Consumers Australia, Submission on draft guideline, pp 9-10

¹⁵¹⁹ Energy Consumers Australia, Submission on draft guideline, pp 9-10

¹⁵²⁰ APGA, *Submission to the AER 2018 rate of return guideline draft decision*, 25 September 2018, pp 33-34.

¹⁵²¹ APGA. Presentation to AER Board, slide 3.

¹⁵²² Spark - Follow up letter to the AER after meeting with the Department of Environment on 20 June 2018, p4.

the overall firm, whereas the current market values of firms materially exceed their regulated asset bases. These differences makes any assessment based on regulated revenues and regulated debt (as contained in the RAB) distinctly removed from the actual assessment being performed by credit rating agencies.

We also note that the rating agencies have a range of quantitative and qualitative measures they consider when assessing a firms credit rating. Financial metrics are only one part of the assessment and are not used in a determinative way. While there are indicative financial metrics the rating agencies expect for a given credit rating, including FFO/Debt, the final credit rating assigned is influenced by multiple factors. For example, Moody's has five factors they consider important to its assessment for ratings in the regulated electric and gas network sector:¹⁵²³

1. Regulatory Environment and Asset Ownership Model
2. Scale and Complexity of Capital Program
3. Financial Policy
4. Leverage and Coverage

The scoring for the factors 1-4 result in a preliminary grid-indicated outcome. Moody's then apply the following factor 5, which can result in upward notching for issuers that benefit from structural enhancements, incorporated in their corporate structure, their regulatory licences or their financing arrangements.

5. Structural Considerations and Sources of Rating Uplift From Creditor Protection

Nevertheless, given the submissions on the FFO to net debt metric we have considered this particular metric based on regulated revenues and regulated debt in making this final decision and the rate of return instrument. In doing this we were assisted by the Australian Gas Infrastructure Group (AGIG) providing the data behind the graph in the Joint Energy Businesses Final Rate of Return Submission and also contained in the APGA's 4 October presentation to the AER Board.¹⁵²⁴ This appears to replicate our understanding of Moody's FFO to net debt metric based on regulated cash flows from published AER post tax revenue models.

The FFO to net debt metric used by Moody's examines forecast firm cash flows after forecast cash expenditure (including operating costs, interest expenses and tax) to forecast net debt. Moody's provide guidance on the expected FFO to net debt ratios that are expected for a given credit rating. This guidance is indicative only and as noted above there are other (qualitative) factors that are taken into account in determining the final credit rating.

¹⁵²³ Moody's Investor Services, Rating Methodology Regulated Electric and Gas Networks, March 16 2017, p2

¹⁵²⁴ AGIG, Financeability Analysis Excel spreadsheet, 15 Oct 2018.

In confidential appendix B we set out commentary from Moody's on its expectations for service providers' ability to maintain current credit ratings based on these metrics.

While the rating agencies look at overall cash flows of firms, it is possible to replicate the metrics based on regulated cash flows (as AGIG has done).

Using regulated cash flows (where we assume revenues and costs equal our regulated allowances) FFO (in a given year) can be calculated as:

Regulated FFO = Allowed return on equity + net regulatory depreciation (after indexation is removed) + revenue adjustments

Net regulated debt can be calculated as:

Net debt = (net RAB debt at the start of the year + net RAB debt at the end of the year)/2

Regulated FFO/Regulated net debt can then be calculated for each year as:

FFO/Net debt = FFO in that year/Net debt in that year

For our analysis we have used a lower bound guidance on FFO to net debt for BBB+ entities of 7% FFO to net debt. Actual lower bounds used by rating agencies may vary across firms and is simply guidance and not a hard requirement.

Having performed this calculation we have found that under the rate of return contained in the rate of return instrument (at roughly current market interest rates) a few regulated businesses, absent countermeasures, will not achieve 7% regulated FFO to regulated net debt in certain years and on average over their regulator periods.¹⁵²⁵ This analysis is based on the regulated cash flows and net RAB debt of 60% contained in the post-tax revenue models for the majority of the AER regulatory decisions released since 2015. The estimated FFO to net debt figures for a numbers of businesses we regulate are shown below in Table 32 through to Table 36. As an initial step we sought to approximately replicate the numbers in AGIG's spreadsheet and found no clear errors in AGIG's calculations. However, for the purposes of our analysis we have used average debt over the year give regulated cash flows occur across the year whereas AGIG used net debt at the end of the year. This difference is not material to our results or conclusions.

We also note that the calculations in the tables below, consistent with formulas above and AGIG's calculations, implicitly assume the AER's tax allowance equals the expected regulated firm's tax cost over the regulatory control period. However, while the tax allowance is a relatively small proportion of revenue, the tax allowance does not actually equal expected tax payable (under our regulatory modelling) given we

¹⁵²⁵ For the purpose of our analysis we used the current AER post tax revenue models, and also updated returns on equity based on our draft guideline return on equity and relatively current risk free interest rates (for example, we have used a return on equity either rounded to 6.3% as reflected in draft decision for NSW distribution service providers released by the AER in Sept and Oct 2018, or unrounded at 6.26% for other businesses).

reduce our estimate of tax payable by the value of imputation credits.¹⁵²⁶ Given this difference, we have also examined the FFO/Net Debt metric for the decisions released in 2017 and 2018 with a reduction for the impact of imputation credits (that reduces the FFO by the estimated tax payable multiplied by 58.5%). We found this reduces the FFO and therefore the FFO/Net Debt metrics by typically in the order of 10%. However, we note this difference is not material to our conclusion.

Table 32 Regulated FFO to net regulated debt for recent draft determinations

	2019/20	2020/21	2021/22	2022/23	2023/24	Average
Ausgrid Dx @ 6.3%	0.060	0.057	0.059	0.061	0.060	0.059
Ausgrid Tx @ 6.3%	-0.24	0.056	0.058	0.061	0.061	0.00019
Endeavour @ 6.3%	0.016	0.089	0.092	0.89	0.072	0.072
Essential @ 6.3%	0.058	0.068	0.071	0.075	0.074	0.069
Evoenergy Dx @ 6.3%	0.10	0.12	0.12	0.13	0.13	0.12
TasNetworks @ 6.3%	0.084	0.088	0.092	0.12	0.11	0.10
P&WC @ 6.3%	0.72	0.78	0.81	0.86	0.89	0.81

¹⁵²⁶ We also note some businesses may operate as trusts and therefore may not pay tax at the trust level and so FFO could (potentially) be higher than the FFO underlying the figures in the tables in those situations.

Table 33 Regulated FFO to net regulated debt for determinations on foot with first regulatory year in 2015

	2015/16	2016/17	2017/18	2018/19	2020/21	Average
Decisions with first regulatory year calendar 2015						
SAPN FD@7.5	0.098	0.12	0.12	0.13	0.12	0.12
SAPN FD@6.26	0.090	0.11	0.11	0.12	0.12	0.11
Energex@7.5	0.099	0.061	0.062	0.063	0.064	0.070
Energex@6.26	0.091	0.053	0.054	0.055	0.056	0.062
Ergon@7.5	0.095	0.077	0.079	0.067	0.069	0.078
Ergon @6.26	0.087	0.069	0.071	0.059	0.061	0.070
Decisions with first regulatory year financial 2015/16						
EvoEnergy Gas @ 7.1%	0.065	0.079	0.065	0.062	0.060	0.066
EvoEnergy Gas @ 6.26%	0.057	0.071	0.056	0.052	0.050	0.057

Notes: First set of values for each network is based on the RoE in the current determination for the network. The second set of values is based on a 6.26% RoE.

Table 34 Regulated FFO to net regulated debt for determinations on foot with first regulatory year in 2016

	2016/17	2017/18	2018/19	2020/21	2021/22	Average
Decisions with first regulatory year calendar 2016						
AGN SA @7.1	0.065	0.058	0.062	0.069	0.068	0.64
AGN@6.26%	0.060	0.053	0.056	0.064	0.062	0.059
Powercor@7%	0.10	0.089	0.093	0.097	0.092	0.094
Powercor@6.26%	0.096	0.084	0.088	0.093	0.087	0.089
Citipower@7%	0.10	0.02	0.96	0.10	0.097	0.99
Citipower@6.26%	0.099	0.090	0.094	0.093	0.097	0.095
Ausnet Dx@7.5%	0.099	0.084	0.085	0.090	0.085	0.089
Ausnet Dx@6.26%	0.092	0.076	0.077	0.082	0.077	0.081
United Energy @7.5 %	0.12	0.11	0.11	0.11	0.11	0.11
United Energy @6.26%	0.11	0.11	0.10	0.11	0.10	0.11
Jemena Electricity @7.5%	0.14	0.10	0.12	0.12	0.11	0.12
Jemena Electricity @6.26%	0.13	0.09	0.11	0.11	0.10	0.11
Decisions with first regulatory year 2016/17 financial year						
APTNT @ 7.1%	0.057	0.060	0.062	0.065	0.067	0.062

Table 35 Regulated FFO to net regulated debt for determinations on foot made with first regulatory year in 2017

	2017/18	2018/19	2019/20	2020/21	2021/22	Average
First year 2017/2018 financial year decisions						
AusNet(T) @ 7.1%	0.097	0.097	0.10	0.10	0.090	0.097
AusNet (T) @6.26	0.091	0.091	0.094	0.095	0.084	0.091
PowerLink @ 7.1%	0.070	0.074	0.079	0.083	0.083	0.078
PowerLink @6.26	0.062	0.066	0.071	0.075	0.076	0.070
TasNetworks (T) @ 7.4%	0.10	0.12	0.11	0.11	0.11	0.11
TasNetworks (T) @ 6.26%	0.09	0.11	0.10	0.10	0.11	0.10
APTPL @ 7.0%	0.072	0.069	0.071	0.050	0.043	0.061
APTPL @ 6.26%	0.068	0.064	0.066	0.046	0.038	0.056
Murraylink @ 7.4%	0.097	0.095	0.102	0.098	0.129	0.104
Murraylink @ 6.26%	0.089	0.088	0.095	0.090	0.121	0.097

Table 36 Regulated FFO to net regulated debt for determinations on foot with first regulatory year in 2018

	2018/19	2020/21	2021/22	2022/23	2023/24	Average
Decisions first year calendar year 2018						
APA (first year calendar 2018) @ 7.3%	0.081	0.080	0.080	0.083	0.073	0.079
APA @ 6.26%	0.074	0.073	0.073	0.076	0.067	0.073
AusNet gas (first year calendar 2018) @ 7.3%	0.095	0.080	0.083	0.082	0.086	0.085
AusNet gas @ 6.26%	0.088	0.074	0.076	0.075	0.079	0.078
MultiNet gas (first year calendar 2018) @ 7.2%	0.090	0.100	0.094	0.092	0.102	0.096
MultiNet @ 6.26%	0.084	0.094	0.087	0.086	0.096	0.089
AGN (which one) @ 7.3%	0.102	0.097	0.101	0.087	0.092	0.096
AGN @ 6.26%	0.096	0.091	0.095	0.080	0.085	0.089
Decisions first year financial year 2018/19						
Electranet @ 7.4%	0.076	0.088	0.090	0.094	0.092	0.088
Electranet @ 6.26%	0.069	0.081	0.083	0.086	0.084	0.081
TranGrid @ 7.4%	0.076	0.084	0.083	0.084	0.084	0.082
TransGrid @ 6.26%	0.069	0.076	0.075	0.077	0.077	0.075

For firms with relatively low regulated FFO to net debt metrics this is primarily driven by relative low net depreciation relative to net debt in their regulated asset base. Businesses with relatively longer average residual asset lives result in the (existing) RAB being returned over a longer time and lower annual depreciation as a percentage of RAB. For example, a firm with a relatively long 50 year asset life and straight line depreciation (ignoring indexation for simplicity) would receive 2% of its RAB back each year (i.e. 1/50). A firm with a 25 year residual asset life on the other hand will receive 1/25 or 4% of its RAB back each year (once again ignoring indexation for simplicity). Nevertheless, the figures in Table 32 through to Table 36 above show that most firms appear within acceptable credit metrics (even absent countermeasures) based on the guidelines return on equity.

In response to our observation that these financial metrics are relatively low for some regulated firms (and materially below 7%) we have considered countermeasures firms might take to improve their financial metrics and if this could warrant a change in any of our benchmark WACC input assumptions. The key counter measure firms might take is to reduce their gearing (i.e. reduce debt capital and increase equity capital).

Reducing gearing by a small amount has a relatively large impact on the FFO/Debt metric because it both increases the return on equity and reduces net debt. Absent other countermeasures, our analysis based on regulated cash flows indicates a few firms might reduce their gearing by up to around 10% relative to our benchmark (i.e. to 50%) to achieve a FFO to net debt ratio of 7% based on regulated cash flows.

Given this, we have considered whether our benchmark regulated firm assumptions, particularly our benchmark assumption of 60% debt, is of concern. In undertaking this analysis we have considered what the allowed revenues for firms would be under a 50% gearing ratio. What we find is our allowed revenues are relatively invariant to changes in gearing. In fact, we find under our modelling assumptions allowed regulated revenue would decrease slightly if we lowered our gearing assumption. This is consistent with Lally's findings.¹⁵²⁷

Our Vanilla WACC is calculated as follows:

$$WACC_{Vanilla} = (rf + Beta_{equity} * MRP) \times (1 - D) + kd \times D \quad (1)$$

Where

rf = the effective annual yield on the risk free asset

MRP = the Market risk premium

D = the proportion of debt funding in the capital structure

E = the proportion of equity funding in the capital structure

$$Beta_{equity} = Beta_{asset} \times \left(1 + \frac{D}{D + E}\right)$$

This can be converted into a pre-tax WACC taking into account the impact of corporate tax and the value of imputation credits as follows:

$$WACC_{pre-tax} = \left[\frac{(rf + Beta_{equity} * MRP)}{[1 - T_c \times (1 - \gamma)]}\right] \times (1 - D) + kd * D \quad (2)$$

or

$$WACC_{pre-tax} = \left[\frac{rf + Beta_{asset} \times \left(1 + \frac{D}{D + E}\right) * MRP}{[1 - T_c \times (1 - \gamma)]}\right] \times (1 - D) + kd * D \quad (3)$$

Where:

K_d = the estimate cost of debt

T_c = the corporate tax rate of 30%

γ = the estimated value of imputation credits

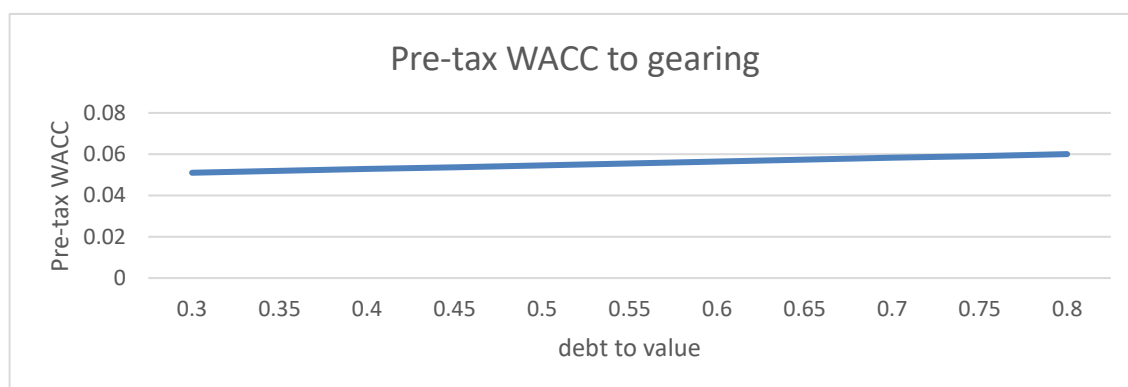
Assuming an equity beta of 0.60 at a gearing ratio of 60% debt to 40 % equity:

¹⁵²⁷ Lally, *Review of the AER's views on gearing and gamma*, 7 May 2018, pp. 11-13

$$Beta_{Asset} = \frac{Equity\ beta}{1 + \frac{Debt\ \%}{Equity\ \%}} = \frac{0.60}{1 + \frac{60}{40}} = 0.24$$

Using values for r_f , k_d , t_c and the value of imputation credits and the asset beta of 2.7%, 4.5%, 30%, 0.5 and 0.24 and allowing the gearing to vary gives the results in Figure 28 below. This shows the estimated pre-tax WACC calculated in accordance with formulas 2 and 3 for different levels of debt in the capital structure.

Figure 28 Sensitivity of pre-tax WACC to gearing changes



The above formula and diagram indicates, consistent with our expert’s advice, that the WACC is relatively invariant to changes in gearing.¹⁵²⁸ Experts at the Concurrent evidence session also commented on the relationship between gearing and WACC and that the line was upward sloping using the same process as used at the time of the 2013 Guideline.¹⁵²⁹

This implies that our regulated return on capital allowance, based on a 60% benchmark gearing ratio, should be sufficient for all regulated firms to finance their operations. To the extent that some firms need to reduce their gearing our analysis indicates our allowed cash flows are expected to be sufficient.

Finally, we note that currently it appears that firms have decreased gearing in recent years and the most recent year we had access to, 2017, indicated an average gearing ratio of 51 (see table Table 37). While we note the gearing and the average for all firms appears relatively volatile, this appears to show firms are able to adjust their gearing to meet their financial needs despite our benchmark being 60%. Gearing levels for the firms we examine based on market values are shown below for the period from 2006 through 2017.

¹⁵²⁸ Lally, Review of the AER’s Views on Gearing and Gamma, 7 May 2018, pp 11-13;

¹⁵²⁹ AER, Concurrent Evidence Session 1 – Proofed Transcript, 15 Mar 2018, p83.

Table 37 AER gearing estimates based on market values

	ENV	APA	DUE	AST	SKI	AVE
2006	66%	51%	79%	56%	60%	62%
2007	65%	59%	67%	55%	57%	61%
2008	77%	73%	76%	59%	70%	71%
2009	75%	68%	80%	70%	70%	73%
2010	74%	61%	80%	64%	65%	69%
2011	66%	53%	79%	64%	62%	65%
2012	63%	47%	72%	59%	59%	60%
2013	53%	46%	71%	57%	62%	58%
2014	47%	45%	64%	58%	55%	54%
2015		50%	62%	59%	59%	58%
2016		49%	51%	57%	53%	52%
2017		49%		52%	51%	51%
5 Year average (2013 - 2017)	50%	48%	62%	56%	56%	54%
10 year average (2008 -2017)	65%	54%	70%	60%	60%	61%

Source: Annual reports, AER analysis

12.3.5 Conclusion

We propose to maintain our draft decision approach of not using financeability assessment to inform our rate of return.

13 Risk-cost trade-off

In section 2.1 we set out that an allowed rate of return that reflects the market cost of capital is likely to achieve the legislative objectives. However, setting an allowed rate of return is not an exact science. The market cost of capital for providers of regulated energy network services cannot be directly observed and must instead be estimated. Due to inevitable uncertainty, there is a risk that the estimated rate of return will be higher or lower than the market cost of capital.

If the allowed rate of return deviates from the market cost of capital then the rate of return may not achieve the legislative objectives – it may not promote efficient investment in and use of the service provider’s energy network in the long term interests of consumers. That is, there may be costs associated with the allowed rate of return being higher or lower than the market cost of capital.

This concept is reflected in the revenue and pricing principles (RPPs)¹⁵³⁰. In particular, principle 6 requires us to have regard to the economic costs and risks of the potential for under and over investment by a regulated network service provider. Similarly, principle 7 requires us to have regard to the economic costs and risks of the potential for under and over utilisation of a distribution system or transmission system. Consideration of these two principles are closely related as a higher rate of return results in higher revenues for networks and investors and higher prices for consumers (and vice versa).

The uncertainty in the estimation of the rate of return therefore introduces two concepts that need to be considered:

- the risk that our rate of return is above or below the market cost of capital, and
- the costs that may result from a rate of return above or below the market cost of capital.

In Chapter 12, we considered evidence and submissions that might indicate whether our overall rate of return is too high or too low. The evidence to undertake this assessment is imperfect, and to some extent contradictory. However, in aggregate, we concluded the evidence does not suggest that our rate of return is too high nor too low. Further, some evidence including financeability assessment, market commentary and the relationship to cost of debt is supportive of the rate of return we have selected. Nevertheless, because of the nature of our task in setting a forward looking rate of return, there remains a risk that our rate of return could be incorrect.

In this chapter, we outline our risk-cost trade-off assessment. We focus on principles 6 and 7 of the RPPs and consider whether the costs resulting from a rate of return above the market cost of capital are greater than the costs of a rate of return below the

¹⁵³⁰ NEL, Section 7A.

market cost of capital (or vice versa). We consider the available evidence on the symmetry of these risks and costs and what, if any, adjustment we should make in light of this assessment.

Overall, we consider we should not make an explicit adjustment to our estimated rate of return on the basis of this assessment. There is a diversity of evidence and views on how the balance might be set. Networks and shareholders highlight the potential costs from a higher risk of outages if the rate of return is not sufficient to induce sufficient investment. They submit the rate of return should be higher than in our draft. Consumers point to the consequences of prices being higher than necessary on customers directly and on downstream economic activity. They submit the rate of return should be lower than in our draft.

We acknowledge that potential costs may arise if our rate of return is too high or too low. We also acknowledge that in some jurisdictions, other regulators have made decisions in favour of a rate of return that is more likely to promote over investment rather than under investment.

In our circumstances, at this time, it is our judgement that we should not make a decision with a conscious bias toward over investment nor under investment. In reaching this judgement we make the following observations:

- The evidence does not clearly support the application of a bias in one direction or the other. Reasonable points are made in support of both directions.
- We have undertaken a comprehensive and systematic assessment that we consider has led to the estimation of an efficient rate of return.
- We consider the probability of our rate of return being too high or too low is symmetrical.
- Any adjustment would be arbitrary. There is no objective analysis that can point to a particular magnitude of adjustment that might be made.
- If our rate of return is incorrect, then adding an arbitrary adjustment may move our rate of return even further from the efficient outcome.
- We have the sense that the costs arising from a rate of return that is too high or too low accelerate the further we are from the efficient level. Adding an arbitrary adjustment may therefore introduce larger costs.

13.1 Draft decision

In our draft decision we noted that consumers had submitted that the balance of risks had shifted. We noted that consumers pointed to declining demand, declining network utilisation, declining average age of assets, a positive upward trend in measures of network performance and the positive option value that can be realised by deferring

network investment.¹⁵³¹ As such, consumers submitted that there is little risk from under-investment because there is unutilised capacity present in each of the network systems. Consumer representatives indicated a willingness to accept a higher level of risk in respect of the rate of return and the investment it is intended to promote in exchange for lower prices.¹⁵³²

We also had regard to submissions made by service providers and investors that we should exercise our judgement with care. These submissions highlighted that there is an ongoing need for investment to replace existing assets, to address locational peak demand and to reconfigure networks in response to changes in the mix of generators. They also noted that continued investor confidence is important in achieving these investment outcomes. In the draft decision we were conscious that the rate of return should be set in a manner that is sufficient to attract capital on a long-term sustainable basis, given the opportunity costs, if we are to achieve the legislative objectives.¹⁵³³

Overall, in the draft decision we exercised judgement by placing our emphasis on market data and avoiding choices that are influenced by any material bias in either promoting or discouraging investment. We considered that the promotion of efficient investment will flow from a decision that reflects well established economic approaches as supported by the available evidence, always having regard to the principles set out in the legislative objectives.¹⁵³⁴

13.2 Independent panel review

The Independent Panel recommended that the AER: ¹⁵³⁵

Explain more clearly how the Final Guidelines promote achievement of the national objectives, including why it is confident that the rate of return methodology it has determined results in an outcome that is neither too high nor too low having regard to the risk-cost trade-off involved.

The Panel acknowledged that estimation of the allowed rate of return involves uncertainty and judgment, stating: ¹⁵³⁶

The regulation of economic performance is not a science. There is no single, provable, correct rate of return. The number chosen is always an estimate. The methodologies are inevitably imprecise, requiring judgement.

The Panel noted that our draft decision summarised different points of view about how to address uncertainty and the resulting risks. However, the Panel stated that fuller

¹⁵³¹ AER, Draft Rate of Return Guidelines – Explanatory Statement, July 2018, p. 28

¹⁵³² AER, Draft Rate of Return Guidelines – Explanatory Statement, July 2018, p. 28.

¹⁵³³ AER, Draft Rate of Return Guidelines – Explanatory Statement, July 2018, p. 29.

¹⁵³⁴ AER, Draft Rate of Return Guidelines – Explanatory Statement, July 2018, p. 29.

¹⁵³⁵ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, p. 68.

¹⁵³⁶ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, p. 62.

explanation is required¹⁵³⁷ and that we should consider the risk-cost trade-off of our decision after our methodological consideration of rate of return parameters: ¹⁵³⁸

In the Panel's view, the AER appears to have based its decisions leading to the rate of return parameters on methodology – as evidenced by the detail of the methodological explanations throughout the nearly 500 pages of the Explanatory Statement. There is no indication in the Explanatory Statement that the AER has based its decisions on consumers' willingness to accept higher risk in return for lower price as distinct from methodological considerations.

The Panel considers that the risk-cost tradeoff should be examined after the component by component analysis. This consideration should appropriately be centered on consideration of the national objectives.

...

While the Explanatory Statement addresses each technical step in the rate or return calculation, it does not sufficiently consider or demonstrate how each of the decisions about individual parameters, when taken together to produce a final estimate of the rate of return and value of imputation credits, will contribute to the achievement of the national objectives.

13.3 Stakeholder submissions

Most submissions were supportive of the Independent Panel's recommendation for a fuller explanation of our consideration of the risk-cost trade-off of our decision.¹⁵³⁹

Energy Consumers Australia submitted that our assessment of the risks and costs of not achieving the legislative objectives in the draft decision was not clear, stating:¹⁵⁴⁰

We have interpolated that the AER has done this analysis and recalibrated its assessment of the meaning of too high or too low given the evidence from consumers about the risk-cost trade-off. The difficulty is that we have to interpolate it rather than find a very clear statement in the ES [explanatory statement]

The Network Shareholder Group supported greater consideration of the risks and costs of our decision-making, submitting that our draft decision reflected a “narrow assessment of inputs rather than overall outcomes”.¹⁵⁴¹

¹⁵³⁷ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, p. 64.

¹⁵³⁸ Independent Panel Report, *Review of the Australian Energy Regulator's Rate of Return Guidelines*, September 2018, pp. 66, 67.

¹⁵³⁹ Infrastructure Partnership Australia, Submission to Rate of Return, September 2018, p. 4; AusNet Services, Submission on the AER's Draft Rate of Return Guideline, September 2018, p. 1.

¹⁵⁴⁰ Energy Consumers Australia, Response to the AER Draft Guideline, September 2018, pp. 11-12.

¹⁵⁴¹ Network Shareholder Group, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 1.

A number of stakeholders submitted on balancing the cost of a rate of return that is too high and the cost of a rate of return that is too low.

AusNet Services submitted that it is important that we balance short term and long term risks:¹⁵⁴²

It is incumbent on the AER, in setting regulated returns for network businesses over the next 5 years, to balance the calls to lower prices in the short-term with an understanding of the long-term damage to the cost of supplying network services of setting an unpredictable rate of return that is not supported by evidence.

Infrastructure Partnerships Australia submitted that our draft decision may reflect a downward bias and consumer preferences for short-term price relief, stating:¹⁵⁴³

The AER acknowledges that it is likely consumer views may preference short-term price relief, at the expense of consumer needs over the long-term. However, it is unclear whether the AER has made allowances for this bias in drafting the rate of return guideline. As such, it appears that consumer consultation has imposed a downward bias on the rate of return guideline process

Similarly, AusNet Services submitted:¹⁵⁴⁴

The AER's Explanatory Statement contains the assertion that:

...consumer representatives have clearly indicated, during this consultation process, a willingness to accept a higher level of risk in respect of the rate of return and the investment it is intended to promote in exchange for lower prices

...

It would seem that the assertion above has been given significant weight by the AER, as the Draft Guideline does not reflect developments in finance theory or updated market evidence.

Service providers and investors submitted that relevant empirical evidence has increased since we made the 2013 Guidelines and that decreases in the rate of return parameters compared to the 2013 Guidelines indicates a bias towards lower prices.¹⁵⁴⁵

The Joint Energy Businesses submitted that:¹⁵⁴⁶

¹⁵⁴² AusNet Services, Submission on the AER's Draft Rate of Return Guideline, September 2018, p. 1.

¹⁵⁴³ Infrastructure Partnership Australia, Submission to Rate of Return, September 2018, p. 3.

¹⁵⁴⁴ AusNet Services, Submission on the AER's Draft Rate of Return Guideline, September 2018, p. 2-3.

¹⁵⁴⁵ Infrastructure Partnership Australia, Submission to Rate of Return, September 2018, p. 3; Joint Energy Business, Submission on AER draft guidelines, September 2018, p. 6; Evoenergy, Submission on Draft Rate of Return Guideline, September 2018, p. 1,3; AusNet Services, Submission on the AER's Draft Rate of Return Guideline, September 2018, p. 3.

¹⁵⁴⁶ Joint Energy Business, Submission on AER draft guidelines, September 2018, p.6.

Very high standards are applied to the evidence that would support an increase in allowed returns, but lower standards are applied to evidence supporting reduced returns.

The Network Shareholder Group submitted that our draft decision reflected a downward bias that may be directed at removing an upward bias that was perceived to exist in previous decisions, and submitted that:¹⁵⁴⁷

the AER has not previously indicated that it has purposely set a higher WACC to encourage investment. If this is the case, the AER should acknowledge that it adopted an 'upward bias' and now considers that an 'upward bias' is no longer required

Similarly the CRG submitted that the reduction in the rate of return in the draft decision partly corrects for an 'overly generous' 2013 Guidelines:¹⁵⁴⁸

The Draft Decision is a modest (incremental) step in the right direction and is acceptable as long as it is part of a downward process which corrects the overly generous (to networks) 2013 settings.

Service providers and investors submitted that our draft decision reflected a downward bias on the basis that consumers have indicated a willingness to accept higher risk in return for lower prices. Service providers and investors also questioned that extent to which consumers were prepared to accept reduced reliability or higher risk of outages.

AusNet Services submitted that its own customer consultation indicates that business consumers have a low tolerance to outages. AusNet Services submitted that more specific and robust consultation needs to occur before concluding that consumers are willing to trade reliability for lower prices.¹⁵⁴⁹ Infrastructure Partnerships Australia submitted that we “should consider the impact and the long-term economic and consumer risks that short-term price relief will have on future consumers”.¹⁵⁵⁰

On balancing risks, service providers and investors submitted that we must consider the value of stability. They submitted that our draft decision reflected changes from the 2013 Guidelines that would have destabilising effects that would increase the long-run cost of capital.¹⁵⁵¹

On the other hand, consumer groups submitted that profitability measures, traded prices for regulated energy network assets, and current asset utilisation levels provide

¹⁵⁴⁷ NSG, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p. 3.

¹⁵⁴⁸ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, 25 September 2018, pp. iii, 48.

¹⁵⁴⁹ AusNet Services, Submission on the AER's Draft Rate of Return Guideline, September 2018, p.3.

¹⁵⁵⁰ Infrastructure Partnership Australia, Submission to Rate of Return, September 2018, p. 2

¹⁵⁵¹ ENA, *AER review of the rate of return guideline response to draft guideline*, 25 September 2018, p.63; Network Shareholder Group, Submission to the draft rate of return guideline, September 2018, p.9

evidence that the risks and costs of under-investment do not outweigh the certain benefits of lower prices and removal of risks for over-investment.¹⁵⁵²

13.4 AER consideration

The direct impact of rate of return on revenues and prices is reasonably transparent. Under our building block approach to setting revenues, the rate of return on capital typically accounts for 45 per cent of the final revenue allowance. Further, network revenues typically account for up to 50 per cent of residential customer and small business bills. Therefore, a 1 percentage point change in rate of return results in an 8 per cent change in network revenue and a 4 per cent change in residential customer and small business bills. Consequently, the direct impact of changes in rate of return is proportionally larger on network revenues than consumer prices.

Beyond these direct effects, the consequences of changes to the rate of return cannot be determined with precision. It is not possible to quantify costs of altered incentives for downstream markets, investment activity, or productive efficiency. In the first instance, the link between rate of return and efficient investment in, and use of networks is not direct. It is one of many factors that network businesses and their Boards consider when making decisions about investments. Second, network costs are one element of the final price of electricity and gas. Third, the costs of an incorrect rate of return are dispersed across society, the economy and over time, so that it is difficult to see their impact in aggregate. Fourth, the impacts extend beyond monetary effects, such as the consequences for a vulnerable family that has been disconnected. Fifth, the impact is on new investment only, existing investment remains in place irrespective of our decision.

In the following sections we explore a range of potential risks and costs that have come to our attention in the consultation process.

13.4.1 Reliability and risk of outages

Consumers, networks and shareholders have all submitted views on the topic of reliability and risk of outages.

While the link between rate of return and levels of investment is indirect, the overall direction is clear. All other things being equal, a higher rate of return is likely to encourage higher levels of investment. The impact on reliability and risk of outages is then a further step removed. It depends on where the investment is directed and the condition and circumstances of the existing networks and whether there is a lag between investment levels and network performance. But again, the direction seems reasonably clear, more investment is likely to improve reliability and reduce the risk of outages.

¹⁵⁵² Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, September 2018. p.iv; Consumer Challenge Panel (CCP), *Submission to the AER on its Draft Rate of Return Guideline*, September 2018, p. 54

We accept submissions from consumers that they prefer not to see a reduction in reliability and service standards and a higher risk of outages. However, the CRG goes on to submit that consumers are willing to accept the risk of lower rate of return because they consider the consequential risk to network performance is low.¹⁵⁵³ In reaching this view, the CRG cites flat demand, excess capacity and good current levels of performance by networks. It considers that even if investment is below ideal levels there is unlikely to be an immediate impact on network performance. We cautiously accept this submission.

By contrast, the NSG submitted analysis showing that the price reductions for customers would be offset if our rate of return leads to outages.¹⁵⁵⁴ This submission highlights the material consequences that can arise through service interruptions.

We accept that material costs can arise to the community in the event of service interruptions. Further, these costs tend to be relatively immediate and direct. We have recently been asked to update estimates of the value of customer reliability and have commenced work. At present, the value of customer reliability estimated by AEMO is \$25.95 per kWh for residential customers and between \$44 and \$48 per kWh for business customers.¹⁵⁵⁵

13.4.2 Downstream economic activity and consumer behaviour

If our rate of return is incorrect, there will be a direct transfer between consumers and networks through prices and revenues. Further, service providers may invest more than necessary so as to increase their regulatory asset bases and returns.

Beyond these direct costs, we expect that an incorrect rate of return is likely to have broader effects across the economy. Energy supply is an essential service, supporting the broadest range of economic activity. If this essential activity is incorrectly priced it is likely to distort decisions throughout the economy.

Consumer submissions pointed to disconnections of large numbers of customers, cost pressures on business and industrial customers and contraction on industrial activity (especially in trade exposed sectors) and growing installation of distributed energy resources.¹⁵⁵⁶ They note that in the extreme, customers are seeking to bypass networks and that accumulated capital investments are at risk of stranding.

¹⁵⁵³ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, September 2018, p. iv

¹⁵⁵⁴ Network Shareholder Group, Letter on the Australian Energy Regulator's draft rate of return guideline, 25 September 2018, p.24

¹⁵⁵⁵ <http://www.aemo.com.au/-/media/Files/PDF/VCR-Application-Guide--Final-report.pdf>

¹⁵⁵⁶ Consumer Reference Group, *Submission to the Australian Energy Regulator – Response to the Rate of Return Draft Decision*, September 2018, p.11

If our rate of return is incorrect it may result in efficiency losses where consumers use more or less energy network services than otherwise. It may also lead to consumers making incorrect downstream investment decisions. The impacts are likely to extend beyond monetary effects, such as the consequences for a vulnerable family that has been disconnected.

These type of costs are difficult to estimate because they are dispersed across society, the economy and over time. Typically, general equilibrium models are used to aggregate and estimate broad economic impacts. We have not had general equilibrium modelling undertaken for this review nor submitted. However, we expect that for a broad based input like energy costs, the impact of incorrect pricing is likely to be substantial. One factor that will have an impact on the magnitude of these costs will be the price elasticity of energy demand. Overall, we expect connections to be relatively inelastic and usage to be more responsive to movements in price.

We note that our capital expenditure incentive schemes may provide countervailing discipline on over-investment by providing a financial incentive for networks to spend less than the capital allowance in their determinations. We also note that distortions already exist because energy prices are not precisely aligned with underlying costs.

13.4.3 Investor confidence

Submissions from networks and shareholders noted a downward trend in our rate of return decisions since 2009. They submitted that this persistent downward trend was undermining investor confidence and could negatively impact productive efficiency through credit rating downgrades.¹⁵⁵⁷ A related submission is the absolute magnitude of change since 2013 may be undermining investor confidence. The Independent Panel also asked us to consider this point.¹⁵⁵⁸

We accept that it is important to maintain investor confidence and that an erosion of investor confidence would not be in the long term interests of consumers. This is particular apt at this time when consideration is being given to additional investments in transmission assets to support changes in the electricity generation mix.

Overall we consider that recent commentary from market practitioners about the rate of return for regulated energy networks indicates:

- No evidence that service providers will have difficulty raising capital or will refrain from investing in their networks.

¹⁵⁵⁷ Joint Energy Business, Submission on AER draft guidelines, September 2018, pp 4-5, Network Shareholder Group, *Submission to the draft Rate of Return Guideline*, 25 September 2018, p.9, 12; Energy Networks Australia, *AER Review of the Rate of Return Guideline*, September 2018, p.20

¹⁵⁵⁸ Independent Panel, Review of the Australian Energy Regulator's draft rate of return guidelines, 7 September 2018, p. 63.

- Some mild surprise resulting from our draft decision, but no evidence of an increase in regulatory risk as a result of our review (though practitioners are increasingly wary of regulatory risk driven by changes to legislative frameworks).
- Practitioners understand that our draft decision (if implemented) would put downward pressure on credit ratings, but expect service providers to take measures to maintain investment grade credit ratings.

13.4.4 Effects in capital markets

If our rate of return is too high it may cause investors to bid up the price of regulated assets and create distortions to capital allocation decisions. Distortions to capital allocation may have flow on effects in downstream markets for the goods and services produced (or would have been produced) from the capital investment.

Similarly, if our rate of return is too low it may result in service providers being unable to raise necessary capital or capital costs being higher than necessary. Investors may decide to take up opportunities in other countries rather than invest in Australia.

13.5 Conclusion

In this chapter, we have explored a range of issues and submissions relevant to the costs that might arise if our rate of return is too high or too low. Overall, we do not consider the evidence supports the application of a bias toward a higher or lower rate of return. Reasonable points are made in support of both directions.

A Independent Panel recommendations

Table 38 Where to find AER responses to Independent Panel recommendations

	Independent panel Recommendation	Where to find AER response	Chapter number
1	Explain more clearly the basis for criteria used to choose between a fixed methodology and fixed value.	Form of the allowed rate of return chapter	3
2	Explain more clearly why the relationship of risk free rate to market risk premium is neither one of lock-step movement nor one susceptible to a robust, predictive methodology.	MRP chapter	9
3	Explain more clearly: <ul style="list-style-type: none"> ▪ why the AER intends to disregard RAB multiples ▪ how and when the ‘monitoring’ and ‘gauging’ of RAB multiples will take place, what questions the AER will seek to answer, and what actions the AER will take once it has answered those questions. 	Overall rate of return chapter	12
4	Explain more clearly why the AER has singled out debt from the other building blocks in suggesting that profitability may inform decisions on the cost of debt.	Overall rate of return chapter	12
5	Address whether consistency is necessary in the treatment of hybrid and subsidiary debt for gearing, as compared to their treatment for estimating beta.	Gearing chapter	4
6	Explain more clearly why it should place any reliance on the Wright approach to determining equity risk premium estimates.	Overall return on equity chapter	5
7	Chapter 5 of the Explanatory Statement should include a discussion of the Black model and the low beta bias and should consider whether any adjustments to the return on equity are justified based on that model and bias.	Overall return on equity chapter with cross reference to the low beta bias and black CAPM chapter	5
8	Justify more adequately the use of a 10-year term for the risk free rate, including explaining the justification for adopting a 10-year term for the cost of equity.	Risk free rate chapter	6
9	Explain for non-expert readers the reasons why:	Binding instrument	Instrument

- the CGS estimation formula involves identifying two CGS yields
- an adjustment is necessary to change the remaining maturity during the averaging period.

	<p>Explain:</p> <ul style="list-style-type: none"> ▪ the reasons why confidentiality, and thus a provider-nominated averaging period, are important ▪ what, if any, scope there would be, given the provider's ability to nominate the averaging period, for the service provider to manipulate the market in the two bonds during that period ▪ why it is reasonable that the averaging period nominated by the service provider will not be made public after the period has passed, since a continuation of confidentiality results in the rate of return estimate not being replicable by stakeholders other than the regulated entity. 	Risk free rate chapter	6
10			
	<p>Explain:</p> <ul style="list-style-type: none"> ▪ why long-run, arithmetic averages of historical market risk premia are appropriate for setting allowed regulatory returns ▪ what specific information, relevant to a five-year regulatory period, is provided by the geometric average. 	MRP chapter	9
11			
12	Explain, or at least more fully reference, the method of adjusting historical excess returns for imputation credits.	MRP chapter	9
13	Check the reasonableness of the proposed market risk premium by examining historical averages of market risk premia in other developed countries.	MRP chapter	9
14	Clarify the discussion of the possible correlation between the market risk premium and the level of risk-free interest rates.	MRP chapter	9
15	Identify the evidence the AER is relying on for the link between reduced debt risk premiums and a lower market risk premium.	MRP chapter	9
16	Clarify the discussion of financial risk in Chapter 2 of the Explanatory Statement and of the conceptual analysis in Chapter 8.	Form of the allowed rate of return chapter	3
17	Clarify whether, in estimating beta, there is any	Equity beta chapter	7

relevance of the Black model and the low beta bias.

18	Consider whether the discussion of the Black model and the low beta bias should be moved to the section on the Sharpe-Lintner Capital Asset Pricing Model or to another part of the Explanatory Statement.	Form of the allowed rate of return chapter	3
19	Explain why limiting the change in beta from that selected in the 2013 Guidelines is justified, given that the 2013 beta estimate was materially influenced by the Black model, in which the AER has diminished confidence.	Equity beta chapter	7
20	Test what assumptions would be required to reconcile the Chairmont data with an average 10-year term at issuance.	Return on debt chapter	10
21	Explain the reasons for adopting a 10-year benchmark for the average term of debt at issuance, rather than relying on the judicial reviews, which did not consider the choice between a 10-year and a shorter term.	Return on debt chapter	10
22	Investigate the possibility of: <ul style="list-style-type: none"> ▪ expanding the scope of future debt information collection to include characteristics on the stock of debt, as well as recent issuances ▪ making more of the Chairmont detail available in the Explanatory Statement for the Final Guidelines, while respecting the commercially sensitive nature of the source data. 	Return on debt chapter	10
23	Adopt a proactive approach to improving the quality and relevance of dividend drop off studies and expanding the number of listed companies to be included in the distribution rate study beyond the Top 20.	Imputation credits chapter	11
24	Explain more clearly why adopting an incremental review to update the estimates for the utilisation rate and the distribution rate is consistent with the Rules and the achievement of the national electricity and gas objectives.	Imputation credits chapter	11
25	Explain more clearly why the AER has not considered a distribution rate estimate higher than 0.88.	Imputation credits chapter	11
26	Explain more clearly how SFG's 2016 dividend drop-off study and the adjustment suggested by Lally and Handley have informed the adopted	Imputation credits chapter	11

	utilisation rate estimate of 0.6.		
27	Explain more clearly why it has not considered an utilisation rate estimate higher than 0.6.	Imputation credits chapter	11
28	Explain more clearly the rationale and methodology used to establish the set of values for gamma of 0.5, distribution rate of 0.83 and utilisation rate of 0.6.	Imputation credits chapter	11
29	Review the AER's rounding policy in relation to gamma, including considering whether to round to the nearest five per cent or to two decimal places.	Imputation credits chapter	11
30	Explain more clearly how the Final Guidelines promote achievement of the national objectives, including why it is confident that the rate of return methodology it has determined results in an outcome that is neither too high nor too low having regard to the risk-cost trade off involved.	Risk-cost trade-off chapter	13

B Financeability

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