



**APGA Submission to the AER**  
**Rate of return omnibus papers**

3/9/2021

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## 1. Executive summary

We are at an important juncture in the development of the 2022 Rate of Return Instrument (RORI) where the Australian Energy Regulator (AER) is establishing its preliminary positions on how it intends to estimate the rate of return over the four-year period, 2023–2026.

These positions are detailed in three draft working papers recently released by the AER:

- Overall rate of return draft<sup>1</sup>
- Equity omnibus,<sup>2</sup> and
- Debt omnibus.<sup>3</sup>

While we support many of the AER's preliminary and preferred positions, we disagree with others. Our submission focuses on the points of difference.

We have included two reports from Competition Economists Group (CEG) with our submission: one on asset stranding risk faced by gas networks and its potential implications for the RORI (Attachment 1), the other on equity beta (Attachment 2).<sup>4</sup> Both of these reports provide context for the environment in which future returns for the gas pipeline will be earned, and underscore our desire for the AER to 'join up' its thinking on this future across the various reviews it has planned over the next 18 months.

We also strongly support Energy Networks Australia's submissions on the draft working papers.

### 1.1. Why this review is important to us

We are getting closer to the pointy end of the 2022 RORI development. As we do so, it is important to ensure that the positions being developed by the AER are aligned with the long-term interests of gas consumers.

The 2022 RORI review is important because:

- it will play a critical role in shaping how regulated gas pipelines can support Australia's transition to decarbonised energy supply and deliver the outcomes that our customers want, and
- our gas pipelines are facing unprecedented times – we will play our part in supporting a secure, reliable, and affordable energy system in a low-carbon energy future.

The draft working papers offer an important insight into the AER's current thinking on most components of the rate of return. We focus our attention on where we see room for improvement.

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<sup>1</sup> AER, *Rate of Return: Overall rate of return: Draft working paper*, July 2021.

<sup>2</sup> AER, *Rate of Return: Equity Omnibus: Draft working paper*, July 2021.

<sup>3</sup> AER, *Rate of Return: Debt Omnibus: Draft working paper*, July 2021.

<sup>4</sup> CEG, *Stranding risk: Depreciation vs uplift*, September 2021; and CEG, *Asset beta for gas transport businesses*, August 2021.

## 1.2. What our key points are

We agree with many of the AER's preliminary and preferred position. Our submission, therefore, focuses on the positions that we do not agree with or where we think the AER needs to do further work.

Our key points are:

- **Look at gas separately from electricity** | the AER's preferred position is to apply a single benchmark across gas and electricity networks. This is premature and inappropriate. The AER has presented no evidence that the risks faced are the same. This assumption also ignores the reality that gas networks face different risks, including in terms of exposure to asset stranding risk. The 2022 RORI for gas networks should be developed in a way that looks at the gas networks specifically, especially when estimating equity beta.
- **Use cross-checks to enhance decision making** | as well as being good practice, using cross-checks as a genuine check on the AER's judgement will help ensure that the 2022 RORI is as robust as possible. It is too easy to assume that the RORI will generate the 'right' rate of return because there is justification for each methodical choice that is made to get there. But ultimately the RORI should be about outcomes as it is these that affect whether the National Gas Objective is promoted or not.
- **Ensure that the return on equity is adequate** | there concerns that the equity returns estimated using the 2018 RORI in the current low interest rate environment are too low. This should prompt the AER to take a close look at the assumptions, data, and methods it uses to estimate the return on equity, including as to how that return is updated automatically when the RORI is applied.
- **Take care with the EICSI** | the Debt Omnibus Paper starts with the presumption that because it has changed the way it constructs the Energy Infrastructure Credit Spread Index (EICSI) that it should be given a greater role when estimating the return on debt. This is premature. It is not clear that those changes reflect improvements relative the independent data curves. There also appear to be significant flaws with the index that make it unsuited to playing a greater role.

## 1.3. Our recommendations

Box 1 below includes recommendations on how the AER should address these concerns during the 2022 RORI process. Appendix A provides our views against the AER's preliminary and preferred positions, making clear where we agree or disagree. Appendix B includes our responses to questions raised by the AER in its two working papers, which includes further recommendations specific to the matters raised in them.

We look forward to further engaging with the AER and other stakeholders about our concerns.

### **Box 1: Key recommendations**

1. Ensure that the risks faced by gas networks are considered appropriately, especially given the changing market outlook for gas compared with electricity.
2. Develop an industry-wide framework for dealing with asset stranding risk that recognises the trade-off between assumed asset lives and ex ante compensation.
3. Use cross-checks when developing the RORI as a genuine check on the judgement used by the AER when adopting assumptions and selecting data and methods to estimate the rate of return.
4. Ensure that the RORI gives reasonable estimates of the return on equity, including in low interest rate environments like the present.
5. If the RORI includes a method to automatically update the return on equity for changes in market conditions, then ensure that it is logically consistent with relationships between parameters factored in when the RORI is made.
6. Consider carefully the degree to which the EICSI is fit for purpose in informing return on debt allowances and use it only to inform judgement – rather than in a mechanistic fashion that undermines the ability of networks to replicate cost of debt benchmark.

### **1.4. Structure of our submission**

Our submission is structured as follows:

- Section 2 summarises our positions against the AER's, which highlights that we agree about many
- Section 3 explains our views about how the AER should consider asset stranding risk holistically and use cross-checks to inform the 2022 RORI
- Section 4 outlines our views on how the return on equity should be estimated, including by looking at the equity beta for gas networks separately from electricity networks
- Section 5 summarises our views on how the return on debt should be estimated, largely adopting positions put forward by ENA
- Appendix A provides the detail sitting behind our positions summarised in section 2
- Appendix B responds to the AER's requests for further information from stakeholders
- Appendix C explains why it is inappropriate to use the geometric mean and surveys to estimate the MRP.

## 2. Our positions

We agree with many of the AER’s preliminary and preferred positions.<sup>5</sup> These are set out in Table 2.1.

We do, however, disagree with some AER positions, which we have set out in Table 2.2. We provide further detail on our positions in Appendix A and in sections 3, 4, and 5. We also provide our responses to the AER’s requests for further information in Appendix B.

**Table 2.1: Summary of positions that we agree with**

Overall rate of return	Return on equity	Return on debt
<ul style="list-style-type: none"> <li>• RORI reviewed every four years</li> <li>• Nominal vanilla WACC, estimated as a weighted average of the return on equity and return on debt</li> <li>• No adjustment for expected incentive scheme outcomes</li> <li>• Terms of equity, debt and inflation do not need to align</li> <li>• Currently in a low interest rate environment</li> <li>• Primarily rely on market value data and existing observation periods to estimate gearing</li> <li>• Distribution rate for imputation credits obtained through the use of ASX50 firms, utilisation rate from ABS wealth data, pending investigation of ATO data</li> <li>• Assume that foreign non-resident investors assign</li> </ul>	<ul style="list-style-type: none"> <li>• Use the Sharpe-Lintner CAPM</li> <li>• Set a forward-looking market risk premium</li> <li>• Risk-free rate set at start of each reset period</li> <li>• Networks have flexibility when nominating averaging period for the risk-free rate, with the allowed period shifted forward by one month</li> <li>• Cross checks used to inform overall return on equity point estimates</li> </ul>	<ul style="list-style-type: none"> <li>• Use trailing average approach</li> <li>• Use RBA, Bloomberg and Thomson Reuters data providers and consider the merits of any additional debt data providers</li> <li>• Reduction in return on debt in line with broader market for debt costs and those faced by regulated businesses</li> <li>• Debt averaging periods must be between 10 days and a year in length and not overlap with each other, with periods that end at least 5 months prior to regulatory year</li> <li>• Networks have flexibility when nominating averaging periods for the cost of debt, with the allowed periods shifted forward by one month</li> <li>• Continue with contingencies included in the 2018 RORI</li> </ul>

<sup>5</sup> The AER’s positions are taken from Table 1 of the Overall Rate of Return Paper.

Overall rate of return	Return on equity	Return on debt
no value to imputation credits		<ul style="list-style-type: none"> <li>Debt raising costs reflect data collected through Debt RIN</li> </ul>

**Table 2.2: Summary of positions that we do not entirely agree with**

Component	AER position	APGA position
<b>Overall rate of return</b>	Measures of financeability are not used directly when setting the rate of return	<ul style="list-style-type: none"> <li><b>Disagree</b> – financeability measures should be considered when setting the rate of return.</li> <li>Financeability assessments should not be used determinatively to set the rate of return.</li> <li>As discussed in section 3.2, financeability measures provide insight into whether an allowed rate of return could lead to financing difficulties for a benchmark efficient entity.</li> </ul>
	Adopt a single benchmark for electricity and gas businesses.	<ul style="list-style-type: none"> <li><b>Disagree</b> – gas and electricity businesses face materially different market outlooks.</li> <li>Although in the past it may have been appropriate to adopt a single benchmark, climate policy and the energy transition is having noticeably different effects on the risks facing gas and electricity businesses.</li> <li>Given this, it is important to avoid the temptation to assume these away. The rate of return for gas businesses needs to be considered on its own merits.</li> <li>We discuss this further in sections 3.1 and 4.4.</li> </ul>

Component	AER position	APGA position
<b>Return on equity</b>	Commonwealth Government Securities are an appropriate proxy for the riskless investment for our purposes.	<ul style="list-style-type: none"> <li>• <b>Partially agree</b> – there is an issue with relying on it in low interest rate environment.</li> <li>• See the ENA submission on this issue.<sup>6</sup></li> </ul>
	Use comparator set of nine Australian firms to estimate equity beta	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – the sample is inappropriate to measure the systematic risk faced by gas networks, especially now that there are only 2 listed energy networks.</li> <li>• As discussed in section 4.4 and supported by the attached report from CEG,<sup>7</sup> data from international gas networks should also be used to inform the equity beta adopted for gas networks. We have suggested a way in which this could be done which addresses some of the AER’s concerns in respect of international data.</li> </ul>
	Give the greatest weight to equity beta estimates from the longest estimation period	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – because that would place weight on firms that are no longer trading or reflect the risk currently faced by gas pipeline businesses.</li> <li>• See our discussion in section 4.2.</li> </ul>
	In determining the MRP, have regard to the historical excess return, both the arithmetic and geometric mean MRP, and MRP surveys	<ul style="list-style-type: none"> <li>• <b>Partially agree</b> – the DGM should also be used to determine the MRP, but the geometric mean of the historical MRP and surveys should not.</li> <li>• See the ENA submission.</li> <li>• Appendix C explains why it is inappropriate to use the geometric mean.</li> </ul>
<b>Return on debt</b>	Match the term of the return on debt to that of an efficient firm's borrowing	<ul style="list-style-type: none"> <li>• <b>Partially agree</b> – given the challenges transitioning between different terms should only change the term where</li> </ul>

<sup>6</sup> ENA, *ENA response to equity omnibus paper*, 3 September 2021, section 5.

<sup>7</sup> CEG, *Asset beta for gas transport businesses*, August 2021.



Component	AER position	APGA position
		<p>there is clear evidence of a material change.</p> <ul style="list-style-type: none"> <li>• There should be a high bar before the term of debt is changed given the difficulties transitioning between terms.</li> <li>• See our submission on the term of the rate of return draft working paper.<sup>8</sup> In our view, the 10-year tenor already matches the term of efficient firm’s debt financing practices.</li> </ul>
	<p>EICSI is to be used directly to determine the benchmark blend of A and BBB bonds</p>	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – use of the EICSI in a mechanistic fashion creates a non-replicable benchmark.</li> <li>• This is consistent with advice from Lally.<sup>9</sup></li> <li>• We note that there is currently only one year of debt data informed by the 2018 RORI in the AER’s dataset, and this should be considered when using the EICSI.</li> <li>• See discussion in section 5.</li> </ul>
	<p>Included only pure debt instruments in the EICSI, excluding hybrids, working capital and bridging loans, any instrument with a term under 12 months, and any instrument not used to finance the RAB</p>	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – there needs to be consistency between the EICSI and how gearing is estimated, and between debt instruments that are included or excluded from the EICSI.</li> <li>• See the ENA submission.<sup>10</sup></li> </ul>
	<p>An updated WATMI, combined with the more detailed drawdown data, may be useful in determining a benchmark term</p>	<ul style="list-style-type: none"> <li>• <b>Partially agree</b> – provided that subordinate debt is included and that recognise that NSW networks are transitioning their debt portfolios</li> </ul>

<sup>8</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, pp.16–17.

<sup>9</sup> Lally, *The Appropriate Term for the Allowed Cost of Capital*, 9 April 2021, pp.6,46-52.

<sup>10</sup> ENA, *Debt parameters and network data: Debt parameters and network data*, 3 September 2021, section 4.

Component	AER position	APGA position
		<p>follow privatisations over the last few years.</p> <ul style="list-style-type: none"> <li>• WATMI (if measured correctly) could only be used to inform the benchmark term, not set it directly. Changes to the benchmark term should only be considered if the evidence is of a substantial, sustained shift in benchmark tenor as frequent changes would significantly increase costs to consumers.</li> <li>• See our submission on the term of the rate of return draft working paper.<sup>11</sup></li> </ul>

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<sup>11</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, 2 July 2021, p.17.

### 3. Overall rate of return

Our focus for the overall rate of return is two-fold:

- First, the AER should ensure that the 2022 RORI is consistent with how it intends to address changes to the asset stranding risk for gas pipeline businesses.
- Second, the AER should give cross-checks a central role when developing the 2022 RORI.

On both issues, we want the AER to rethink how it addressed these when developing the 2018 RORI. We explain why in the next two sub-sections.

#### 3.1. Stranded asset risk

The risks facing gas pipeline businesses are changing – with an increasing risk of asset stranding driven by decarbonisation of Australia’s energy supply and the transition to a more competitive energy sector where historical market power may be a thing of the past. We discussed some of these changes in our October 2020 submission.<sup>12,13</sup>

Although arguably not well set up to deal with market power that has a finite expected life, the regulatory framework contained within the National Gas Law and National Gas Rules has some flexibility to deal with changes to asset stranding risk. For instance,

- Asset lives used for cost recovery can be adjusted to reflect expected economic lives
- Depreciation methods can be adopted that align with expected demand for gas transportation services
- The allowed rate of return can be set to reflect the risks faced by gas pipeline businesses
- Other revenue allowances could be included to compensate for risks not reflected in the allowed rate of return (e.g., non-systematic risks).

What is not clear, however, is whether pulling any one of these levers in isolation will effectively deal with all aspects of asset stranding risk, and of the broader market forces which are driving this particular risk.

#### A holistic approach to risk

Given this, a holistic assessment of risk faced by gas sector is needed. That assessment should:

- **Focus on pragmatism over theory** – the AER should consider these risks from the pragmatic perspective of the lowest cost ways of dealing with them, rather than the theoretical perspective of which bucket a particular asset pricing model suggests a particular risk ought to be in if the assumptions which underpin this abstract model were true.
- **Consider all risks collectively** – it should ensure that the various places in which the risks are addressed are considered together and not in a siloed fashion which may cause risks to either be inadvertently ignored, or potentially double-counted.

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<sup>12</sup> APGA, *APGA Submission to the AER: Draft working papers on return on equity models and international approaches to the rate of return*, 9 October 2020, pp.10–16.

<sup>13</sup> Further material was included in submissions to the ERA as part of the Dampier to Bunbury Pipeline access arrangement review. See: <https://www.erawa.com.au/DBP-AA5>.

- **Look at gas on its own merits** – the AER should not start from a presupposition that gas and electricity are identical because the regulatory environment they face right now is the same and deviates if substantial evidence of difference emerges. Instead, it should assess gas on its own merits.

At the AER’s workshop on the return on equity we discussed how there is a ‘toolkit’ of mechanisms that the AER could use to adjust asset stranding risk any compensate for any residual risk. We also noted that different tools had been adopted or explored by different regulators. Our focus in that presentation was based around the three points above, and we do not consider that the long run interests of consumers can be adequately protected unless an approach like this is followed.

Subsequently, we engaged CEG to advise on the remedies available to address the stranding of investment in regulated gas networks.

In its advice, CEG explains that:<sup>14</sup>

- An acceleration in the rate of depreciation will reduce the likelihood and expected cost of stranding and, therefore, reduce the level of compensation required for that stranding – accelerated depreciation can be achieved by shortening asset lives, adopting the “economic asset stranding” approach used by the NZCC, ceasing to index the RAB for inflation and/or adopting diminishing value methods (and other methods which change the shape of depreciation) for depreciation.
- However, acceleration of depreciation in response to significant uncertainty about the future, is itself an uncertain process and may not capture adequately all of the relevant changes in risk; there may be a risk of gaps or double counting.
- Measures to address stranding risk such as an ex-ante stranding uplift to the WACC (consistent with a self-insurance cost) and accelerated depreciation can be shown, in principle, to be largely equivalent in terms of their ability to capture risk and their impact on consumer prices. There is therefore an element of pragmatism necessary in their use, and the optimal solution may not be one-size-fits-all.
- To date, only a few regulators have considered this issue in any detail, and different regulators have used different approaches. The field remains a work in progress, but it is important not to simply kick the can down the road given the large asset values involved and the impacts uncertainty on regulatory approach can have on consumer and investor confidence.

CEG then develops what it considers is a more realistic model based on illustrative, albeit plausible, assumptions about the path for future gas demand. This is detailed in Attachment 2.

As we noted in that presentation, adopting a conceptual framework like this where there is a trade-off between asset lives and ex ante allowances and using the three dot points above does not necessarily lead different allowed returns on equity and debt for gas and electricity networks.

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<sup>14</sup> CEG, *Stranding risk: Depreciation vs uplift*, September 2021.

## Avoiding presumptions

There is a clear difference between:

- Reaching the conclusion that gas and electricity networks face similar risk after a process of reasoning grounded in the three points above – as we propose, and
- Assuming that similarity between gas and electricity networks places a high bar for change against any potential finding of difference – as appears in the Equity Omnibus Paper.

By way of **illustration**, the Equity Omnibus Paper notes that:<sup>15</sup>

*In relation to gas pipelines, there may be risks of extreme changes in demand which present the potential for asset stranding. However, we do not consider these risks likely to be systematic in nature. Therefore, we do not consider they should be accounted for in the equity beta or the regulated rate of return. Nevertheless, if these risks are sufficiently material to require a regulatory response, adjustments can be made to the way regulated cash flows are set (for example, providing prudent discounts or accelerated depreciation provisions).*

The paper did not cite evidence to support its view that stranding risks are unlikely to be systematic.

Conceptually, there are reasons why some stranding risk could be systematic in nature, particularly to the extent that it is driven by decarbonisation policy. Decarbonisation policies affect the entire economy – which needs to adapt to meet Government policy, such as ‘net zero’ targets. It affects different parts of the economy in different ways depending upon exposure to it just as sectors of the economy more susceptible to, say, interest rate risk are affected in different ways as rates change. Indeed, other regulators have recognised that some stranding risk could be systematic, as has Dr Lally.<sup>16</sup>

The proposition that the risks are not systematic in nature needs to be proven, not assumed. Dealing with risks in this compartmentalised way ignores the long run interests of consumers. It assumes that meeting these risks is tied implicitly to the assumptions of a particular asset pricing model, rather than furthering the National Gas Objective.

A more pragmatic approach would recognise that it may be in consumers’ interests to prefer one treatment over another. For instance, if all risks associated with asset stranding were idiosyncratic and addressed through depreciation, then this could lead to prices for consumers now and into the future that are higher than they otherwise would be. In the that scenario, consumers may prefer the risk to be addressed by adjusting the allowed rate of return.<sup>17</sup> The reality is that this has not yet been explored.

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<sup>15</sup> AER, *Equity Omnibus: Draft working paper*, July 2021, p.50.

<sup>16</sup> Lally, *Review of further WACC submissions: Report for the Commerce Commission*, 23 November 2016, p.9.

<sup>17</sup> We are not suggesting that this would occur, but only that it might. Since there is uncertainty around asset stranding, if it is decided that this will be dealt with solely through shortening asset lives, then to provide the same degree of protection over invested capital as existed prior to the economic environment changing, then asset lives might need to be shortened by more than might be the case if other tools are also used to provide an appropriate margin of error. If markets are perfect, then any

By way of a **second example**, in the *Equity Omnibus* paper the AER also asserts:<sup>18</sup>

*The regulatory framework for electricity and gas service providers are similar because both face limited systematic risk by virtue of being regulated natural monopolies. They effectively face very limited increase in risk due to competition*

However, merely being regulated natural monopolies does not, in and of itself, lead to the same level of systematic risk exposure.

By way of an example, water and railways are also regulated natural monopolies, but Australian and overseas regulators routinely give different betas to these firms, even though those same regulators cover energy, water, and rail, and do so with very similar legislative guidance. Again, this is an assertion that the AER should provide evidence of testing.

### A way forward

We appreciate that this current RORI review captures only part of the AER's overall approach to risk in the gas sector and that the AER intends to consult on its approach to gas risk over the next year. We welcome this approach and understand – because the current working papers have come out before the other process has started – that the AER is unlikely to have fully developed its thinking in respect of holistically treating risk. We too, are working towards this goal.

However, we would expect that, by the time of the December 2021 information paper, the AER would be well on the way towards development of its thinking in a holistic manner, and with a substantially more well-formed body of thinking that shows:

- How the RORI process and the other stranded asset process inter-relate, and
- How the AER has ensured – across the two processes – that all risk has been adequately captured, but not omitted nor double-counted.

For our part, this submission outlines of our thinking. We will actively engage with the AER's forthcoming stranded assets working paper when it emerges, while anticipating that there will be some degree of overlap in our submissions. We also anticipate that we will discuss some topics in RORI responses which ultimately get addressed in the stranded asset process (and vice versa). We trust that the AER will see this as part of the process of adaptation to a new environment.

### 3.2. Cross-checks

It is paramount that cross-checks play a genuine role when developing the 2022 RORI. They have not in past rate of return reviews.

Although they have been used to some degree, the AER's assessment centred around the validity of the cross checks themselves, rather than what they suggested about the allowed rate of return. The cross-checks did not make any difference to the actual outcome, despite most cross checks pointing to very different results than those which the AER finally used.

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means of addressing risk embedded in information about the future ought to lead to the same overall consequences now. But markets are not perfect, so the solution requires more than hand-waving. This is the message implicit in the diagram above, and the approach used by the NZCC.

<sup>18</sup> AER, *Equity Omnibus: Draft working paper*, July 2021, p.50.

## The case for using cross-checks

Cross checks could be used to change the allowed rate of return during the RORI period as the AER suggests it may do with conditioning variables.<sup>19</sup> Putting to one side whether those particular cross-checks are suitable – as noted by ENA,<sup>20</sup> they are not – cross checks *should be* employed when developing the RORI. We explain why below.

We previously submitted that:

- cross-checks should be used to actually check the estimated rate of return,<sup>21</sup> and
- financeability assessments should be included as a cross-check to ensure that the 2022 RORI is likely to lead to allowed rates of return that support efficient investment.<sup>22</sup>

The rationale for why cross-checks should be included is simple. We can never truly know the true cost of capital. We can only ever estimate it using models and assumptions that inherently have limitations and rely on data that are highly imprecise. Even if we have 100 percent agreement on a particular model, the only thing that we know is that the range of potential outcomes that best use of available models and data provide will be wide – and so judgement will be required to play a significant role in deriving a final answer.

Healthy scepticism around that judgement should be applied to such judgement because reasonable minds can differ when faced with the same evidence. Clearly, such scepticism should not be so extreme that a RORI cannot be developed at all. But it should push us towards genuinely checking the estimates generated when judgement is used to derive an answer, especially when using methods, models and data that are imprecise and based on a series of theoretical assumptions. Other information should be used to test estimates to ensure that they are as robust as possible.

## How cross-checks could work

There are different ways that cross-checks could be used. A pragmatic approach could be to use a five-step process, like that set out here and in our slides from our presentation on 11 August 2021 for the return on equity:

- **Step 1** – estimate the return on equity range, using the CAPM and high and low values from the parameter ranges suggested by the available data
- **Step 2** – use judgement to make a first approximation of an appropriate return on equity
- **Step 3** – employ all relevant cross checks as ranges
- **Step 4** – look for the maximum overlap of the cross checks in step 3 with the range in step 1
- **Step 5** – revise judgement, as needed, to choose a point within the range of maximum overlap.

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<sup>19</sup> AER, *Rate of Return: Equity Omnibus: Draft working paper*, July 2021, pp.26–27.

<sup>20</sup> ENA, *ENA response to equity omnibus paper*, 3 September 2021, pp.65–66.

<sup>21</sup> APGA, *APGA Submission to the AER: Draft working papers on return on equity models and international approaches to the rate of return*, 9 October 2020, p.7.

<sup>22</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, 2 July 2021, pp.13–14.

Using this process, at no point are the cross-checks used to supplant the SL CAPM or its various underlying assumptions. Nor are we moving outside the range of outcomes suggested in the data. Rather, the cross-checks are used to inform how the AER uses judgement to select its parameter point estimates.

We illustrate how this process could be applied in Box 3.1 below.

### **Box 3.1: An example of how cross-checks could work**

#### ***Starting assumptions***

Let's suppose that we want to apply cross-checks to the return on equity of 6.6%, with value estimated using the SL CAPM with the following inputs:

- a risk-free rate of 3%
- an MRP of 5% from within the range 5% to 8% depending on what methods are used
- an equity beta of 0.6 from within the range 0.5 to 0.7.

Let's also suppose that four cross checks have been accepted and that:<sup>23</sup>

- option prices on the stocks of firms with a similar level of systematic risk suggest a forward-looking return on equity of 6% to 8%
- prevailing debt costs are around 5% to 5.5% and, following a rigorous framework like that of Merton (1974), these suggest that equity in the same firms would lie in a range between 6% and 10%
- dividend strips available for these stocks suggest a required return on equity of between 7% and 9%
- analyst reports include a range for the return on equity of 7.5% to 10%.

#### ***Applying cross-checks***

The first thing to observe is that the potential range for the return on equity from applying the SL CAPM, given the parameter ranges, is 5.5% to 8.6%. The next thing to observe is that the current value of 6.6% falls within the range suggested by option prices and based on the cost of debt, but below the ranges suggested by actual equity returns and analyst reports.

These observations suggest that the current value of 6.6% might be too low and there is a case for adopting a higher value from within the SL CAPM range.

For instance, the figure below suggests that the cross-checks support a value of 7.5% from within the SL CAPM range. This value falls below the top-end of the range from options (1) and

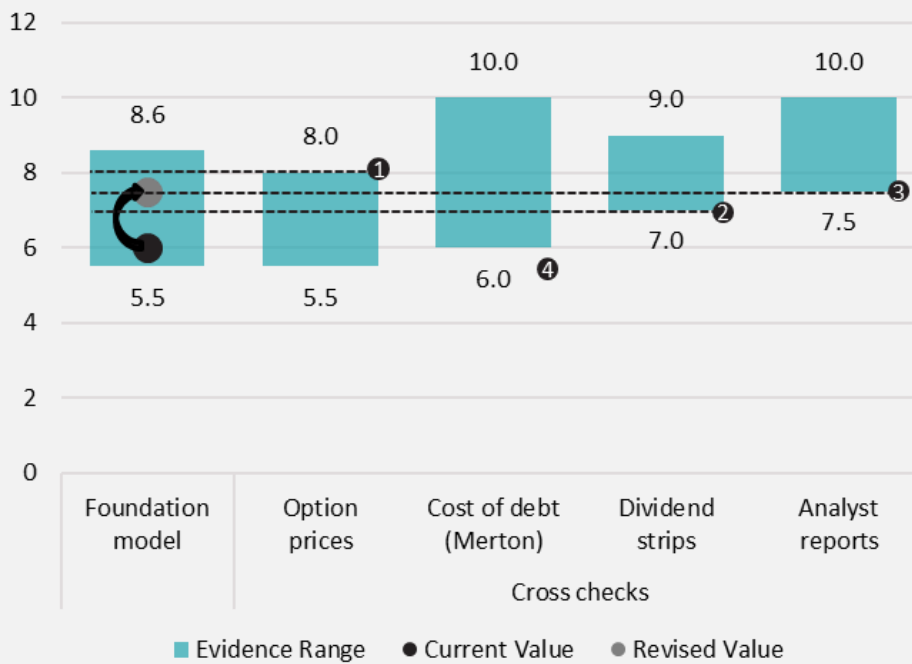
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<sup>23</sup> We have obviously made up the examples here, but each of these diverse sources of information are used in practice to inform the cost of equity. There is an academic literature associated with each of them. However, not all will be feasible within the Australian context due to a lack of data for the stocks concerned.



above the bottom of the ranges from actual equity returns (2) and analyst reports (3). The value also sits within the range for the cost of equity suggested by debt costs (4).

In this case, a value of 7.5% could be supported by adopting a risk-free rate of 3%, an MRP of 6.4% and an equity beta of 0.7 – all from within the reasonable range identified for each parameter.



### Conclusion

The example shows how cross-checks can be used to first check whether an initial estimate is consistent with those checks. It also shows how those cross-checks can be used to inform any revision to the estimate.

Importantly, at no point do the cross-checks supplement the SL CAPM. All that they are doing is guiding whether a different point estimate from the reasonable range for a given input to the CAPM (e.g., risk-free rate, beta, MRP) should be selected.

## 4. Return on equity

Setting an appropriate return on equity is fundamental to promoting the National Gas Objective.

Expert evidence and the passage of time has highlighted some issues in respect of the return on equity allowances coming from return on the 2018 RORI as markets changed in ways that no stakeholder predicted. Both ENA and the CRG have proposed solutions to this problem that the AER should genuinely consider.

We discuss these solutions below. We also make the case for why the AER should estimate the equity beta for gas networks in its own right, rather than simply assume that gas and electricity networks face the same risk and should have the same value.

### 4.1. The problem

The 2018 RORI adopted an approach to setting the return on equity that fixed two of the three parameters while requiring the third – the risk-free rate – to update.

The consequences were three-fold:

- **First**, this led to allowed rates of return that were materially lower than those adopted by economic regulators that applied similar incentive-based regulatory frameworks<sup>24</sup>
- **Second**, it relied on methods that had significant methodological issues, such as fixing MRP based on unconditional historical averages without incorporating forward-looking evidence such as the dividend growth model<sup>25</sup>
- **Third**, it adopted a rigid mechanism for updating the return on equity that is unsuited to responding to changes in market conditions like the low interest rate environment we are in at present.<sup>26</sup>

In short, the approach in the 2018 RORI is not robust to significant changes in interest rates and leads to allowed rates of return that are out of step with decisions adopted by other regulators and do not reflect the returns investors expect given the risk they are bearing.

This is a problem because gas and electricity networks need to make investment decisions mindful of how the allowed return on equity is set. If that allowance is significantly out of step with the costs of equity financing, then this almost certainly affects whether investment is undertaken or not.

Various solutions have been proposed to this problem by both the ENA and the CRG.

We discuss the ENA and CRG solutions in sections 4.2 and 4.3. We also make our case in section 4.4 for why the AER should seek to estimate the equity for gas networks separately from that for electricity networks.

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<sup>24</sup> Brattle, June 2020, *A review of international approaches to regulated rates of return*, p. 58

<sup>25</sup> CEPA, *Relationship between RFR and MRP*, 16 June 2021, p.44.

<sup>26</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, 3 July 2021, pp.13–14.

## 4.2. ENA solutions

ENA has developed a comprehensive framework that addresses:

- How to estimate the various parameters of the return on equity, particularly in the context of the current low interest rate environment, and
- How, if this proves necessary, to adjust estimates through time to take account of key relationships like that between the risk-free rate and MRP.

The only major area that has not been addressed by the ENA is the formation of a beta for gas specifically – which we discuss below.

In broad terms, we with ENA's conclusions, including its preliminary conclusions in respect of parameter values. Rather than repeat these conclusions at length, we rather highlight a series of key points which we have drawn from that submission and believe require careful consideration. These points may, we fear, otherwise get lost in amongst the sheer volume of evidence that ENA has provided.

Key components of ENA's solution are:<sup>27</sup>

- **Approach to parameters** – for a given parameter, start with the range formed from key pieces of evidence, incorporating *all* data not just the mean, filter out evidence that should be ignored, and then use judgement to select the final value
- **Equity beta** – combine 10 years of Australian firm data, data from international markets, and recent conclusions from international regulators, alongside a mix of methods that prevent a handful of data points from dominating the results
- **MRP** – Form an estimate at the start of the 2022 RORI which makes use of a combination of historical and forward-looking evidence, making use of a DGM approach which addresses previous AER concerns. For the historical evidence, give no role to geometric mean evidence which is theoretically incorrect.
- **Adjusting the return on equity estimate:** If the return on equity estimate is adjusted through the course of the RORI, do so via a simple approach which partially (rather than fully) reflects risk-free rate changes and, most importantly, ensure that the updating method is consistent with the way in which the initial estimate was formed.

### Our views on the ENA solution

We support these components, noting of course our views on the equity beta for gas networks noted in section 4.4 below.

In our view, the ENA solution:

- adopts a sensible way to selecting parameters from within reasonable ranges, making clear the role of judgement, and facilitating cross-checking of that judgement
- recognises the limits with relying on data from over a decade ago when estimating equity beta and the need to augment Australian data with other information now that there are only two Australian listed firms

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<sup>27</sup> ENA, *ENA response to equity omnibus paper*, 3 September 2021.

- uses consistent logic to update the MRP relative to what was adopted previously (e.g., in the 2018 RORI) and changes in conditions since (e.g., the low interest rate environment)<sup>28</sup>
- appropriately combines forward-looking and historical evidence when estimating the MRP, recognising that there is no ‘perfect’ source for the unobservable MRP
- addresses concerns with how the DGM is formulated and applied as one source of evidence for the MRP<sup>29</sup>
- ensures that the return on equity can update automatically over time in response to changes in forward-looking evidence – as a proxy for changes in conditions – without the need for judgement in a way that is both workable and symmetric.<sup>30</sup>

### 4.3. CRG solution

By and large – with one key exception – the CRG has not focused on problems with the 2018 RORI and their potential solutions. Rather, the CRG has focused on preventing movement away from the 2018 RORI.

However, the CRG has suggested a change from the 2018 RORI that directly addresses how to mechanistically change the allowed return on equity through time to avoid problems associated with negative real interest rates. This not only has practical importance, but also addresses the theoretical problems the CAPM has with negative real interest rates.

The approach, as expressed by the CRG involves replacing the normal CAPM with a special form as per Figure 4.1.

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<sup>28</sup> The long run historical average MRP used in 2018 is an unconditional mean. If the current risk-free rate is below the long run average – as we and the ENA believe – and there is evidence of a negative relationship between the MRP and risk-free rate, then the MRP in December 2022 must be higher than it was in December 2018. We would be highly suspicious of an MRP finding that used similar information as used in 2018 and yet derived a lower result as this would imply a positive relationship between the two parameters.

<sup>29</sup> We look forward to the AER engaging on this proposed approach and the positive way in which it has dealt with past concerns. We would be disappointed if the AER simply engaged consultants to come up with a fresh round of objections to the use of this model and ignored the considerable effort which has gone into deriving practical and pragmatic solutions.

<sup>30</sup> If a certain mix of historical and forward-looking evidence was reflected in the initial estimate of the MRP, then a similar mix should be reflected in subsequent (automated) adjustment of the allowed return on equity.

**Figure 4.1: CRG's proposed solution: an adjusted CAPM** <sup>31</sup>

<p><b>Adjusted CAPM:</b> <math>RoE = R_f + \beta (R_m - R_f) - (1 - \beta)r_f</math></p> <p>where: <math>r_f = R_f - E(\pi)</math> if <math>R_f &lt; E(\pi)</math> [ie. when real interest rates are negative]</p> <p><math>r_f = 0</math> if <math>R_f \geq E(\pi)</math> [ie. when real interest rates are non-negative]</p>
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Noting that  $R_F = r_f + E[\pi]$  when  $R_F < E[\pi]$ , then this expression can be simplified to:

If  $R_F \geq E[\pi]$  then  $RoE = R_F + \beta_e(E[R_M] - R_F)$  (i.e., the usual CAPM)

If  $R_F < E[\pi]$  then  $RoE = E[\pi] + \beta_e(E[R_M] - E[\pi])$  (i.e., replace  $R_F$  with expected inflation)

### Our views on the CRG solution

Exploring ideas put forward by the CRG and other stakeholders is important.

In the present case, CRG's proposed solution does not assist in the determination of  $E[R_M]$ . All of the work alluded to above from ENA is still important in that context. The AER would still need to turn its mind to issues about where interest rates are relative to their long run average, and what relationships might exist between market returns and the risk-free rate.

The AER would also need to focus more squarely on the return to the market, rather than the MRP, as it is this term which appears in both equations. However, this is a relatively small change, and requires essentially the same analysis.

Nevertheless, it is an alternative way of dealing with adjustments to the allowed return on equity through time. It is mechanistic. It operates more rarely than the approach ENA suggests – it is only activated when real interest rates are negative, i.e., when the nominal CGS minus the expectation of inflation is negative. The normal SL CAPM operates otherwise.

It may be, therefore, that no changes need to be made to the allowed rate of return beyond updating it for the risk-free rate, and this may be preferable to ENA's solution, where adjustment is continuous. On the flipside, however, ENA's solution is symmetric, whilst the CRG's solution is asymmetric, and this would need to be weighed in any assessment of the two approaches.

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<sup>31</sup> See: CRG, *Rate of return: Equity Omnibus – Draft working paper, CRG Preliminary response*, 11 August 2021, slide 15.

#### 4.4. A focus on gas

Gas networks should be looked at on its own merits. This would better promote the National Gas Objective than assuming that they should be treated the same as electricity networks.

Looking at the evidence on gas networks provided in the expert report from CEG specifically supports an equity beta of at least 0.7. And although the Economic Insights analysis appears to support this value, we have concerns with its reliability compared with more recent analysis by CEG.

We elaborate on these points below.

##### Case for looking at gas on its own merits

Gas and electricity networks face materially different market outlooks.

Although in the past it may have been appropriate to adopt a single benchmark across gas and electricity networks, climate policy and the energy transition is having noticeably different effects on the risks facing those networks.

As discussed in section 3.1, climate policy and the energy transition are having a material effect on the asset stranding risk faced by gas businesses that is unlikely to align with that faced by electricity networks.

Given this, it is important for the AER to avoid the temptation to assume these differences away. It may well be that the AER adopts the same approaches and assumptions for calculating the return on equity for both electricity and gas networks. However, it should not get there based on an assumption. What matters is the *process* that the AER follows to determine the approaches and assumptions.

In our view, the return on equity – and the rate of return more generally – for gas networks needs to be considered on its own merits. The National Gas Law does not require a single benchmark to apply to both gas and electricity networks.

##### What the evidence shows

In short, the evidence supports an equity beta of 0.7 for gas networks. Although this is the *same* value that ENA proposes for both gas and electricity networks, we have got to that value independently. We did not assume that gas and electricity networks should have the same value – and the AER should do the same.

We engaged CEG to estimate the asset beta for gas networks, which:<sup>32</sup>

- adopted the comparator set and methodology used by the New Zealand Commerce Commission (NZCC) for gas transport businesses
- tested different comparator samples based on whether stocks were trading for different sample periods
- observed that the asset beta has been increasing over time, with an average increase in the asset beta of 0.08 if sample periods are moved forward by 5 years

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<sup>32</sup> CEG, *Asset beta for gas transport businesses*, August 2021.

- observed that Economic Insights' analysis of equity beta is outdated and less reliable compared with its own estimates.

If the 0.08 increase in asset beta observed by CEG were added to that adopted by the AER in the 2018 RORI (of 0.24), then that would imply an equity beta of 0.71.<sup>33</sup>

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<sup>33</sup> This is calculated as  $0.71 = (0.24 + 0.08) \times (1 + 55\% / (1 - 55\%))$ .

## 5. Return on debt

The approach to estimating the return on debt does not need to change from that used the 2018 RORI because there is not enough data available currently to show the impact of 2018 RORI on previously observed outperformance.

It is consistent with efficient debt financing practices and is an effective way to ensure that customers receive the benefits associated with network outperformance associated with debt allowances.

### 5.1. Updated AER analysis

The AER has undertaken more work on the EICSI since 2018 and ironed out some of its flaws. However, the practical effect of this is that the AER might take more confidence in using it in the same way that it did in 2018. There is no need to change the way it is used, and indeed the changes suggested by the AER cause significant problems.

In 2018, the AER used the evidence it had gained from the EICSI as it then stood to change the mix of A and BBB debt indices. However, it did so using judgement about the strengths of the index and the quality of the data. It did not do so in a mechanistic fashion as it currently proposes. It is this mechanistic approach which is problematic. It is also premature, because the AER has not yet adequately established that any improvements over the independent data curves. This has been the strong message both from industry and the AER's own consultant Lally.

### 5.2. ENA response

The ENA has responded in a comprehensive manner to the AER's proposals in respect of the cost of debt. In its submission, ENA makes clear:<sup>34</sup>

- networks generally issue debt in line with the benchmark assumptions contained in the 2018 RORI
- the AER's proposed change to how it wants to use network debt data and the overall regulatory framework is unreasonable, including because it would:
  - no longer target a cost of a 10-year trailing average debt management strategy
  - be inconsistent with retaining the 10-year trailing average approach
  - is not informed by debt data of businesses that contain the impact of 2018 RORI
  - effectively give networks an allowance for cost of debt associated with a different tenor than that which the AER deems efficient
- the AER should use the network debt data to test whether:
  - the benchmark debt management strategy contained in the 2018 RORI is consistent with the observed practice of gas and electricity networks
  - the AER's method for estimating the compensation for the return on debt matches the costs a network will incur in following that strategy.

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<sup>34</sup> ENA, *Debt parameters and network data: Debt parameters and network data*, 3 September 2021.



### **5.3. Our view**

We support ENA's submission.

If there is robust and sustained evidence of genuine outperformance of actual versus allowed return on debt subsequent to networks being subject to the 2018 RORI, then this may provide evidence for the AER to change the allowed debt compensation from the level provided in the 2018 RORI. This – as it was in 2018 – ought to be a matter of judgement, clearly reasoned and discussed with stakeholders, and not a mechanistic adjustment.

We would also expect to see AER's analysis of the cost of debt that it is collecting and how the data specifically considers the impact of 2018 RORI in the December 2021 information paper. This will ensure that all stakeholders can respond to the AER's views. If this information is provided only in the draft decision, then the Independent Panel will have no means of considering the views of stakeholders and the merits of the AER's approach.

## Appendix A: Positions and issues canvassed

This appendix starts with Table 1 of the AER’s *Overall Rate of Return* paper – which outlines the AER’s positions and issues canvassed – then adds our positions against them.

**Table A.1: 2022 RORI Working papers – positions and issues canvassed**

Working Paper	2018 Instrument position	Current AER Position	APGA position
<b>Energy network debt data</b>	Use the EICSI as a cross-check for benchmark credit rating	<b>Preferred position:</b> EICSI is to be used directly to determine the benchmark blend of A and BBB bonds	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – the EICSI does not directly measure the credit rating of the benchmark firm. Doing so directly is not a replicable benchmark.</li> <li>• This is consistent with advice from Lally.<sup>35</sup></li> <li>• As per the 2018 RORI, the EICSI could be used to inform the benchmark credit rating.</li> <li>• See discussion in section 5.</li> </ul>
	Use the WATMI as the floor of possible options for the benchmark term	<b>Preliminary position:</b> An updated WATMI, combined with the more	<ul style="list-style-type: none"> <li>• <b>Partially agree</b> – The WATMI could only be used to inform the</li> </ul>

<sup>35</sup> Lally, *The Appropriate Term for the Allowed Cost of Capital*, 9 April 2021, pp.6,46–52.

Working Paper	2018 Instrument position	Current AER Position	APGA position
		detailed drawdown data, may be useful in determining a benchmark term	<p>benchmark term, not set it directly.</p> <ul style="list-style-type: none"> <li>It should include subordinate debt and that recognise that NSW networks are transitioning their debt portfolios follow privatisations over the last few years.</li> <li>See our submission on the term of the rate of return draft working paper.<sup>36</sup></li> </ul>
<b>International regulatory approaches to the rate of return</b>	Review of instrument to be held every five years consistent with legislation. Annual updates to be undertaken annually.	<b>Preferred position:</b> Review of instrument to be held every four years consistent with legislation. Annual data updates published.	<ul style="list-style-type: none"> <li><b>Agree</b></li> </ul>
	Set the risk-free rate only at the beginning of each reset period	<b>Preferred position:</b> Set the risk-free rate only at the beginning of each reset period	<ul style="list-style-type: none"> <li><b>Agree</b></li> </ul>
	Make no adjustments for expected incentive scheme outcomes	<b>Preferred position:</b> Make no adjustments for expected incentive scheme outcomes	<ul style="list-style-type: none"> <li><b>Agree</b></li> </ul>

<sup>36</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, 2 July 2021, p.17.

Working Paper	2018 Instrument position	Current AER Position	APGA position
<b><i>CAPM and alternative return on equity models</i></b>	Standard Sharpe-Lintner CAPM model used as the basis for determining the return on equity	<b>Preferred position:</b> Standard Sharpe-Lintner CAPM model used as the basis for determining the return on equity	<ul style="list-style-type: none"> <li>• <b>Agree</b> – but with reservations about flaws in the model.</li> </ul>
<b><i>Term of the rate of return</i></b>	The term of equity and debt were of ten-year duration	<b>Preliminary position:</b> It is unnecessary to align the term of equity, debt and expected inflation	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
	10-year term for return on equity, consistent with life of underlying asset	<b>No position yet, seeking views:</b> Ten-year term consistent with existing practice or five-year term for return on equity, consistent with length of the regulatory period	<ul style="list-style-type: none"> <li>• <b>Strong view</b> – the term should not be set to match the length of the regulatory period.</li> <li>• We explain our view further in our submission on the term of the rate of return draft working paper.<sup>37</sup></li> </ul>
	Return on debt determined through a trailing average approach	<b>Preferred position:</b> Return on debt determined through a trailing average approach	<ul style="list-style-type: none"> <li>• <b>Agree</b> – this approach aligns with efficient debt financing practices for long-lived infrastructure assets.</li> </ul>

<sup>37</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, 2 July 2021, p.15.

Working Paper	2018 Instrument position	Current AER Position	APGA position
			<ul style="list-style-type: none"> <li>• See our submission on the term of the rate of return draft working paper.<sup>38</sup></li> </ul>
	Ten-year term for return of debt	<p><b>Preliminary position:</b> Match the term of the return on debt to that of an efficient firm's borrowing</p>	<ul style="list-style-type: none"> <li>• <b>Partially agree</b> – given the challenges transitioning between different terms should only change the term where there is clear evidence of a material change.</li> <li>• There should be a high bar before the term of debt is changed given the difficulties transitioning between terms.</li> <li>• See our submission on the term of the rate of return draft working paper.<sup>39</sup></li> </ul>
<b>Rate of return and</b>		<p><b>Preferred position:</b> We are currently in a low interest rate environment.</p>	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>

<sup>38</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, 2 July 2021, p.16.

<sup>39</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, 2 July 2021, pp.16–17.

Working Paper	2018 Instrument position	Current AER Position	APGA position
<p><i>cashflows in a low interest rate environment</i></p>		<p><b>Preferred position:</b> The reduction in our return on debt has been in line with movements in the broader market for debt and the costs the regulated businesses face.</p>	<ul style="list-style-type: none"> <li>• <b>Agree</b> – but that does not necessarily have any bearing on the return on equity.</li> </ul>
	<p>Commonwealth Government Securities are an appropriate proxy for the riskless investment for our purposes.</p>	<p><b>Preferred position:</b> Commonwealth Government Securities are an appropriate proxy for the riskless investment for our purposes.</p>	<ul style="list-style-type: none"> <li>• <b>Unclear</b> – this is an issue that needs further consideration, especially when we are in a low interest rate environment.</li> <li>• See the ENA submission on this issue.<sup>40</sup></li> </ul>
	<p>Measures of financeability are not used directly when setting the rate of return</p>	<p><b>Preliminary position:</b> Measures of financeability are not used directly when setting the rate of return</p>	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – financeability measures should be considered when setting the rate of return.</li> <li>• Financeability assessments should not be used determinatively to set the rate of return.</li> <li>• As discussed in section 3.2, financeability measures provide insight into whether an allowed rate of return could lead to</li> </ul>

<sup>40</sup> ENA, *ENA response to equity omnibus paper*, 3 September 2021, section 5.

Working Paper	2018 Instrument position	Current AER Position	APGA position
			financing difficulties for a benchmark efficient entity.
<b>Equity Omnibus</b>	Use comparator set of nine Australian firm to estimate equity beta	<b>Preliminary position:</b> Use comparator set of nine Australian firms to estimate equity beta	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – the sample is inappropriate to measure the systematic risk faced by gas networks, especially now that there are only 2 listed energy networks.</li> <li>• As discussed in section 4.4 and supported by the attached report from CEG,<sup>41</sup> data from international gas networks should also be used to inform the equity beta adopted for gas networks.</li> </ul>
	Give the greatest weight to equity beta estimates from the longest estimation period	<b>Preferred position:</b> Give the greatest weight to equity beta estimates from the longest estimation period	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – because that would place weight on firms that are no longer trading or reflect the risk currently faced by gas pipeline businesses.</li> <li>• See our discussion in section 4.2.</li> </ul>

<sup>41</sup> CEG, *Asset beta for gas transport businesses*, August 2021.

Working Paper	2018 Instrument position	Current AER Position	APGA position
	Set a forward-looking market risk premium	<b>Preferred position:</b> Set a forward-looking market risk premium	<ul style="list-style-type: none"> <li>• <b>Agree</b> – however, we disagree with the AER on the extent to which historical excess returns over the last 120 years are an appropriate measure of the forward-looking market risk premium.</li> </ul>
	Diminished confidence in the use of dividend growth models	<b>No position yet, seeking views:</b> Consider if the dividend growth model might be used to inform the relationship between the MRP and risk-free rate	<ul style="list-style-type: none"> <li>• <b>Strong view</b> – the DGM estimates the forward looking MRP.</li> <li>• It should be used to inform the forward looking MRP directly, rather than just the relationship between the MRP and the risk-free rate.</li> </ul>
	In determining the MRP, have regard to the historical excess return, both the arithmetic and geometric mean MRP, and MRP surveys	<b>Preferred position:</b> In determining the MRP, have regard to the historical excess return, both the arithmetic and geometric mean MRP, and MRP surveys	<ul style="list-style-type: none"> <li>• <b>Partially agree</b> – the DGM should also be used to determine the MRP, but the geometric mean MRP and MRP surveys should not.</li> <li>• See the ENA submission and Appendix C.</li> </ul>



Working Paper	2018 Instrument position	Current AER Position	APGA position
	No reliance placed on the Wright approach	<b>No position yet, seeking views:</b> Consider the potential for a relationship between the MRP and risk-free rate, and whether an appropriate implementation method is available	<ul style="list-style-type: none"> <li>• <b>Strong view</b> – if the AER is to rely on historical data, then historical total market returns should inform the estimate of MRP consistent with the theory of the SL CAPM.</li> <li>• See the ENA submission.</li> </ul>
	Allow networks flexibility in nominating the averaging period for the risk-free rate	<b>Preferred position:</b> Allow networks flexibility in nominating the averaging period for the risk-free rate	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
	Averaging period was between 20 and 60 consecutive business days within a window running from between three and seven months prior to the commencement of the regulatory control period	<b>Preferred position:</b> Shift the allowed nomination period window for the risk-free rate forward in time by one month to lessen timing issues	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
	Use cross checks to inform our overall return on equity point estimates	<b>Preliminary position:</b> Use cross checks to inform our overall return on equity point estimates	<ul style="list-style-type: none"> <li>• <b>Agree</b> – this should include financeability and other measures for the reasons discussed in section 3.2.</li> </ul>

Working Paper	2018 Instrument position	Current AER Position	APGA position
	Adopt a single benchmark for electricity and gas businesses.	<b>Preliminary position:</b> Adopt a single benchmark for electricity and gas businesses.	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – gas and electricity businesses face materially different market outlooks.</li> <li>• Although in the past it may have been appropriate to adopt a single benchmark, climate policy and the energy transition is having noticeably different effects on the risks facing gas and electricity businesses.</li> <li>• Given this, it is important to avoid the temptation to assume these away. The rate of return for gas businesses needs to be considered on its own merits.</li> <li>• We discuss this further in sections 3.1 and 4.4.</li> </ul>
<b>Debt Omnibus</b>	Application of a simple trailing average approach to determine the return on debt, with a 10 per cent weighting for each of the 10 years	<b>No position yet, seeking views:</b> Seek views on weighting trailing average approach by capex spending	<ul style="list-style-type: none"> <li>• <b>Unclear</b> – aligning the cost of debt with debt raising activities is appropriate. However, there are several methodological choices available that we are not yet clear about.</li> <li>• We are also concerned that this approach may introduce</li> </ul>

Working Paper	2018 Instrument position	Current AER Position	APGA position
			<p>significant complexity to rate of return estimation with limited improvement, especially if transitions are needed (e.g., from the current approach or if there are changes to the term of debt).</p> <ul style="list-style-type: none"> <li>• We discuss this further in section 5.</li> </ul>
	<p>The debt averaging period must start no more than 16 months before the regulatory period, and finish no less than four months prior to the commencement of the regulatory period</p>	<p><b>Preferred position:</b> Change timing so the debt averaging period must start no more than 17 months before the regulatory period, and finish no less than five months prior to the commencement of a regulatory year.</p>	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
	<p>Included only pure debt instruments in the EICSI, excluding hybrids, working capital and bridging loans, any instrument with a term under 12 months, and any instrument not used to finance the RAB</p>	<p><b>Preferred position:</b> Included only pure debt instruments in the EICSI, excluding hybrids, working capital and bridging loans, any instrument with a term under 12 months, and any instrument not used to finance the RAB</p>	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – there needs to be consistency between the EICSI and how gearing is estimated, and between debt instruments that are included or excluded from the EICSI.</li> <li>• See the ENA submission.<sup>42</sup></li> </ul>

<sup>42</sup> ENA, *Debt parameters and network data: Debt parameters and network data*, 3 September 2021, section 4.

Working Paper	2018 Instrument position	Current AER Position	APGA position
	Used the EICSI purely as a cross-check for benchmark credit rating	<b>Preliminary position:</b> Implement the EICSI by adjusting the weights of A and BBB data to match network cost of debt over the past four years	<ul style="list-style-type: none"> <li>• <b>Disagree</b> – the EICSI does not directly measure the credit rating of the benchmark firm. Doing so directly is not a replicable benchmark.</li> <li>• This is consistent with advice from Lally.<sup>43</sup></li> <li>• As per the 2018 RORI, the EICSI could be used to inform the benchmark credit rating.</li> <li>• See discussion in section 5.</li> </ul>
	Instrument set out a number of contingencies to ensure that the formulaic application of the instrument could be applied in instances where all relevant debt data was not available	<b>Preferred position:</b> Continuation of 2018 approach	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
	Debt raising costs collected on the basis of historical criteria	<b>Preferred position:</b> Debt raising costs collected through a Debt RIN to be issued in 2021	<ul style="list-style-type: none"> <li>• <b>Agree</b> – it is important to update debt raising cost estimates from time to time.</li> </ul>

<sup>43</sup> Lally, *The Appropriate Term for the Allowed Cost of Capital*, 9 April 2021, pp.6,46–52.

Working Paper	2018 Instrument position	Current AER Position	APGA position
	Continued use of the RBA and Bloomberg data providers, while adding Thomson Reuters	<b>Preferred position:</b> Continued use of the RBA, Bloomberg and Thomson Reuters data providers.	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
		<b>Preliminary position:</b> Consider the merits of any additional debt data providers	<ul style="list-style-type: none"> <li>• <b>Agree</b> – at this stage, we are not aware of any other debt data providers of sufficient reliability.</li> </ul>
	Debt averaging periods must be between 10 days and a year in length and not overlap with each other.	<b>Preferred position:</b> Debt averaging periods must be between 10 days and a year in length and not overlap with each other	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
<b>Overall Rate of Return Omnibus</b>	Nominal vanilla WACC, estimated as a weighted average of the return on equity and return on debt	<b>Preferred position:</b> Nominal vanilla WACC, estimated as a weighted average of the return on equity and return on debt	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
	Place primary reliance on market value estimates and the continued use of existing observation periods when estimating gearing	<b>Preferred position:</b> Place primary reliance on market value estimates and the continued use of existing observation periods when estimating gearing	<ul style="list-style-type: none"> <li>• <b>Agree</b></li> </ul>
	In calculating gearing, hybrid securities excluded from Envestra and Spark Infrastructure, but included for AusNet services	<b>No position yet, seeking views:</b> Seek views on the inclusion of hybrid securities for gearing.	<ul style="list-style-type: none"> <li>• <b>Preliminary view</b> – consistency is important.</li> </ul>

Working Paper	2018 Instrument position	Current AER Position	APGA position
			<ul style="list-style-type: none"> <li>If hybrid securities are used to estimate gearing, then they also need to be used to inform the cost of debt. Failure to do so would mean that the allowed rate of return does not fairly compensate for the costs of those securities.</li> </ul>
	After reviewing data, consistency with previous use of 60 percent gearing	<b>Preliminary position:</b> Consider adjusting gearing to more closely align with market data	<ul style="list-style-type: none"> <li><b>Agree</b> – the market data suggests that gearing should be lower than 60%.</li> </ul>
	Distribution rate for imputation credits obtained through the use of ASX50 firms, utilisation rate from ABS wealth data	<b>Preferred position:</b> Distribution rate for imputation credits obtained through the use of ASX50 firms, utilisation rate from ABS wealth data, pending investigation of ATO data	<ul style="list-style-type: none"> <li><b>Partially agree</b> – subject to the outcome of the AER’s investigation.</li> <li>In principle, the ATO data should be superior as the ATO should have a good understanding of the amount of tax it collects. But we understand that the AER is still investigating.</li> </ul>
	Assume that non-resident investors assign no value to imputation credits	<b>Preliminary position:</b> Assume that foreign non-resident investors assign no value to imputation credits	<ul style="list-style-type: none"> <li><b>Agree</b></li> </ul>

Working Paper	2018 Instrument position	Current AER Position	APGA position
	<p>Cross checks have limitation but can provide contextual information. However they are not useful in informing the rate of return directly</p>	<p><b>No position yet, seeking views:</b> Seeking views on the use of cross checks</p>	<ul style="list-style-type: none"> <li>• <b>Strong view</b> – properly done, cross checks should provide more than just contextual information.</li> <li>• They should inform the AER’s exercise of judgement in an environment is sparse and relies on imprecise estimation.</li> <li>• We discuss the role of cross checks further in section 3.2.</li> </ul>

## Appendix B: Response to AER requests for feedback

This appendix sets out our responses to the requests for feedback included in the Overall Rate of Return Paper, Equity Omnibus Paper, and Debt Omnibus Paper. Our responses are not exhaustive, and we expect to engage on many of these topics throughout the 2022 RORI review process.

**Table B.1: Feedback on AER working papers**

Topic	Request	Response
<b>Equity omnibus – draft working paper</b>		
<b>DGM</b>	<i>Views on whether the AER’s estimate of the MRP be improved by employing dividend growth models</i>	<ul style="list-style-type: none"> <li>• Yes, dividend growth models can – and in our view should – be used to improve the MRP estimate. A view that we have held since 2013.</li> <li>• Using the DGM is the only way to get forward-looking information without making assumptions about whether the MRP or total market returns are constant over time.</li> <li>• The ENA approach to the DGM alleviates the AER’s historical concerns.</li> </ul>
<b>RBA paper on historical MRP</b>	<i>Views on whether the AER should consider this evidence</i>	<ul style="list-style-type: none"> <li>• This paper has limited value.</li> <li>• Even its author believes that the series that the AER already uses is better. See ENA submission for further detail.<sup>44</sup></li> </ul>
<b>Use of arithmetic and geometric means for MRP</b>	<i>Views on whether continuing previous approach is valid</i>	<ul style="list-style-type: none"> <li>• The previous approach is not valid.</li> <li>• ENA’s submission provides further evidence – in addition to that provided by the AER’s own consultants – which highlights why this error in approach should be abandoned.<sup>45</sup></li> </ul>
<b>Relationship between MRP and risk-free rate</b>	<i>Views on the potential for a relationship between the risk-free rate and MRP</i>	<ul style="list-style-type: none"> <li>• The relationship is most likely negative, as explained in ENA’s submission.<sup>46</sup></li> <li>• The AER should consider this relationship when developing the 2022 RORI.</li> </ul>

<sup>44</sup> ENA, *ENA response to equity omnibus paper*, 3 September 2021, section 4.

<sup>45</sup> ENA, *ENA response to equity omnibus paper*, 3 September 2021, section 4.

<sup>46</sup> ENA, *ENA response to equity omnibus paper*, 3 September 2021, section 3.



<b>Topic</b>	<b>Request</b>	<b>Response</b>
<b>Equity beta comparator set and estimation period</b>	<i>Views on whether the AER should change its equity beta methodology if it shifted to a five year single period CAPM</i>	<ul style="list-style-type: none"> <li>• The AER should change its beta estimation approach in any event.</li> <li>• The ENA submission provides further detail on this.<sup>47</sup></li> </ul>
<b>Equity beta for electricity vs gas networks</b>	<i>Views or evidence on whether a consistent equity beta should apply across both sectors</i>	<ul style="list-style-type: none"> <li>• Gas betas should be looked at in their own right, separately from electricity betas.</li> <li>• We discuss this further in section 4.4.</li> </ul>
<b>Averaging period</b>	<i>Views on the AER’s proposal to provide flexibility to nominate the averaging period and moving the period forward by a month</i>	<ul style="list-style-type: none"> <li>• Flexibility should be maintained.</li> <li>• There is no reason to force networks to align. This would in any case make no difference to variability experienced year to year.</li> </ul>
<b>Use of conditioning variables</b>	<i>Views on their use when setting the MRP and changing it during the RoRI</i>	<ul style="list-style-type: none"> <li>• The DGM is a better way to formally bring forward-looking information into the MRP than eyeballing some conditioning variations against some historical average.</li> <li>• Using conditioning variables and an ‘eyeball test’ is also not a valid cross check for the return on equity.</li> <li>• There is no reason to use conditioning variables to adjust the allowed rate of return in period – as the AER itself notes – and there are much simpler ways of doing this adjustment.</li> </ul>
<b>Cross checks</b>	<i>Views on improvements or changes that can be made to how cross checks are used</i>	<ul style="list-style-type: none"> <li>• Cross-checks should play an important role when developing the 2022 RORI.</li> <li>• Our views are provided in section 3.2.</li> </ul>
<b>Debt omnibus – working paper</b>		
<b>EICSI</b>	<i>Suggestions on adjustments to cost of debt approach if data shows current approach overstates actual costs</i>	<ul style="list-style-type: none"> <li>• The AER’s investigation needs to be conducted properly so that only genuine outperformance is picked up.</li> <li>• There is scope to adjust the allowed rate of return by applying a simple wedge to the index results.</li> </ul>

<sup>47</sup> ENA, *ENA response to equity omnibus paper*, 3 September 2021, section 6.

Topic	Request	Response
		<ul style="list-style-type: none"> <li>• See ENA's submission for further detail.<sup>48</sup></li> </ul>
<b>EICSI inclusion criteria</b>	<i>Views on whether inclusion criteria are appropriate</i>	<ul style="list-style-type: none"> <li>• Further thought is needed on the inclusion criteria.</li> <li>• The criteria remain unclear to us.</li> <li>• They also appear inconsistent with how other aspects of the overall rate of return framework, including as to the treatment of hybrid debt.<sup>49</sup></li> </ul>
<b>Weighted trailing average</b>	<i>Views on whether the NPV=0 condition is sufficiently satisfied for the simple trailing average approach, particularly in the case of large investment programs. If not, should a weighted average approach be adopted</i>	<ul style="list-style-type: none"> <li>• We are unclear of the merits of the weighted trailing average approach compared with the simple trailing average.</li> <li>• It may be that it better satisfies the NPV=0 condition, but it is also more complex.</li> <li>• We will further consider the AER's consideration of this alternative, including the design features such as weights and transitional arrangements.</li> </ul>
	<i>Views on how the weights in the weighted average return on debt might be estimated</i>	<ul style="list-style-type: none"> <li>• As above.</li> </ul>
	<i>Views on whether any transitional arrangement are likely to be required assuming different changes of approach, and what these might be</i>	<ul style="list-style-type: none"> <li>• As above.</li> </ul>
	<i>Feedback on the issues set out above, the potential solutions and if these are considered sufficiently material to warrant a change.</i>	<ul style="list-style-type: none"> <li>• As above.</li> </ul>
<b>Averaging period</b>	<i>Comment on the AER's preliminary position that the averaging period for the observation for a given year</i>	<ul style="list-style-type: none"> <li>• The AER's preliminary position is reasonable.</li> </ul>

<sup>48</sup> ENA, *Debt parameters and network data: Debt parameters and network data*, 3 September 2021, section 4.

<sup>49</sup> ENA, *Debt parameters and network data: Debt parameters and network data*, 3 September 2021, section 4.

Topic	Request	Response
	<i>should finish no later than 5 months prior to the start of that year</i>	
<b>Debt data providers</b>	<i>Comment on the continued appropriateness of the existing curves</i>	<ul style="list-style-type: none"> <li>• The existing curves are reasonable.</li> <li>• The third parties that publish those curves remain reputable.</li> <li>• We are not aware of any good reasons why any of the three curves should not be considered.</li> </ul>
	<i>Views on any alternative curves from different data providers that they consider might be used</i>	<ul style="list-style-type: none"> <li>• We know of no additional curves that could provide additional useful information.</li> </ul>
<b>Contingencies</b>	<i>Views on improvements or changes that could be implemented to return on debt contingencies</i>	<ul style="list-style-type: none"> <li>• The current contingencies are appropriate.</li> <li>• We are not aware of any good reasons to change them.</li> </ul>
<b>Overall rate of return – working paper</b>		
<b>WACC</b>	<i>Should a nominal vanilla WACC be used to estimate the allowed rate of return?</i>	<ul style="list-style-type: none"> <li>• Yes.</li> <li>• This is consistent with the AER's post-tax revenue model where tax is included as a separate building block.</li> <li>• Any change to the form of WACC used will require changes to how building block revenue is calculated.</li> </ul>
<b>Gearing</b>	<i>What is the appropriate approach for estimating gearing?</i>	<ul style="list-style-type: none"> <li>• Market values, as the AER does already.</li> <li>• However, the AER should average across the cycle to avoid volatility.</li> </ul>
	<i>What is the appropriate value for benchmark gearing?</i>	<ul style="list-style-type: none"> <li>• The market value, which appears to be 55% at present.</li> </ul>
	<i>What is the appropriate treatment of hybrid securities in the gearing estimation methodology?</i>	<ul style="list-style-type: none"> <li>• This should be consistent with treatment in the EICSI, as discussed above.</li> <li>• ENA's submission provides more detail on this point.<sup>50</sup></li> </ul>

<sup>50</sup> ENA, *Overall rate of return: Response to AER's Pathway to 2022 Rate of Return Instrument: Draft Overall Rate of Return Omnibus Working Paper*, 3 September 2021, section 5.3.

<b>Topic</b>	<b>Request</b>	<b>Response</b>
	<i>What is a suitable method for allocating hybrid securities between debt and equity?</i>	<ul style="list-style-type: none"> <li>• See ENA’s submission on this point.<sup>51</sup></li> </ul>
<b>Gearing / beta</b>	<i>To what extent should the treatment of hybrid securities in the gearing estimation methodology align with the estimation of equity beta?</i>	<ul style="list-style-type: none"> <li>• Hybrid securities should be included in the debt calculation. They should not influence beta estimation.</li> <li>• Adjusting beta for the impact of hybrid securities would be terribly imprecise and rely heavily on assumptions that would be hard for stakeholders to validate.</li> <li>• We are unclear how such adjustments could be made without undermining the resulting equity beta estimates.</li> </ul>
<b>Gamma</b>	<i>Should the data used to inform gamma in the 2018 Instrument continue to be used?</i>	<ul style="list-style-type: none"> <li>• Yes, but the AER should pay more attention to ATO data (see discussion below).</li> </ul>
	<i>Is the data in the ATO’s December 2018 note suitable for informing the utilisation rate?</i>	<ul style="list-style-type: none"> <li>• Yes, the ATO’s note is suitable for informing the utilisation rate.</li> <li>• In principle, the ATO should know how much tax is being paid (as that is its job).</li> <li>• We await the results of the AER’s investigation on this point.</li> </ul>
	<i>Should non-resident investors be assumed to derive no value from imputation credits?</i>	<ul style="list-style-type: none"> <li>• Yes, non-resident investors should be assumed to derive no value from imputation credits.</li> <li>• This is consistent with the reality that non-resident investors generally cannot use imputation credits to offset tax liabilities.</li> </ul>
<b>Cross checks</b>	<i>How can profitability measures be used as a possible cross check for informing the overall rate of return?</i>	<ul style="list-style-type: none"> <li>• Profitability measures cannot be used as a cross check for informing the overall rate of return.</li> <li>• Such measures can only be used to check whether realised returns aligned with those set using the prior RORI.</li> <li>• Whether this occurred or not is affected by factors unrelated to how the allowed</li> </ul>

<sup>51</sup> ENA, *Overall rate of return: Response to AER’s Pathway to 2022 Rate of Return Instrument: Draft Overall Rate of Return Omnibus Working Paper*, 3 September 2021, section 5.3.

Topic	Request	Response
		<p>rate of return was set (and whether it was reasonable), such as differences between allowed and actual expenditure.</p> <ul style="list-style-type: none"> <li>The purpose of the allowed rate of return is <i>not</i> to predict what actual returns will be. Rather it is to reflect an ex ante allowance for the return required by investors to invest.</li> </ul>
	<p><i>How can RAB multiples be used as a possible cross check for informing the overall rate of return?</i></p>	<ul style="list-style-type: none"> <li>RAB multiples should not play a substantive role as a cross check.</li> <li>A RAB multiple of one is theoretically incorrect.</li> <li>There is no guidance in theory or empirical literature as to what the right multiple should be.<sup>52</sup></li> <li>Similar to profitability measures, the values are largely of historical interest only.</li> </ul>
	<p><i>How can investment trends be used as a possible cross check to inform the overall rate of return?</i></p>	<ul style="list-style-type: none"> <li>Investment trends cannot be used as a cross check for informing the overall rate of return.</li> <li>Much like profitability measures, investment trends can only signal investment decisions made by energy networks in the past.</li> <li>That investment could be driven by many factors, including safety, that are unrelated to whether the allowed rate of return set using the prior RORI was appropriate.</li> </ul>
	<p><i>How can financeability metrics be used as a possible cross check to inform the overall rate of return?</i></p>	<ul style="list-style-type: none"> <li>Financeability metrics should play an important role when developing the 2022 RORI.</li> </ul>

<sup>52</sup> Some evidence from the US suggests a RAB multiple of 1.6. See: Ewens M, Peters RH and Wang S, *Acquisition Prices and the Measurement of Intangible Capital*, 2019, NBER Working Paper 25960. Available: <http://www.nber.org/papers/w25960>.

Topic	Request	Response
		<ul style="list-style-type: none"> <li>• Our July 2021 submission outlines our views on the role of financeability metrics.<sup>53</sup></li> <li>• Section 3.2 provides our views on cross-checks more generally.</li> </ul>
<b>Scenario testing</b>	<i>Can scenario testing be used to inform the overall rate of return?</i>	<ul style="list-style-type: none"> <li>• Yes, and indeed it should be used.</li> <li>• Scenario testing is a useful tool for assessing how the rate of return may change under different states of the world (e.g., high or low interest rates) for a given set of assumptions and methods.</li> <li>• For instance, scenario testing could be used to test alternative approaches to estimating the MRP, including whether it can update automatically (e.g., to changes in interest rates) when the RORI is applied for individual revenue resets.</li> <li>• Scenario testing should not be confused with cross-checks, which attempt to test the <i>outputs</i> from a given combination of assumptions, methods and inputs against alternative information.</li> </ul>

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<sup>53</sup> APGA, *APGA Submission to the AER: Draft working papers on term of the risk-free rate and the rate of return and cash flows in a low interest rate environment*, 2 July 2021, pp.10–12.

## Appendix C: Averaging historical excess returns

The Equity Omnibus Paper proposes to continue using both the arithmetic and geometric means of historical excess returns, and survey data, in the estimation of a forward looking MRP. This appendix explains why we consider this inappropriate and that only the arithmetic mean (or average) should be used.

### Our views in short

- **Arithmetic mean in, geometric mean out** | if the MRP is to be estimated from historical excess returns data, then the arithmetic mean of those data is the required estimate. There is no compounding, period by period, and so no case for using a geometric mean. Doing so would impart a downward bias to the estimate of the MRP that is unjustified.
- **Surveys out** | data are available for direct estimation of the MRP. There is no case for using the results of surveys in the process of estimation.

We elaborate on these below.

### Lack of foundation

Unfortunately, the Equity Omnibus Paper – like earlier discussions of MRP estimation – does not set out the economic assumptions made for estimating the forward looking MRP from historical excess returns and does not explain the statistical model that is being used.

Without specifying the statistical model, the reasons given for continued use of the geometric mean on page 4-24 of the working paper are without foundations.

### Getting to the bottom of bias

The December 2018 RORI Explanatory Statement noted that both arithmetic and geometric means were used because there were strengths and limitations with each.<sup>54</sup> The arithmetic mean was a mathematically unbiased estimator of future returns if yearly returns are independently and identically distributed, and future returns were expected to have the same distribution.

But there was – the Explanatory Statement continued – debate as to the independence of returns from year to year, and about the uniformity of the distribution over time, as shown by trends in the long-term data and raised in recent advice. It was therefore not clear that using solely the arithmetic average of historical excess returns would provide an unbiased estimate of future excess returns.

If, as might be the case in portfolio planning, returns are compounded over an extended period then – as Marshall Blume has argued – then the geometric mean is the better estimator of the compound growth rate to be applied over the period.<sup>55</sup> Using an arithmetic average of periodic (year by year) rates to estimate the rate of return over the extended period would impart an

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<sup>54</sup> AER, *Rate of return instrument explanatory statement*, December 2018, p.90.

<sup>55</sup> Marshall E. Blume, *Unbiased Estimators of Long-run Expected Rates of Return*, 1974, *Journal of the American Statistical Association*, 69(347), pp.634–638.

upward bias to the end-of period portfolio value. This bias imparted if the arithmetic mean is used is further examined by others.<sup>56</sup>

However, the issue of upward bias when estimating expected future portfolio value imparted by using the arithmetic mean of period-by-period rates of return is not the same as the issue of estimating the mean of a returns distribution using historical time series data. The upward bias imparted to a future portfolio value calculated using an arithmetic average of period-by-period rates of return is not the issue that arises when using historical excess returns to estimate the MRP. When estimating the MRP, there is no compounding of returns year by year over the period for which historical data are available.<sup>57</sup> Those historical data are used to estimate the mean of an assumed stationary excess returns distribution.

If the mean of the excess returns is constant, and if the terms of the time series of historical excess returns available for estimation are regarded as samples of size one drawn from identical and independent distributions with that constant mean and with constant variance, then the arithmetic mean of the historical excess returns provides a consistent estimate of the mean of the excess returns. As the number of terms in the historical excess return series becomes large, the arithmetic mean of that series converges in probability to the mean of the excess returns.

### **Independence of returns**

The efficient markets hypothesis has been advanced in support of the independence assumption in the preceding paragraph but – as was noted in the December 2018 RORI Explanatory Statement – the terms of the series of historical excess returns may not be independent.

*Even if* the terms of the series of historical excess return are serially correlated and provided the series is covariance stationary with absolutely summable autocovariances, then the mean of the distribution of excess returns can be estimated as the arithmetic mean of historical excess returns. As the number of terms in the historical excess return series becomes large, the arithmetic mean of that series converges in mean square to the mean of the excess returns.<sup>58</sup>

If historical excess returns are to be used, statistical theory points to the arithmetic mean of the series of those excess returns being the appropriate estimator for the MRP. The required estimator is not the geometric mean.

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<sup>56</sup> See, for example, Daniel C. Indro and Wayne Y. Lee, *Biases in Arithmetic and Geometric Averages as Estimates of Long-Run Expected Returns and Risk Premia*, 1997, *Financial Management*, 26(4): pp.81–90; Eric Jacquier, Alex Kane and Alan J Marcus, *Optimal Estimation of the Risk Premium for the Long Run and Asset Allocation: A Case of Compounded Estimation Risk*, 2005, *Journal of Financial Econometrics*, 3(1), pp.37–55.

<sup>57</sup> There may be compounding of the regulatory rate of return over the regulatory period, as discussed by Lally in a report for the AER but, again, this is not the issue using a time series of historical excess returns to estimate the MRP. See Martin Lally, *The Cost of Equity and the Market Risk Premium*, 25 July 2012. Lally concludes that there no compounding in regulatory situations, and the absence of a compounding effect leads to a preference for the arithmetic mean over the geometric mean.

<sup>58</sup> See James D Hamilton, *Time Series Analysis*, 1994, Princeton: Princeton University Press, chapter 7, for the relevant theorems.



Convergence of the arithmetic mean to the expected value, both where the terms of the time series are independent and where they are serially correlated, is essentially a “large sample” result. Ideally, a long series of historical excess returns should be used to estimate the MRP, and that has been the case. The extended Brailsford, Handley and Maheswaran data now comprises 138 annual observations. However, over a long period, there is a real risk that structural change in the economy introduces non-stationarity.

### **A look at the long term**

Referring to trends in the long-term data and recent advice, the December 2018 Explanatory Statement questioned the uniformity of the underlying distribution over time.

Indeed, the assumption of uniformity can be questioned and is akin to asking:

*Are the attitudes to risk underlying the risk premium today the same as attitudes to risk during the Great Depression, and afterwards, during the Second World War, or earlier, during the depression of the 1890s and subsequently, during the Great War (1914-18)?*

But, if the assumption of uniformity of the underlying distribution is drawn into question, then irrespective of whether an arithmetic or geometric mean is used, the using a long-term average of historical excess returns cannot provide any estimate of the MRP in the absence of an understanding of the changes which have taken place, and the reasons for those changes.

We are not aware of any research that provides those reasons and understanding and continue – as others have done – to hold the tenuous assumption that the series of long term historical excess returns is stationary and can be used for MRP estimation. This uncertainty, though, carries no implication that the geometric mean has some role to play in estimation. It does not. Its relevance is in the context of a very different ‘problem’.

### **The case for the arithmetic mean**

In these circumstances, we find that, in their seminal paper on the MRP published in 1985, Mehra and Prescott used the arithmetic mean of historical excess returns.<sup>59</sup>

The authors continued to use the arithmetic mean in their paper *The Equity Premium in Retrospect*, published in the Handbook of The Economics of Finance in 2003. Mehra and Prescott advised that the arithmetic mean is the correct statistic if one is interested in the mean value of excess returns.<sup>60</sup>

Jonathan Berk and Peter DeMarzo provide similar advice in their well-known textbook. They note that one way of estimating the MRP is as the historical average of the excess of returns on the market over the risk-free rate. However, they caution – because we are interested in the expected return – that the correct average to use is the arithmetic mean.<sup>61</sup>

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<sup>59</sup> Rajnish Mehra and Edward C Prescott, *The Equity Premium: A Puzzle*, 1985, Journal of Monetary Economics, 15: pp.145–161.

<sup>60</sup> Rajnish Mehra and Edward C Prescott, *The Equity Premium in Retrospect*, 2003, In George M Constantinides, Milton Harris, Rene M Stulz, *The Handbook of Economics and Finance*, Vol. 1B, Financial Markets and Asset Pricing, Elsevier: pp.889–938.

<sup>61</sup> Jonathan Berk and Peter DeMarzo, *Corporate Finance*, 2014, 3<sup>rd</sup> edition, Pearson: p.406.

### **The case against survey data**

The Equity Omnibus Paper advises that, in addition to using historical excess returns, survey data are to be used in estimation of a forward looking MRP.

We note that only one of the 14 surveys listed in Table 22 of the December 2018 Rate of return instrument Explanatory Statement was current at the time the Explanatory Statement was published, and there was little to indicate that either the results of this one survey, or the results of any of the other 13 listed in the table, might be relevant to the period of the Instrument (1 January 2019 to 31 December 2022).

The Explanatory Statement noted (at page 270) 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.*

We agree. In changing financial markets, out-of-date survey data are unlikely to provide useful information about investor expectations for up to five years in the future.

We have previously expressed reservations about the use of surveys for MRP estimation, and we continue to have doubts about their use in estimating a forward looking MRP for the 2022 RORI. At best, surveys reporting the MRP might provide information that could be used to cross check a proposed allowed return on equity.