Consultation paper

Rate of return guidelines

May 2013

AUSTRALIAN ENERGY REGULATOR

Request for submissions

Interested parties are invited to make written submissions to the Australian Energy Regulator (AER) regarding this paper by the close of business, 14 June 2013.

Submissions should be sent electronically to: rateofreturn@aer.gov.au

Alternatively, submissions can be sent to:

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

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

All non-confidential submissions will be placed on the AER's website at www.aer.gov.au. For further information regarding the AER's use and disclosure of information provided to it, see the ACCC/AER Information Policy, October 2008 available on the AER's website.

Enquires about this paper, or about lodging submissions, should be directed to the Network Regulation branch of the AER on (02) 6243 1233.

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1 Introduction

The Australian Energy Regulator is responsible for the economic regulation of electricity transmission and distribution network services in the national electricity market (NEM) as well as gas transmission and distribution network services ('network services'). Our 'Better Regulation' program is directed at delivering an improved regulatory framework focused on the long term interests of electricity and gas consumers. This follows from changes to the National Electricity Rules (NER) and National Gas Rules (NGR) (collectively the rules) that were published by the Australian Energy Market Commission (AEMC) on 29 November 2012. The AEMC's network rule change determination included new requirements relating to the framework for estimating of the rate of return on capital.

Our Better Regulation program involves the publication of several guidelines, including publication of rate of return guidelines (the guidelines) for the regulated electricity and gas transmission and distribution network service providers (the 'service providers'). We are required to publish the guidelines by 29 November 2013.

The guidelines will set out the approach we intend to take to determining the allowed rate of return in accordance with the National Electricity Law (NEL), the National Gas Law (NGL) (collectively, the law and rules).

This consultation paper is the second step in our development of the guidelines. The consultation paper is structured to promote discussion on:

- the elements of the new rate of return framework and our broad approach to meeting those requirements
- our preliminary positions on some of these elements, to the extent that preliminary positions have been formed
- the estimation methods, financial models, market data and other evidence that we should take into account when estimating the allowed rate of return
- the way in which we will take into account the estimation methods, financial models, market data or other evidence.

1.1 The Rate of Return framework

The return on capital often represents the largest component of the revenue determinations of service providers. A service provider should be provided with a reasonable opportunity to recover at least the efficient costs it incurs in providing regulated services and complying with a regulatory obligation or requirement or making a regulatory payment. The allowed rate of return allows service providers to obtain necessary funds from capital markets to fund capital investments and service the debt they incur in borrowing the funds. Therefore, the rate of return is a key element of the network charges that consumers pay.

After an extensive consultation process, the AEMC amended the rules to include new requirements relating to the framework for estimating the rate of return on capital. The previous frameworks for estimating the rate of return for electricity transmission, electricity distribution and gas service providers differed in a number of respects, in particular the extent of prescription in the rules and

whether the estimate was made at each determination or in a periodic review.[1] The AEMC was concerned that the regulator be better able to respond to changing financial market conditions and the availability of new evidence. In its final determination, the AEMC concluded that none of the previous rate of return frameworks were capable of best fulfilling the requirements of the National Electricity Objective (NEO), the National Gas Objective (NGO) and the Revenue and Pricing Principles (RPP). The AEMC considered that a new rate of return framework was therefore needed:[2]

The most important framework issue in energy regulation is the achievement of the national electricity and gas objectives, being in the case of electricity:

> promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to–
>
> a) price, quality, safety, reliability and security of supply of electricity and
>
> b) the reliability, safety, and security of the national electricity system.[3]

We consider that the NEO, NGO and the overall rate of return objective will be best achieved through the exercise of regulatory practices that:

- recognise the desirability of consistent approaches to regulation across industry, so as to promote economic efficiency
- promote incentives to finance efficiently
- promote reasoned, predictable and transparent decision making
- ensure that the net present value of revenues is sufficient to cover service providers' efficient expenditures (the 'NPV=0' condition)
- promote flexibility and adaptability, to allow the regulator to make decisions in changing circumstances, and to take account of a wider range of assessment methods and information in estimating the rate of return
- improve the regulatory determination process to allow the regulator adequate time for decision making, to enhance consumer engagement, and to increase transparency and accountability.

This is consistent with the AEMC's intent that the approach to assessing various methodologies for estimating the rate of return be driven by principles.[4]

Ensuring that the Net Present Value of revenues covers service providers'' efficient expenditure is central to economic regulation. Service providers should be compensated for efficiently incurred costs and for the return required by their investors. However, allowed revenue should not be set in manner that allows for over recovery of these costs and returns. This satisfies the NPV = 0 condition.

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1 The former frameworks refer to frameworks prior to issuance of AEMC's final determination published on 29 November 2012 which sets out the amendments that have been made to the NER and the NGR. The former frameworks are provided in Chapter 6A of the NER for electricity transmission, Chapter 6 of the NER for electricity distribution, and rule 87 of the NGR for gas service providers.

2 AEMC, *Final determination*, 29 November 2012, p. 42.

3 NEL, Section 7. For the National gas objective, see section 23 of the NGL.

4 AEMC, *Final determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rules 2012; National Gas Amendment (Price and Revenue Regulation of Gas Services) Rules 2012*, 29 November 2012, p.56.

Similarly, any changes in methodologies should ensure this principle holds over the life of the investment. Ensuring the NPV=0 condition is upheld is in the long term interest of consumers, and therefore satisfies the national gas and electricity objectives.

The ERA's consultation paper proposed that it is desirable for rate of return methods to lead to consistent regulatory decisions across industries, service providers and time. Similarly, the AER proposed that methods be 'supportive of broader regulatory aims' and be 'consistently applied across industries, service providers, regulators and time'.[5]

The desirability of achieving the specific aims of incentive regulation may be linked back to the efficiency requirements of Rules. For example, the revenue and pricing principles refer explicitly to the need to provide effective incentives to promote economic efficiency.[6]

A service provider should be provided with effective incentives in order to promote economic efficiency with respect to the regulated services that it provides. The economic efficiency that should be promoted in respect of electricity includes

- Efficient investment in a distribution or transmission system
- The efficient provision of electricity network services
- The efficient use of the distribution system or transmission system.[7]

Accordingly, the revenue and pricing principles (RPPs) are an important framework issue for assessing how the national electricity and gas objective and the rate of return objective interrelate. Everything we do in assessing the rate of return must be consistent with the national electricity and gas objective. This will more likely be achieved where we ensure that our decisions are consistent with the broad incentive regulation approach and good regulatory practice.

For example, it is important that the regulatory framework delivers incentives on the service providers that are comparable to the incentives faced by firms in the boarder economy, whether regulated or not.. Inconsistent incentives could lead to distortions between industries, which would diminish the achievement of economic efficiency.. To do otherwise would put at risk the long term interest of customers with respect to the security and reliability of electricity and gas supplies.

The ENA considers that transparency in the regulator's decision making is important.[8] We consider that transparency is consistent with sound regulatory practices.

The ENA also was concerned that earlier attempt to define regulatory transparency 'was ambiguous and could be interpreted as a suggestion that regulatory powers might be exercised for extraneous purposes', and that therefore this should be excluded.[9] We consider that the desirability of consistent approaches to regulation across industry is tied explicitly to the efficiency requirements of the national gas and electricity law and rules.

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5 Australian Energy Regulator 2012, *Better Regulation: Rate of Return Guidelines: Issues Paper*, December 2012, www.aer.gov.au/node/18859, p. 11.

6 NEL, Section 7A; for NGL, see section 24.

7 NEL, Section 7A. Similar provisions are included for the NGL, see section 24.

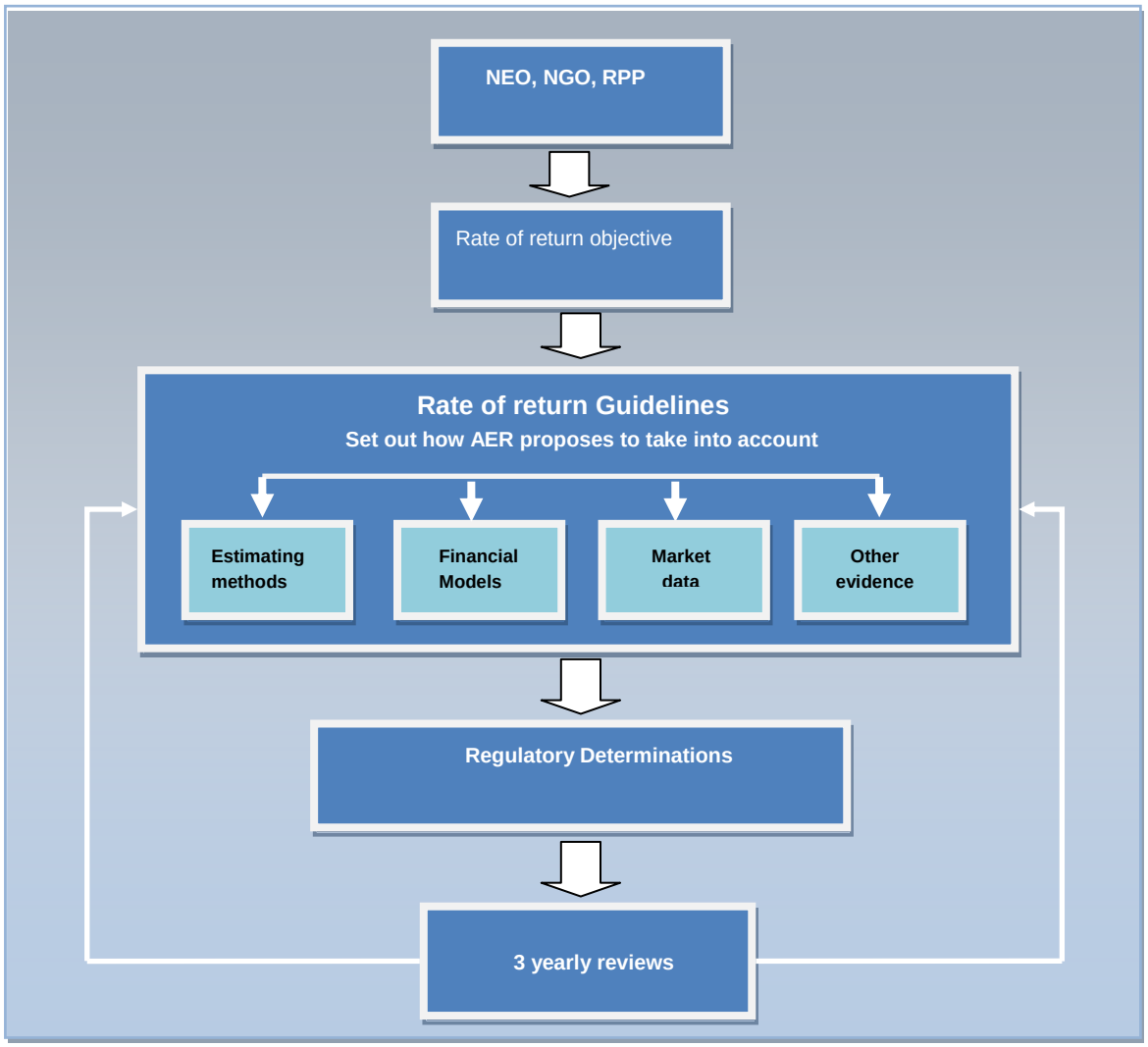
8 Energy Networks Association (ENA) submission to *AER Rate of Return Guidelines – Issues Paper,* February 2013,, p. 23. www.aer.gov. au (ENA submission to AER, February 2013).

9 ENA submission to AER, February 2013, pp. 11–12.

We also note the ENA's suggestion for the need to account for the effect on incentives to finance efficiently.[10] Again, it is important that the allowed rate of return be set such that is meets the national electricity and gas objectives.

Chart 1.1 illustrates the process for rate of return assessment consistent with the rate of return objective. This requires us to have regard to using the estimation methods, financial models, market data and other evidence as discussed in detail in the subsequent chapters of this paper.

Chart 1.1 Rate of return assessment framework



The NEO, the NGO and the RPP guide the rate of return objective. That rate of return objective is focussed on the rate of return required by a benchmark efficient service provider, with similar risk characteristics as the service provider subject to the decision, in its provision of regulated services. The return on capital is to be commensurate with the efficient financing costs of a benchmark efficient service provider. The new rules give us the flexibility to adopt the approach we consider most appropriate to estimate the rate of return with the ability to take into account a wider range of relevant estimation methods, financial models, market data and other evidence as well as considering inter-relationships between parameter values. This will enable us to determine the best estimate of the required rate of return at the time of each regulatory determination.

[10] ENA submission to AER, February 2013, pp. 11, 14–15, 31, 35.

The Rules require us to determine an allowed rate of return that achieves the allowed rate of return objective at the time we make a revenue or access arrangement determination. The allowed rate of return for a regulatory year must be a weighted average of the return on equity for the regulatory control period in which that regulatory year occurs and the return on debt for that regulatory year.[11]

The Rules also require that we have regard to estimation methods, financial models, market data and other evidence relevant to the assessment of the rate of return on capital.[12] This aspect of the new rate of return framework incorporates a greater degree of regulatory judgement than did the previous framework. The AEMC's considerations and final determination were quite clear on this and we believe that this view is widely acknowledged and accepted amongst all stakeholders.[13] This is different to the previous regime which minimised scope for regulatory judgement. As part of the framework, the AEMC has not included any preferred methods for estimating components of the rate of return. Instead the AEMC has provided high-level principles to guide the estimation and left to us the judgement as to the best approach consistent with achieving the overall allowed rate of return objective.[14]

Accordingly, we expect to be adopting a less formulaic approach than we did in past determinations under the previous rules. We will be assessing a broader range of estimation methods, financial models, market data and other evidence to assist us in meeting our obligations under the new rules. This will involve the use of regulatory judgement in what information we will use and how we will use it. To assist us in this assessment process and to provide other stakeholders with greater transparency around this, we are proposing a set of criteria which we will apply in making judgements and decisions about the estimation methods, financial models, market data and other evidence. This discussed in chapter 2.

In our view the changes provide a fresh impetus to focus on the overall objective of making decisions that are in the long-term interests of consumers. In essence this requires the regulatory process to look not only at the short term impact of proposals but also how these will affect price and service outcomes for customers over a longer period, even beyond the five year regulatory period. It is important to keep this longer term perspective in mind when considering improvements to our regulatory approaches. This is a key part of our aim to ensure that consumers pay no more than necessary for a safe and reliable supply of gas and electricity. In keeping with the overall objectives of incentive regulation, the overall rate of return should provide service providers effective incentives to promote economic efficiency with respect to services they provide.

1.2 The rate of return guidelines (the guidelines)

The new Rules require us to develop rate of return guidelines that set out the approach we intend to take to determining the allowed rate of return for both electricity and gas service providers. We intend for the final guidelines to include sufficient detail to allow a service provider or other stakeholders to make a reasonably good estimate of the rate of return that would be determined by us if the guidelines were applied to a determination for a particular business at any given time.

The AEMC specifically stated that the guideline would be non-binding on us in determining the required rate of return or on service providers in proposing their required rate of return as part of their revenue proposals.[15] However, we would nonetheless expect as part of each revenue or access

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11 NER, cl. 6.5.2(d) and cl. 6A.6.2(d); NGR, r. 87(5).
12 AEMC, *Final determination*, 29 November 2012, pp. iii, 3, 8,18,4 3, 48.
13 AEMC, *Final determination*, 29 November 2012, p 67.
14 AEMC, *Final determination*, 29 November 2012, pp 67–71.
15 AEMC, *Final determination*, 29 November 2012, pp 58, 71.

determination, to consider the application of the guidelines in the context of the specific circumstances of the service providers' proposals. Stakeholders can expect that, consistent with the AEMC's stated intention and the rules, we will apply the guidelines at each determination and make our decisions in relation to the rate of return in accordance with the guidelines unless sufficient reasons exist to warrant departure[16]. While there is no persuasive evidence requirement as there was under the previous rules, the current rules still require reasons for departure. Should we decide to depart from the guideline we would provide reasons for doing so. Equally while it is open to the service providers to move away from the guideline within their specific revenue proposal, the rules require that they provide reasoning for a proposal to depart from the approach set out in the guidelines.[17]

We are required to complete and publish the guidelines by 29 November 2013.[18] Once completed, we intend to apply the Guidelines to the next round of regulatory determinations expected to be submitted to us in 2014.

Consistent with the requirements of the rules, we will review the guidelines at intervals not exceeding three years, with the first interval starting from the date the first Guidelines are published. In our view subsequent guidelines would likely involve incremental changes in approach and involve consultation on proposed amendments..

1.3 Consultation process

Important to our success in developing the guidelines will be to hear from all stakeholders on the matters that are important to them. In developing the guidelines we are undertaking a comprehensive consultation process to provide stakeholders with multiple opportunities to raise, address and debate matters relating to the return on capital. We expect this process will enable service providers and other stakeholders to have had considerable input to the development of our assessment methods as part of consultation on the guidelines over 2013.

A comprehensive consultation process will also hopefully reduce the likelihood of an early departure from the guidelines and may minimise the scope for extensive review of the proposed approach at each revenue or access arrangement determination. An effective guideline would provide a consistent framework for rate of return proposals to be made and justified by service providers, to be understood by other stakeholders and within which we assess, make and justify decisions on the proposals. This should provide stakeholders with greater certainty as to how we will assess rate of return requirements at each determination. A brief update on the consultation process so far undertaken is given below:

- On 18 December 2012, we released an Issues Paper. This paper raised and sought comment of a broad range of issues at a high level with no firm positions taken by us.
- On 5 February 2013, we hosted a forum on the development of the guidelines. A range of stakeholders including representatives of regulated energy businesses, energy users, state regulatory authorities, government statutory authorities and investors in regulated utilities participated in this forum.

  At the forum we sought high level views from participants on key matters. Forum participants discussed issues set out in our Issues Paper. Stakeholders sought clarification on how we would

[16] NER, cl. 6.2.8(c) and cl. 6A.6.2(c); NGR, r.87(13).
[17] NGR, r. 87(18); AEMC, *Final rule determination*, 29 November 2012, pp. 28, 40.
[18] NGR, r. 87(18).

apply the principles set out in its issues paper and explain how these principles related to the NEO, NGO and RPP.[19]

- On 25 and 26 February 2013 we hosted two sub-groups workshops on i) the overall rate of return and cost of equity ii) the cost of debt. Again a range of stakeholders attended these workshops and discussed the key issues relating to development of guidelines including the role of the principles, the nature of the benchmark efficient entity, the use of financial models and approaches for estimating the cost of equity and cost of debt.
- In addition, we have held a number of bilateral meetings with the QTC, TCorp, IPART, APIA, Consumer Reference Group, EUAA, ENA, Merrill Lynch, Moody's and Goldman Sachs.
- We have published notes on key aspects of the discussions we had at the public forums. These can be found on our website at http://www.aer.gov.au/node/18859.

A key element of our consultation over the coming months will be the use of working groups and other targeted forums. This will allow stakeholders the opportunity to provide more detailed input on specific aspects of the rate of return. Together with written submissions on this consultation paper we will use this dialogue to complete our draft of the guidelines by August. We would expect that the draft guidelines will communicate our draft position on all key issues. Table 1-1 sets out our proposed consultation timeframes for developing the guidelines.

Table 1–1 Rate of return guidelines development timeframes

Date	Milestone
18 December 2012	Publish issues paper
5 February 2013	Workshop on issues paper
15 February 2013	Submissions on issues paper received
25 & 26 February 2013	Workshops with stakeholders on cost of equity and cost of debt
Late April / early May 2013	Publish consultation paper
May 2013	Workshop on consultation paper
June 2013	Submissions on consultation paper received
9 August 2013	Publish draft Guidelines
August 2013	Workshop on draft Guidelines
Mid September 2013	Submissions on draft Guidelines received
29 November 2013	Publish final Guidelines

[19] A summary of the AER forum held on 5 February 2013 can be found at http://www.aer.gov.au/node/18859.

2 Application of our criteria for assessing rate of return proposals

The law and the rules relevant to the allowed rate of return assessment and the rate of return guidelines development are outlined in appendix B.

This chapter discusses our understanding of what is meant by the terms "estimation methods, financial models, market data and other evidence" and how they may be taken into account in setting the required rate of return. We set out some criteria that we will use to assess the merits of this information and develop the guideline.

2.1 Background

The AEMC considered that the estimation of the rate of return could be improved by permitting us to take account of a broad range of information. The AEMC specifically did not include in the new rules any preferred methods for determining a rate of return but instead has left the judgement as to the best approach to us consistent with achieving the rate of return objective. The new rules specify that we have regard to relevant estimation methods, financial models, market data and other evidence relevant to the assessment of the rate of return on capital.[20] This aspect of the new rate of return framework incorporates a greater degree of regulatory judgement than did the previous framework. The AEMC's considerations and final determination were quite clear on this. Moreover, the AEMC did not include any preferred methods for estimating components of the rate of return. Instead the AEMC has provided high-level principles to guide the estimation.[21]

> Estimating the rate of return ultimately requires a regulator to exercise judgement about the analytical techniques and evidence to use to make an estimate that is commensurate with efficient financing costs. The new framework does not prescribe methodologies or lock-in specific benchmark characteristics other than providing high-level principles that should be taken into account when estimating various components, such as return on equity and debt. While the judgement as to the best approach is left to the regulator, the preferred methods must be developed to meet the overall allowed rate of objective.

The AEMC considered that rate of return decisions should be principles based[22]. In our Issues Paper we proposed a set of 'principles' that we considered would be used to inform our decisions on the information we would have regard to in achieving the rate of return objective. This was the subject of further discussion at the public forums where stakeholders sought clarity on the principles and how we proposed to use them.

2.2 Summary of submissions

Submissions

The responses to our issues paper and subsequent discussions at the public forums have been considered in developing a set of criteria that we propose to use to guide the exercise of our judgement.[23]

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20 AEMC, *Final rule determination*, 29 November 2012, pp. iii, 3, 8, 18, 43, 48.
21 AEMC, *Final rule determination*, 29 November 2012, p. 38.
22 AEMC, *Final rule determination*, 29 November 2012, pp. iv–v, 27, 38, 42.
23 In the issues paper, we used the term 'principles' instead of 'criteria'. We consider that 'principles' are the fundamental truths that serve as the foundation for laws, systems or reasoning, whereas 'criteria' are the principles or standards by which judgments or decisions can be made (principles are broader then criteria and sit below in the decision hierarchy).

Stakeholders have generally supported our proposed principles based approach to the rate of return guidelines. The ENA, APIA, QTC and PIAC were all in favour of us using principles to guide our assessment of the overall rate of return. There was agreement that all principles should refer back to the NEO, NGO, RPPs and the Rules. Some stakeholders proposed slight amendments to the principles and thought that the outcomes from their application would lead to predicable and consistent decisions. The MEU and PIAC saw this as particularly important.

However, the ENA considered that the list of principles should be shorter and that the list would be better described as a series of "considerations" for the AER's decision making processes rather than principles.[24] The MEU submitted that the principles proposed by us in the Issues Paper are laudable goals but they must not be used to close off issues that will assist in ensuring the outcomes will be demonstrably efficient. They considered that the principles must be used to deliver efficient outcomes that are in the long term interests of consumers.[25]

The businesses including the NSW DNSPs have endorsed the revised set of considerations proposed by the ENA in its submission and would prefer a framework which they contend provides a reasonable degree of predictability in relation to how the rate of return will be calculated, and also provides for a reasonable degree of predictability around rate of return outcomes.

The EUAA submitted that they have a preference for stable prices, just as they expect investors in network service providers have a preference for predictable returns. But regulatory determinations of the allowed rates of return that deviate substantially from the cost of capital are not acceptable to users, even if they are "certain", stable or predictable. EUAA submitted that the current arrangements for the determination of WACC place great importance on stability. But it has delivered returns that are a significant premium to the opportunity cost of capital. The AER should have regard to the level of the WACC determined by other economic regulators and regulators in other countries.

The PIAC acknowledged the importance of setting out principles in the rate of return guidelines. However, PIAC raised concerns that the principles set out in the Issues Paper appear to be more focussed on the quality of the inputs rather than the validity of the outputs and their relevance to the prime objective of the long-term interests of consumers. PIAC is of the view that the allowed rate of return objective should be clearly stated as the first principle for the AER to consider in selecting estimation methods, economic models, market data and other evidence for calculating the allowed rate of return.[26]

The APIA in its submission on the rate of return issues paper has supported our use of regulatory judgement.[27] In APIA's view, the use of regulatory judgement is a two stage process. First, the regulator must apply understanding, perspective and insight to the evidence before it with logic and reasoning. Second, a decision must be reached and explained in a logical, clear and transparent manner. Throughout the process of exercising judgement, the regulator must be mindful of consistency.

Stakeholders feedback

On the 5 February public forum stakeholders also discussed our Issues Paper. Stakeholders sought clarification on how we would apply the principles set out in our Issues Paper and considered that it

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24 ENA, *Submission to the AER's issues paper - rate of return guidelines*, February 2013.
25 PIAC, *Submission to the AER's issues paper - rate of return guidelines*, 15 February 2013.
26 PIAC, *Submission to the AER's issues paper - rate of return guidelines*, 15 February 2013.
27 APIA, *Submission to the AER*, February 2013.

was necessary to better explain how the principles in the Issues Paper related to the NEO, NGO and RPP.

Consumer representatives were of the view that the principles must focus on the long term interests of consumers, as this was the paramount consideration under the NEO and NGO. Network service providers were of the view that it was important to clarify any principles that we might apply in undertaking our task. Energy user and consumer representatives considered that the principles should support outcomes—efficient costs and protection of the long term interests of consumers.

Most attendees expressed a view that we should look at a full spectrum of information, including financial models, other rate of return estimates and investors' views of the market. Further, most attendees supported our use of regulatory judgment when deciding how to weigh the various approaches or methodologies when setting the rate of return. It was considered important that we explain our reasoning for adopting a particular approach.

On the 25 and 26 February workshop there was general agreement that a principles based approach is appropriate. Stakeholders were generally supportive of the principles outlined in the Issues Paper, however, NSP's considered that they could be shortened and made more precise. NSP's also suggested that they might be called "considerations" rather than principles. Additionally, they questioned the need for the 'supportive of broader regulatory aims' principle. Energy user representatives sought explicit reference to the NEO and NGO in the principles..

Network service providers were of the view that there should not be one primary model for determining the return on equity. The 'stepped approach' outlined in submissions by the network industry associations were discussed in greater detail. They acknowledged the requirement for us to use regulatory judgement at all stages of this approach. This includes using judgment to determine the set of relevant information, estimating the parameter inputs and return on equity outcomes from various models, and the weighting of relevant information. Network representatives however highlighted the importance of transparency and detailed reasoning associated with the application of regulatory judgement. There was some discussion that the guideline should provide a worked example of how the AER would use its regulatory judgment.

2.3 Estimation methods, financial models, market data and other evidence

The new rules require us to set out in the guidelines:

- the methodologies it proposes to use and proposes to take into account[28]
- the estimation methods, financial models, market data and other evidence it proposes to take into account.[29]

In a determination, we must have regard to relevant estimation methods, financial models, market data and other evidence.[30]

Our preliminary understanding of what these terms mean and how we may use them in determinations is outlined below and we seek stakeholders' views on how to interpret each of these phrases.

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[28] NER, clause 6.5.2(n)(1).
[29] NER, clause 6.5.2(n)(2).
[30] NER, clause 6.5.2(e)(1).

Financial models

We consider financial models to mean an abstract representation of a financial decision-making situation. Examples of financial models include the Sharpe–Lintner CAPM, the Black CAPM, the Fama–French model and dividend growth models. These models are discussed in greater detail in appendix E.

We will use financial models to estimate both the return on equity and the return on debt. We may also use one financial model to estimate parameters within another financial model. An example might be using a dividend growth model to estimate the MRP within the Sharpe–Lintner CAPM.

The strength of financial models is that they provide a consistent and coherent framework for considering the rate of return or its components. We expect that financial models will continue to play a central role in the determination of the rate of return. Our past use of the Sharpe–Lintner CAPM has rested upon its sound theoretical foundations and strong degree of acceptance and use in practice, not just by regulators in Australia and overseas but by capital market participants more generally.[31]

Estimation methods

We consider estimation methods to mean some process or procedure used to compute an estimate of a parameter within a model or a component of the rate of return.

An example of an estimation method includes the method we have previously used to estimate the risk free rate. To do so we have averaged the observed yield on 10 year Commonwealth Government Securities over a defined period. Another example is the use of estimates of the long run average MRP as a proxy for the current MRP in CAPM estimates of the return on equity.

We will use estimation methods to determine parameters, numbers or any other inputs to the rate of return where a financial model is not applicable, or to support a financial model.

Market data

We consider market data to be:

- data on prices, maturity and terms and conditions of government and non-government bonds, financial derivatives, currencies, and other financial instruments
- data on equity prices and ratios such as price earnings ratios and RAB multiples
- data on financial structures such as a gearing levels and credit ratings.

An example of market data is the data we have used in the past to determine the risk free rate. This estimation method (discussed above) uses data on the observed yield on 10 year Commonwealth Government Securities. Another example of market data is data on corporate bond yields that can be used to estimate the return on debt directly or cross-check estimates of the return on debt derived from other sources such as the Bloomberg fair value curves.

As outlined above the new rules require us to also consider market data beside other information so that the best estimate of the rate of return can be obtained overall that achieves the allowed rate of

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[31] See, for example, Grant Samuel, *Financial Services Guide and Independent Expert's Report in relation to the takeover offer by Pipeline Partners Australia Pty Limited - Appendix 2: Selection of discount rate*, 3 August 2012, p. 1.

return objective. We may use market data as an input to estimation methods or financial models or as an alternative estimate and cross check of the output of those methods and models.

Other evidence

We consider other evidence to mean any other evidence we consider relevant to the rate of return. Examples might include broker reports, expert's reports or feedback from market participants and stakeholders.

We will use other evidence at any point in the estimation of the rate of return, where we consider it will contribute to meeting the rate of return objective. This may include as a cross-check on the overall WACC or return on equity estimates, or as a consideration when estimating a particular parameter.

The criteria listed at section 2.4 provide a framework for assessing the relevance and quality of the financial models, estimation methods, market data and other evidence.

2.4 Our assessment criteria for the application of regulatory judgement

Principles or criteria?

'Principles' are the fundamental truths that serve as the foundation for laws, systems or reasoning, whereas 'criteria' are the principles or standards by which judgments or decisions can be made. Principles are broader than criteria and sit below in the decision hierarchy.[32]

It is worth noting in this context that the AEMC set out in its Final Decision that principles are an important driver in the new arrangements, informing the exercise of judgment and achievement of best practice:[33]

One of the criteria the Commission has applied to determine the best framework for the NER and the NGR includes allowing methodologies for parameters to be driven by principles and to reflect current best practice.

Whilst principles can be seen as broader than criteria, the use of the term criteria supports our intent that the criteria are separate and subordinate to the laws, principles and rules set out in the National Gas Law (NGL) and the NGR, including the over-riding National Gas Objective.

We do not consider that the term 'considerations' (as suggested by the ENA) is appropriate, as the term is defined either in relation to 'careful thought' or to a 'fact or motive' that is taken into account.[34] These elements do not fully describe what is intended. Raising the status to 'criteria' will accord more importance, and provide greater certainty for stakeholders as to the framework that will be used to inform the exercise of regulatory judgment for the overall rate of return.

On balance, the term criteria is used as it: is closely related but sufficiently different to the term principle; clearly captures the intent (see below); and creates a clear separation from the superior requirements of the NGL and NGR. Accordingly, we use the term 'criteria' henceforth

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32 See for example, oxforddictionaries.com/definition/english/criterion.

33 Australian Energy Market Commission 2012, *Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012 National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, www.aemc.gov.au, p. 56.

34 See for example, oxforddictionaries.com/definition/english/consideration

We consider the requirements of the rate of return objective and the rate of return provisions in the rules to be quite broad. The factors which we are required to have regard to are not necessarily prescriptive of particular outcomes[35]. Rather they set out the matters that we are required to take into account under the law and the rules when making a determination.

It is feasible that various estimation methods, financial models, market data and other evidence may meet some, but not all, of the specific requirements of the new rate of return provisions. To this end, potential approaches may address the rate of return provisions well in some areas, and less well in other others.

Taking into account stakeholder submissions and feedback\, we are proposing to use a defined set of criteria in making judgements about the estimation methods, economic models, market data and other evidence we will take into account in determining the allowed rate of return.

These criteria are not intended to supplant the new rules. Rather, we consider that these criteria are subordinate to the laws, principles and rules set out in the NEL, NGL, NER and NGR. We consider these criteria are consistent with the law and rules. They also help us frame how we ensure that regulatory outcomes meet the national gas and electricity objectives. We consider that these criteria will provide stakeholders with greater certainty, and indeed provide a framework, as to how we intend to exercise our regulatory judgment in respect of this information, while allowing flexibility and adaptability for us to make decisions in changing circumstances.

We will use these criteria to assess whether information and data presented to us is appropriate and relevant for making decisions on the rate of return. We will use the criteria to give weight to data that is deemed relevant for estimating the allowed rate of return and ensure that we are meeting the national electricity objective. Data and other evidence that meets only some of the criteria may be given less weight or have no weight placed on it. The criteria will therefore help us to make regulatory judgements in respect of meeting the rate of return objective.

It is important to remember that different models, financial methods and information have different purposes. It is therefore paramount to determine what those purposes are before deciding if such information should be used to set a rate of return for regulated service providers. For example, takeover reports are produced by entities to asses if a takeover offer is fair and reasonable. Valuation agents produce a cost of capital to discount revenues into perpetuity. Further examples might be brokers' reports. A typical broker’s report is unlikely to be useful at the parameter level—that is not its purpose—but it may be useful in regard to the return on equity. Considering such information at the return on equity level would require us to interpret the information having regard to the purpose for which it was compiled and whether the information generated was useful for establishing a regulatory rate of return for service providers. Put simply, the purpose will determine what role the information will play and how we will use it.

We intend to use the criteria to set out in the guideline the estimation methods, financial models, market data and other evidence relevant to establishing the allowed rate of return.

However, at the time of an individual service provider's determination, the criteria will also be used by us to assess any information provided by that service provider that supports or departs from the methods, financial models, market data and other evidence established in the guideline. The criteria are:

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[35] NER, clause 6.5.2(e), (g), (i), (k), (l) and clause 6A.6.2(e), (g), (i), (k), (l); NGR, r. 87(5), (7), (9), (10), (11), (12).

The allowed rate of return objective may be best met if the proposed rate of return methodologies are:

- where applicable, reflective of economic and finance principles and market information
    - estimation methods and financial models are consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data;
- fit for purpose;
    - use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose;
    - promote simple over complex approaches where appropriate;
- implemented in accordance with good practice;
    - supported by robust, transparent and replicable analysis that is derived from available, credible datasets;
- where models of the return on equity and debt are used these are;
    - based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation
    - based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale;
- where market data and other information is used, this information is
    - credible and verifiable
    - comparable and timely
    - clearly sourced
- sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.

3 Overall rate of return

This chapter focuses on the determination of the rate of return using the nominal vanilla WACC formula. This includes a discussion on the continued role of reasonableness checks on the overall rate of return.

Further, this chapter considers the use of point estimates and ranges for the determination of the return on equity and the return on debt, as well as for the determination of individual parameter estimates. A particular focus is the varying degree of regulatory judgment at each stage of the estimation process, including the use of quantitative and qualitative weighting of estimation methods, financial models, market data and other evidence.

The term of the WACC is also discussed in this chapter, but specific return on equity and return on debt issues are included in chapters five and six respectively. Similarly, the consideration of specific reasonableness checks on the overall rate of return is included in appendix D.

3.1 Background

The rate of return has historically been determined using the nominal vanilla WACC formula. Our implementation of this formula included the determination of point estimates of the return on equity, the return on debt, and the gearing ratio. Similarly, point estimates of the return on equity and return on debt have historically been determined based on point estimates of individual parameters.

In previous decisions, our estimate of the rate of return has also been assessed using overall reasonableness checks. The role of these checks was as a prompt for us to re–examine our approach to estimating the returns on debt and equity, and the gearing ratio. Notwithstanding this, these checks typically affirmed the reasonableness of our allowed rate of return.

The key consideration under the current rules is that the final approach contributes to a rate of return that is commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of regulated services. This broad focus provides the opportunity for consideration of a wider variety of options for estimating the rate of return, including the use of ranges and a different role for the measures previously used as overall reasonableness checks. At the same time, it provides the opportunity to maintain elements of the approach we have adopted in previous decisions where there are good reasons for doing so.

3.2 Propositions for stakeholder consultation

In this chapter we set out the following propositions for consultation:

- We will continue to determine the rate of return based on the WACC formula and point estimates of the return on equity, return on debt and gearing ratio. As a result, there will not be a range from which to choose an overall rate of return point estimate (section 3.5.1).
- We will continue to use reasonableness checks on the overall rate of return. The results from these checks may prompt us to re–examine our approach to estimating the return on equity, return on debt, and/or gearing ratio where they indicate a potential concern with the reasonableness of the overall rate of return (section 3.5.2).

- We will continue to set the return on equity for the duration of the regulatory period with no adjustments (annual or ad hoc) within the regulatory period (section 3.7.2).[36]

3.3 Summary of stakeholder submissions

We received submissions on the overall rate of return from service providers, industry associations and consumer groups. In the context of the overall rate of return, submissions focused on:

- whether to continue with the current nominal vanilla WACC formula, and
- the use of reasonableness checks on the overall rate of return.

Whether to continue with the nominal vanilla WACC formula

Stakeholders generally supported the continued application of the nominal vanilla WACC.

A number of individual service providers directly supported the continued use of a nominal vanilla WACC.[37] No submissions proposed alternative WACC constructions.

Use of reasonableness checks on the overall rate of return

Stakeholders submitted a wide range of views on the use of overall rate of return reasonableness checks. These included:

- Some stakeholders submitted that reasonableness checks should apply to the overall rate of return, but recommended ways in which these checks should factor into decision making. For example:
  - The MEU, Uniting Care Australia, the PIAC and the Grattan Institute supported benchmarking and the use of 'reality checks' on the overall rate of return.[38] The MEU and Uniting Care Australia also suggested additional checks.[39] However, the PIAC also questioned whether the Australian Competition Tribunal's 'standard of proof' would accommodate high-level benchmarking.[40]

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[36] We are yet to form a view on intra–period updates for the return on debt. As discussed in section 3.7.1, we seek stakeholders' views on how considerations around annual updating and implementation can be balanced. Chapter six and appendix G discuss these issues in greater detail.

[37] Queensland Treasury Corporation, *Rate of return guidelines issues paper: Submission to the Australian Energy Regulator*, February 2013, pp. 10–11; Jemena, *Rate of return guidelines—Issues paper: Submission from Jemena Limited to the Australian Energy Regulator*, February 2013, p. 24; Ergon Energy Corporation Limited, *Submission on the rate of return guidelines issues paper*, February 2013, p. 7; Energex, *AER rate of return guidelines issues paper—Energex submission*, February 2013, p. 9; Citipower, Powercor Australia and South Australia Power Networks, *Submission to the AER*, February 2013, p. 10.

[38] Major Energy Users, *Australian Energy Regulator better regulation rate of return guidelines—Comments on the issues paper*, February 2013, pp. 32-33; UnitingCare Australia, *Submission in response to the Australian Energy Regulator better regulation rate of return guideline issues paper*, February 2013, p. 9; Public Interest Advocacy Centre, *Better returns for consumers: PIAC submission to the AER's Issues paper—Rate of return guidelines*, February 2013, pp. 23-24; Grattan Institute, *Rate of return issues paper—Submission by the Grattan Institute*, February 2013, p. 3.

[39] These included a comparison of allowed rates of return against observed market rates of return, and a comparison of service providers' actual rates of return over time against the allowed rates of return. UnitingCare Australia, *Submission in response to the Australian Energy Regulator better regulation rate of return guideline issues paper*, February 2013, p. 9.

[40] Specifically, the PIAC highlight the Tribunal's 'very demanding' standard for market data and query whether high-level market observations would meet this standard. Public Interest Advocacy Centre, *Better returns for consumers: PIAC submission to the AER's Issues paper—Rate of return guidelines*, February 2013, pp. 23-24.

- The ENA, Jemena and Envestra submitted that overall rate of return considerations should apply at the overall decision making level, rather than to parameters in isolation.[41] The ENA and Envestra further submitted that overall rate of return considerations should not apply as 'absolute' criteria capable of being met or failed, nor as a 'score sheet' of discrete considerations.

- In contrast, some stakeholders submitted that reasonableness checks should apply at the parameter level, or to the returns on debt and equity, but not to the overall rate of return. In particular:

  - Queensland Treasury Corp (QTC) submitted that provided the best estimate of individual WACC parameters has been made, there should be no need to make a subsequent adjustment to the weighted average of these estimates.[42] As an example, the QTC proposed that the overall rate of return should be checked using the margin between the return on equity and return on debt.

  - Citipower, Powercor and SA Power Network's, and Energex submitted that market evidence could be used in the estimation of the return on equity, return on debt and gearing ratio.[43] They further submitted that they were not aware of evidence which could be used to assess the overall rate of return or to make adjustments to it.

- The APIA submitted that there are 'significant problems with obtaining top down WACC estimates, both in terms of relevance and quality'.[44] They highlighted problems with the individual reasonableness checks raised in the issues paper, and suggested that these checks would have to be converted to apply to the return on debt and return on equity.

- The EUAA, United Energy and Multinet all recommended the use of international data or international comparisons to estimate the rate of return.[45]

3.4 Nominal post tax framework

The rules prescribe that we must use a nominal post-tax framework to determine building block revenues.[46] Therefore, consideration of alternatives (such as a real pre-tax or real post-tax framework) is outside the scope of this guideline.[47]

A nominal framework means that the building block revenue forecasts include estimates of expected inflation. This means that we estimate the revenue allowance in nominal dollar terms. In particular, when calculating the rate of return on capital building block we index the regulatory asset base each year by expected inflation. We multiply this by a nominal rate of return that also includes expected

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41 Energy Networks Association, *Response to the AER rate of return guidelines—Issues paper*, February 2013, p. 40; Jemena, *Rate of return guidelines—Issues paper: Submission from Jemena Limited to the Australian Energy Regulator*, February 2013, p. 24; Envestra, *Submission to rate of return guidelines issues paper*, February 2013, p. 5.

42 Queensland Treasury Corporation, *Rate of return guidelines issues paper: Submission to the Australian Energy Regulator*, February 2013, pp. 10–11.

43 Citipower, Powercor Australia and South Australia Power Networks, *Submission to the AER*, February 2013, p. 10; Energex, *AER rate of return guidelines issues paper—Energex submission*, February 2013, p. 9.

44 Australian Pipeline Industry Association, *Response to issues paper—The Australian Energy Regulator's development of rate of return guidelines*, February 2013, pp. 34–36.

45 Energy Users Association of Australia, *Submission to the AER*, February 2013, p. 2; United Energy and Multinet, *Rate of return guidelines—Response to issues paper*, February 2013, p. 12.

46 NGR r. 87(2)(b); NER r. 6.5.2(d)(2), and NER r. 6A.6.2(d)(2)

47 We support the use of a nominal post-tax framework. The previous electricity rules required the use of a nominal post-tax framework. On the other hand, the previous gas rules did not prescribe any particular framework. We proposed a rule change to amend the gas rules to also require the use of a nominal post-tax framework. The AEMC accepted this rule change.

inflation. To ensure that the impact of inflation is properly accounted for, we make a corresponding reduction to the depreciation calculation. This produces the regulatory depreciation building block.

A post-tax framework means that the estimated rate of return does not include compensation for the cost of corporate income tax. Instead, the overall building block allowance includes a separate tax allowance. To implement this framework, we use a 'nominal vanilla' WACC, which is a combination of a pre-tax return on debt and a post-tax return on equity. Conceptually, this post-tax return on equity includes the value of dividends, capital gains and imputation credits. However, the accumulation indices used in historical estimates of the MRP only include the returns from capital gains and dividends. Therefore, in using historical estimates to inform our forward looking MRP value, we 'gross up' these estimates for the value of imputation credits. We also adjust the corporate income tax allowance for the value of imputation credits to investors.[48]

3.5 The WACC formula and overall rate of return reasonableness checks

In past decisions, we have determined the overall rate of return by adopting a point estimate for the return on equity and debt, and weighted those estimates based on a defined gearing ratio. In this section, we consider two sets of issues:

- Should we continue to determine the rate of return in a determinative manner based on the weighted average of the return on equity and return on debt?
- If we determine the rate of return based on the WACC, what role do reasonableness checks have on the overall rate of return play?

3.5.1 Use of the WACC formula to determine the overall rate of return

Our preliminary position is that we will continue to use the WACC formula to establish the overall rate of return. That is, we propose to determine the overall rate of return based on point estimates of the return on debt and equity (and gearing ratios).

The focus on meeting the allowed rate of return objective allows broader scope to consider the overall rate of return in a more holistic manner. In particular, it allows information relevant to the overall rate of return to be considered more directly. For example, we could determine estimates of the overall rate of return, without specific reference to point estimates of the return on debt and equity, and gearing ratios. We consider, however, that applying a WACC formula is more likely to lead to transparent and robust outcomes. In particular, the financial models available to determine the return on debt and equity estimate an actual number. In contrast, overall reasonableness tests—such as analysis of RAB acquisition or trading multiples—are only informative of a potential issue.[49]

Our proposed approach is used by other regulators such as the QCA and ERA. IPART, however, uses the WACC to set a rate of return range based on return on equity and debt ranges. Different again is the market practitioner Grant Samuel's approach. In determining final estimates for Epic

[48] We discuss imputation credits further in chapter 7 and in appendix H.

[49] That is, a RAB multiple of less than one may indicate that the regulatory WACC is too low, but does not indicate what the regulatory WACC should actually be.

Energy, Grant Samuel selected an estimate range that was above the range it derived from using the WACC (and CAPM) to reflect:[50]

- alternative approaches, such as the Dividend Growth Model, which suggested higher rates than the CAPM
- anecdotal information that equity investors have re-priced risk since the global financial crisis
- global interest rates, which were at very low levels compared to historical norms
- analysis of research reports, which indicated that brokers adopted a higher return on equity and rate of return.

Notwithstanding these other approaches, we consider that the most transparent and replicable approach to estimating the rate of return is to use the WACC formula to determine a single point estimate. As discussed in section 3.5.2, however, overall reasonableness checks may still play an important role.

3.5.2 Use of reasonableness checks on the overall rate of return

Our preliminary position is that we will continue to use reasonableness checks on the overall rate of return. Consistent with the approach outlined in section 3.5.1, we propose to use reasonableness checks informatively. That is, reasonableness checks may act to prompt us to re–examine the approach to estimating the return on equity, return on debt, or gearing ratio.

Appendix D discusses the available reasonableness checks in greater detail. This discussion states our previous positions (where relevant), including the limitations of each approach, for the following reasonableness checks on the overall rate of return:[51]

- RAB acquisition and trading multiples
- comparison with brokers' or takeover valuation report discount rates
- comparison with other regulators' rates of return
- comparison of return on equity and return on debt
- financeability and credit metrics
- other possible sources of information.

This section and appendix D focuses on reasonableness checks on the overall rate of return. A range of reasonableness checks could also be applied to the return on equity or return on debt in determining the respective point estimates. Reasonableness checks on the return on equity are considered as part of the relevant set of information discussed in sections 5.4 and 5.5. Reasonableness checks could also be used at the parameter level—for example, using other estimation techniques or a comparison with international data.

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[50] Grant Samuel, *Financial services guide and independent expert's report in relation to the takeover offer by Pipeline Partners Australia Pty Limited*, 3 August 2012, appendix 2.

[51] However, this does not imply that all relevant information will be given significant weight.

3.6 Term of the WACC

The current rules require us to have regard to the desirability of using an approach that leads to the consistent application of any estimates of financial parameters.[52] However, the rules do not mandate a consistent term across the return on equity and return on debt. Rather, the current rules enable us to consider whether a consistent term for both the return on equity and the return on debt is appropriate. In previous decisions, we have adopted a 10 year term for both the return on equity and return on debt.

The AEMC was of the view that the regulator is in the best position to determine a rate of return that meets an overall objective focussed on the efficient financing costs of a benchmark efficient service provider.[53]

We consider the present value principle would help to inform the appropriate term for return on equity and return on debt. The present value principle states that the present value of a service provider's revenue stream should match the present value of its expenditure stream (plus or minus any efficiency rewards or penalties). As Associate Professor Lally explains, this is a fundamental principle of economic regulation. Satisfying this principle both promotes efficient investment and avoids the excess profits that regulation seeks to prevent.[54]

We note there are divergent views on the appropriate term to ensure consistency with the present value principle. We discuss the views in relation to return on equity and return on debt separately in sections below.

3.6.1 Return on equity

In the present context, the present value principle requires that the return on equity that should apply in the building block model is the return on equity that is prevailing at the commencement of the access arrangement period and reflects the length of the period. Lally in his recent reports suggests that we should use a term that is consistent with the regulatory period when estimating a risk free rate at the start of the period.[55] That is, to apply a 5 year term. The ERA, the QCA and IPART have all applied a five year term in their recent regulatory decisions.[56]

On the other hand, we also note there are views in favour of using a longer term to more closely match the life of the assets.[57] Damodaran suggests that the duration of the risk free rate should be set to the duration of the cash flows. He suggests that since regulated assets have long lives, the duration of the risk free rate should be set as long as is practically possible. In applying a significantly longer term approach, we might under or over estimate the return on equity for any particular regulatory period. However, setting the term equal to the life of the assets might lead to a more stable return on equity over time. Regulators in the UK tend to apply a term that is equal to the life of the assets.[58]. As noted by CEPA, adopting a longer term approach can lead to different views about how

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52 NER, cl. 6.5.2 (e) (2).
53 AEMC, *Rule determination*, 29 November 2012, p.38.
54 M. Lally, *The risk free rate and the present value principle*, 22 August 2012, p. 8.
55 Lally, *Risk free rate and present value*, August 2012, p. 16.
56 ERA, Final *decision on proposed revisions to the access arrangement for the Western Australian Power Network*, 5 September 2012, p. 326, 327; QCA, *Final report; SunWater irrigation price review 2012-17*, May 2012, p. 485, 503; IPART, *Draft Report: Hunter Water Corporation - Prices of water, sewerage, stormwater drainage and other services from 1 July 2013 to 30 June 2017*, March 2013, p. 185.
57 A. Damodaran, *What is the riskfree rate? A search for the Basic Building Block,* December 2008, p. 9-10.
58 CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p. 3.

markets operate—for example, the degree of mean reversion.[59] UK regulators often have as a starting position that the return on equity is relatively stable through time.[60]

We note Lally's recommendation to use a 5 year term and the approach of UK regulators to adopt a term that matches the life of the assets. We seek stakeholder views on the appropriate term for the return on equity.

3.6.2 Return on debt

We could utilise any of the three approaches to estimating the required return on debt (see Box 3.1). All three approaches may satisfy the present value principle under certain assumptions. Our approach under the previous rules—the 'on the day' approach—satisfies the present value principle if it is efficient for the benchmark entity to raise or hedge all of its debt at one time at the start of the regulatory period. However, service providers' submissions on the return on debt indicate this assumption is not the case in reality. Some stakeholders suggested that businesses' current debt financing practices might be a product of regulators using the 'on the day' approach, and would not be considered efficient in the absence of regulation. In practice, businesses generally employ a staggered debt approach as a means to reduce refinancing risk, which is the risk of not finding replacement funding when debt expires.

One option would be to adopt a term longer than the regulatory period for the return on debt, such as a 10 year term we applied in our past decisions. In the 2009 WACC review, we noted that while there were strong conceptual arguments for a term matching the length of the regulatory period on the equity side, a term for the risk free rate which matches the length of the regulatory period may result in a significant shortening of debt on issue by the benchmark efficient entity.[61] Therefore, by applying a longer (10 year), more conservative term for return on debt, would ensure that refinancing risk is not increased for service providers.

Alternatively, the ERA's 'bond-yield approach' estimates the DRP by averaging observed bond yields on the current market that meet certain criteria.[62] In this sense, a specific term is not required or specified for the return on debt. Effectively, the term of the return on debt is an output from its return on debt approach instead of being an input assumption.

Box 3.1 The three approaches to the return of debt

The AEMC set out three approaches to estimating the return on debt that could reasonably be contemplated by a regulator, which should reflect one of:[63]

The return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the making of the distribution determination for the regulatory control period.

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59 CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p. 3.

60 See, for example, Ofgem, *Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial Issues*, March 2011, p. 33.

61 AER, final decision; electricity transmission and distribution network service providers review of the weighted average cost of capital (WACC) parameters, May 2009, pp. 166–169.

62 Specifically, all bonds (sourced from Bloomberg) were from Australian companies, denominated in Australian dollars and issued in Australia. Further, bonds could be either fixed or floating and either bullet, callable or putable. Different scenarios used other slightly different criteria, such as a minimum term (two or five years), and a range of credit ratings (BBB-/BBB/BBB+ or BBB/BBB+).

63 NER, cl. 6.5.2(j); NGR, r.87(10).

The average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the regulatory control period.

Some combination of the above.

For simplicity, we refer to these as the 'on the day', 'trailing average portfolio' and 'hybrid portfolio' approaches, respectively.

3.7 Design aspects of estimating the return on equity and debt

In section 3.5.1, we stated our preliminary position of using the WACC formula with determinative weighting of return on equity and debt point estimates. This is consistent with our current approach. It is not necessary, however, that a formulaic approach be adopted throughout the rate of return estimation process. The following section therefore explores the issue of using estimation ranges in addition to point estimates. There is also a question as to whether intra-period adjustments are appropriate. These considerations are common to estimating both the return on equity and return on debt.

3.7.1 Point estimates and ranges, and quantitative or qualitative weighting

With more reliance placed on the expert judgement of the regulator, there is now greater scope to estimate ranges and use judgment to determine the best point estimates within such ranges. The option of using point estimates only, or ranges and point estimates, can occur at different 'levels' of the estimation process. The levels at which point estimates or ranges are available are:

- 'The overall rate of return level'. We may determine a point estimate only, or a point estimate from within a range of the overall rate of return. As discussed in section 3.5.1, we propose to adopt a point estimate only.
- 'The return on equity or return on debt level'. We may determine a point estimate only, or a point estimate from within a range, or use a range only of the return on equity or debt. As discussed in section 3.5.1, we propose to not use a range only. A range could arise from considering results of multiple models or estimation methods. Alternatively, a range could arise from a single model or method by using multiple input parameter values.
- 'The parameter level'. We may determine a point estimate only, or a point estimate from within a range, or a range only for parameters that will feed into a return on equity and debt model or models. Different approaches could be adopted for different parameters based on the perceived level of uncertainty.
- 'The evidentiary level'. There may be multiple sources of evidence available (giving rise to an evidentiary range) to determine a parameter or parameter range. Additionally, each source of evidence may indicate a range of parameter values.[64] This type of range is unavoidable because of the inherent uncertainty with estimating parameters.

[64] The approach we have previously adopted to estimating the market risk premium demonstrates an evidentiary level range arising from both multiple source of evidence and a single source of evidence. In the 2013 Victorian Gas Access Arrangement review, we considered historical estimates, survey results and other information, giving rise to an evidentiary range for the market risk premium. Additionally, for example, historical estimates of the market risk premium indicated an evidentiary range of 3.0-6.1 per cent. See: AER, Access arrangement final decision APA GasNet Australia (Operations) Pty Ltd 2013–17, Part 1, March 2013, p. 29.

If a range approach is adopted, a second question arises; at what level should we choose a point estimate from within the resulting range(s)? For example, we could use a parameter level range to derive a return on equity or debt level range, and a return on equity and debt level range to derive an overall rate of return range. Alternatively, we could select a point estimate from within any such ranges and then have only a single estimate at the next level.[65]

The third question that arises is; at what stage in the process should a point estimate be selected from within a range? This could occur during the guideline's development or during a determination.

Although our issues paper did not directly seek comments on the issues raised here, there were some relevant points made in submissions. We have taken these into account in the ensuing discussion. Further, we have drawn on the approaches adopted by other regulators and market practitioners. More detail on the approaches of other regulators can be found in appendix I.

At the overall rate of return level, our preliminary view is that we will not have a range. The reasons for this are discussed in section 3.5.1. By implication, we will ultimately adopt a point estimate of the return on equity and return on debt. We will combine these point estimates using the WACC formula, by using quantitative weighting (the gearing ratio). This view partially answers the second question we raised—that is, a point estimate will be chosen at, or before, the return on equity and debt level. Our position of adopting a point estimate at the return on equity and return on debt is consistent with the ENA's submission.[66]

At the return on equity and return on debt level, there may be a range from which we will choose a point estimate. This is discussed further in chapter 5.

At the parameter level, we may determine a point estimate directly, or select a point estimate from within a range or use a range. At this time, we do not have a view on whether we should set a parameter range (APIA's view) or whether we should determine a single parameter estimate (ENA's view).[67] Our position on these matters will be included in the draft guideline.

At the evidentiary level, there will be a range of evidence. At the evidentiary level, the reasons for selecting a particular value can be made having regard to financial and statistical evidence. For example, in the Victorian gas access arrangement review we considered a variety of different evidence on the market risk premium (MRP)—including historical excess returns, dividend growth model estimates and survey evidence. We considered historical estimates, dividend growth model estimates and survey evidence indicated the MRP was between 3.0–6.1 per cent, 5.9–8.4 per cent and 6 per cent, respectively.[68] After considering the strengths and weaknesses of each source of evidence we adopted a point estimate for the MRP of 6 per cent.

For clarity figure 3.1 demonstrates the levels at which we propose to adopt point estimates, a range, or a point estimate from within a range.

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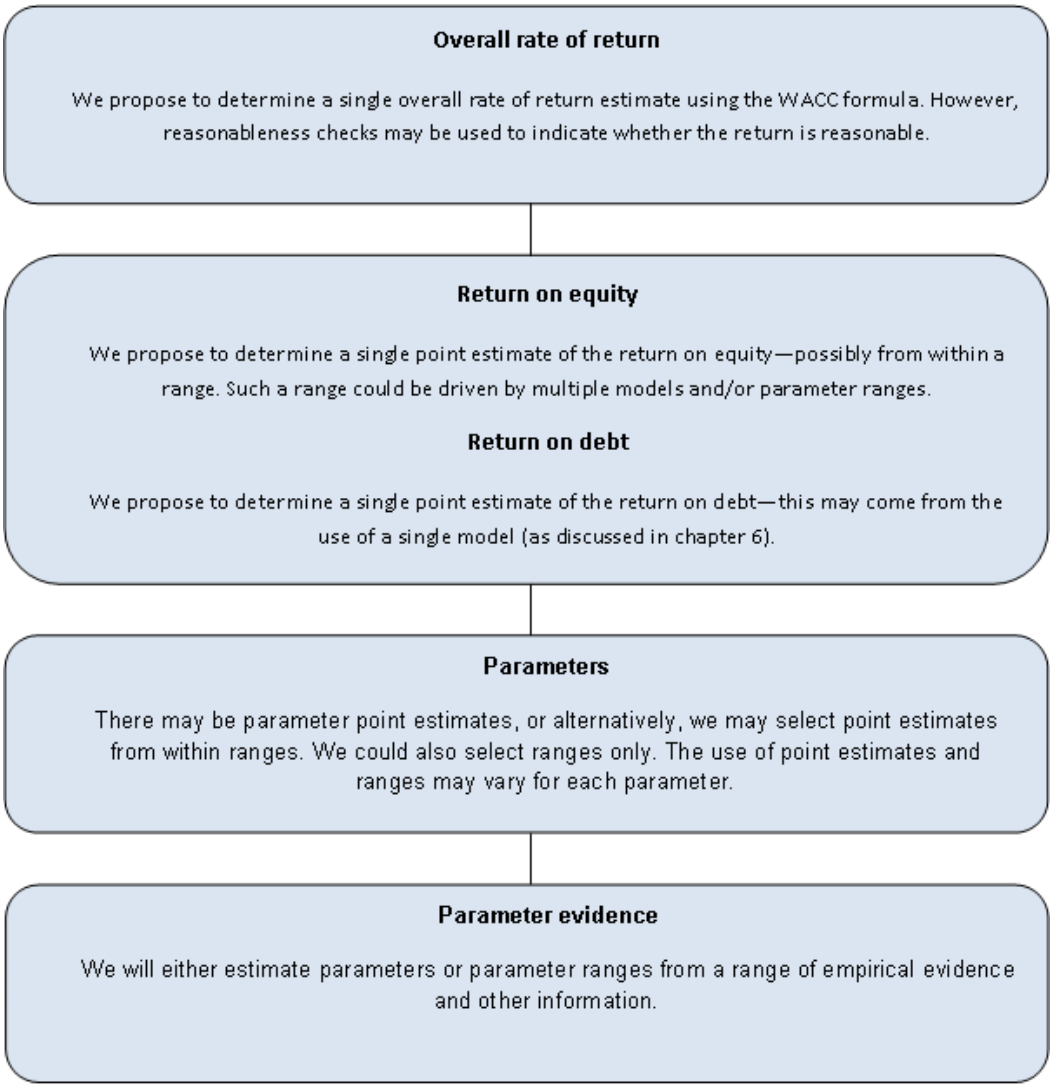
[65] This is not to say that ranges can arise only from ranges in other levels. For example, a return on equity range can be determined from parameter level point estimates albeit using multiple estimation models. Hence, the example is only for illustrative purposes.

[66] This aspect of the ENA's submission was supported by the majority of network service providers. For example, see: CitiPower, Powercor, South Australian Power Networks, *Submission*, February 2013, p. 11; Jemena, *Rate of Return Guidelines –Issues Paper*, 15 February 2013, p. 17

[67] APIA, *Response to issues paper*, 20 February 2013, p. 18; ENA, *Response to the AER rate of return guidelines—issues paper*, February 2013, pp. 23–24.

[68] AER, *Access arrangement final decision APA GasNet Australia (Operations) Pty Ltd 2013–17, Part 1*, March 2013, p. 29.

Figure 3.1 Point estimates and ranges—Our proposed application of regulatory judgement at different levels of the rate of return estimation process



Source: AER analysis.

When discussing ranges, it is notable that there is no one method which is typically adopted by other regulators, particularly in the estimation of parameters. For example, both IPART and ESCV (in its gas access arrangement determination) estimated ranges for the MRP, equity beta and debt risk premium. The ESCV made point estimates for the risk free rate and gearing ratio because capital markets allowed a single value to be determined.[69] In other words, the risk free rate could be estimated with precision from available market data whereas the MRP could not be. On the other hand the ERA and QCA adopt single parameter estimates.[70] Another approach is that adopted by NZCC, which makes point estimate and calculates the standard errors of the debt risk premium, asset beta and the tax-adjusted market risk premium.[71] From this, the NZCC calculates, and adopts, the 75th percentile estimate of the WACC. From examining submissions and other regulators' approaches, it is reasonable to conclude that there is no settled view on which approach is superior.

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[69] On the other hand, for other parameter the ESCV considered that methodological complexities and limitations of statistical analysis provide only for a range to be determined. ESCV, *Gas Access Arrangement Review 2008-12*, March 2008, p. 490.

[70] ERA, *Final decision on proposed revisions to the access arrangement for the Western Australian Power Network*, 5 September 2012; QCA, *Final report; SunWater irrigation price review 2012-17*, May 2012

[71] Commerce Commission New Zealand, *Input methodologies (EDBs & GPBs) reasons paper*, 22 December 2010, p. 566.

A further example is the approach adopted by RARE Infrastructure, which has regard to multiple sources of parameter evidence. For example, in estimating the market risk premium, RARE Infrastructure takes account of historical premia, survey results and implied equity premia from sources including dividend discount models, National Accounts data on achieved returns on capital, and brokers and strategists.[72] RARE Infrastructure does not assign specific weights to such information but uses its judgment to determine the parameter estimate.

The benefit of using ranges is that they recognise the scope for uncertainty and may provide more flexibility to take account of prevailing market conditions. There are a number of ways to choose a point estimate from within a range as demonstrated by other regulators' approaches. It is worthwhile noting, however, that a common feature of other regulators' approaches is that it is not possible to precisely justify a particular point estimate from within a range. That is, should we adopt a range, the extent of our reasoning is likely to encompass:

(1) the results of our application of each estimation method or financial model or observation of other data sources

(2) a high level assessment of the applicability of our results from each estimation method, financial model or other data source using the criteria

(3) our final choice of the point estimate.

In advocating for ranges, service providers must recognise that there is no one 'correct' estimate and that a high degree of regulatory judgment is involved.[73] The reasoning behind the judgment may not always be amenable to quantification.

3.7.2 Intra–period adjustments

Our current approach is to fix the rate of return for the duration of the regulatory period (usually five years), based on prevailing conditions in the market for funds at the commencement of the regulatory period. Under the previous rules, we did not make annual or ad hoc adjustments to the rate of return within the regulatory period.

The current rules now include a provision to allow an annual adjustment to the return on debt if the regulator decides such an approach is appropriate.[74] The formula for calculating the updated return on debt must be specified in the regulatory determination or access arrangement and must be capable of applying automatically.[75] In order for the approach to be 'automatic', there can be very little room for debate or judgement in the application of the approach adopted.

Return on equity

Unlike the return on debt, the rules do not explicitly give us the option to estimate different returns on equity for different regulatory years in the regulatory control period. In addition, no stakeholders commented on the intra-period adjustments in relation to the return on equity in their submissions to the rate of return issues paper. Therefore, we maintain our current approach that the return on equity should be set for the entire regulatory period with no annual update.

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72 RARE, *Cost of Capital*, September 2012.
73 ENA, *Response to AER rate of return guidelines, issues paper*, February 2013, pp. 23–25. APIA, *Response to issues paper*, February 2013, pp. 17–18.
74 NER cl. 6.5.2, NGR r. 87.
75 NER cl. 6.5.2(l).

Return on debt

The current rules allow us to estimate the return on debt using a methodology which results in either:[76]

- the return on debt for each regulatory year in the regulatory control period being the same; or
- the return on debt (and consequently the allowed rate of return) being or potentially being, different for different regulatory years in the regulatory control period.

The on-the-day approach can produce a single ex–ante estimate of the return on debt for the subsequent five years of the regulatory period. If updated annually, it can estimate the return on debt in the following year.

Under a portfolio approach, the first option implies that the trailing average is computed at the start of the regulatory period and not updated after that. This is the approach suggested in the Regulatory Development Branch's '*Estimating the cost of debt*' paper.[77] The second is consistent with the trailing average being annually updated. QTC has also suggested that annual adjustments of the portfolio approach could apply at the following regulatory reset via an NPV neutral 'true-up'.[78] We discuss intra-period adjustments under a portfolio approach in detail in appendix G.

We note service providers' preference for intra-period adjustments (either within the regulatory control period or in the next regulatory reset via a true-up mechanism) in relation to return on debt, as well as the argument against it in the RDB paper. We seek stakeholders' view on how the considerations around annual updating and implementation discussed in appendix G.

3.8 Issues for consultation

We seek submissions from interested stakeholders on the issues raised in this chapter, including responses to the following questions:

Question 3.1
Do stakeholders agree with our proposition that we should continue to determine the rate of return by ultimately selecting point estimates (possibly from within ranges) of the return on equity, the return on debt, and gearing?

Question 3.2
What is the appropriate term for the return on equity? Do stakeholders support Lally's recommendation based on the present value principle that the appropriate term should be consistent with the regulatory period?

Question 3.3
What is the appropriate term for the return on debt? Do stakeholders agree with the view that a specific term is not required, if we apply an approach that is similar to the ERA's 'bond-yield approach'? Is there a case for the same term for the return on equity and return on debt?

[76] NER cl. 6.5.2(i), NGR r. 87(9).
[77] RDB, *Estimating the cost of debt*, April 2013
[78] QTC, *Submission on the rate of return guidelines issues paper*, February 2013, p. 28.

Question 3.4

For parameter estimates, should we adopt point estimates, ranges, or point estimates from within a range?

Question 3.5

At what stage (during a determination or the guidelines process) should point estimates or ranges of the return on equity, return on debt and parameter estimates, be established?

Question 3.6

Should we make annual adjustments to the return on debt?

4 Benchmark firm and compensation for risk

This chapter sets out the role of risk in the determination of the allowed return on capital building block. It also sets out our considerations regarding the definition of an efficient benchmark entity, and its efficient financing costs. The above are requirements set out in the rate of return objective.

4.1 Background

The required rate of return is a concept that can only be meaningfully thought of in the context of the degree of risk that a company is exposed to. This is explicitly recognised in the rate of return objective:

> The allowed rate of return objective is that the rate of return for a *Distribution Network Service Provider* is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the *Distribution Network Service Provider* in respect of the provision of *standard control services* (the *allowed rate of return objective*).[79]

For our future determinations to be consistent with the rate of return objective, we need to identify the degree of risk to which the service provider is exposed in providing regulated services, and identify what the efficient financing costs of an efficient benchmark entity would be in this context.

An important starting point is to define the perspective from which we consider the above issues. We consider that the relevant context is that of an investor or lender who faces a broad range of investment opportunities, which may be domestic or international. Defining this starting point should guide us in deciding on the appropriate methods and models for estimating the required rate of return that is consistent with the Rate of return objective.

The AER's past requirement to only use the Sharpe–Lintner CAPM when estimating the return on equity meant that it only considered non-diversifiable (systematic) risk, as captured in the equity beta within the Sharpe–Lintner CAPM framework. Since the 2009 WACC review, we have applied the same equity beta of 0.8 in all determinations. This implicitly assumed the same degree of systematic risk for all network service providers. A consideration for us in developing these guidelines is whether different return on equity models differ in the way they account for the same risks, or whether they differ in their assumptions on which risks should be factored in.

The question of risk and its relationship with the required rate of return is central to the guideline development. Owing to the complexity of this issue, we are seeking an expert adviser's opinion. We have issued Terms of Reference (ToR) for consultancy advice in this area. Further detail of the advice we are seeking, and stakeholders' role in the consultation is provided later in the chapter.

4.2 Propositions for stakeholder consultation

In this chapter we set out the following propositions for consultation:

- We should use the fewest definitions of the benchmark efficient firms that capture any material differences in the degree of risk to which service providers are exposed in providing regulated services (section 4.5).

[79] NER, cl. 6.5.2(c). It similarly apply for the Transmission Network Service Provider, see NER, cl. 6A.6.2(c)

4.3 Summary of stakeholder submissions

Submissions on the definition of the benchmark efficient entity and on how risk should be factored into the rate of return were received from network service providers, industry associations, and consumer groups.

There was a broad agreement that the conceptual definition of a benchmark efficient entity should be retained and be distinct from the practical implementation. Industry associations and network service providers mostly argued that the AER should only depart from the conceptual benchmark when required to achieve statistically robust estimates. However, one service provider argued that the conceptual benchmark should be relaxed in order to admit market evidence.[80]

The ENA proposed the following definition of the benchmark efficient entity:

> A 'pure-play' regulated electricity or gas network business operating within Australia without parental ownership providing the same scale and scope of standard control / reference services to the same customer base at the current time.[81]

The ENA's definition was endorsed by network service providers and by the APIA. Specifically, service providers considered there to be a need for the benchmark efficient entity to reflect the particular situation of each network. Network service providers and industry associations also argued that "without parent ownership" should be retained in the definition.[82]

Network service providers stated that considerations of private and public ownership should not influence the rate of return. In contrast, one consumer group argued that it is a material consideration. It particularly stressed that consumers should benefit from the lower financing costs that are incurred by government-owned businesses.[83]

In terms of risk, size of the RAB was identified as a consideration by network service providers and industry associations. It was considered particularly relevant for the return on debt, in terms of influencing businesses' efficient debt practices. Service providers also requested that the AER consider risk-management as an element of efficient debt-raising practice. However, one network service provider stated that the benchmark definition should not attempt to cover every debt funding arrangement that the businesses may undertake.[84]

Several stakeholders commented that the AER should consider non-regulated companies as part of the practical implementation of the benchmark. The practices of non-regulated companies were seen to indicate efficient debt management, and non-regulated companies that undertake substantial capital expenditure were considered useful comparators for estimating the equity beta.

In terms of assessing risks, submissions recognised the need to assess whether a risk factor is material and measureable. In addition to size, one submission identified customer base and location as other relevant considerations for the rate of return.[85] Additionally, one network service provider

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80 United Energy / Multinet, *Rate of return guidelines response to issues paper*, February 2013, p.12.
81 ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p.15
82 QTC, *Submission on rate of return guidelines issues paper*, 15 February 2013, p.8; CitiPower, Powercor and SA Power Networks, *Submission on rate of return guidelines issues paper*, 15 February 2013, p.7.
83 MEU, *Rate of return guidelines comments on the issues paper*, February 2013, p.11.
84 United Energy / Multinet, *Rate of return guidelines response to issues paper*, February 2013, p.18.
85 APIA, *Response to issues paper, 20 February 2013*, p.29 and schedule 3 p.6

submitted that the relevant risk characteristics vary with the choice of the model used to estimate the return on equity.[86]

Submissions were divided on the extent to which there may be material differences in risk between different network service providers. Some service providers considered that, aside from the impact of size on the approach to raising debt, the risks are generally comparable across the sector. However, gas transmission service providers considered that they are exposed to greater risk than electricity service providers.[87]

4.4 Risk and the rate of return

In order to develop our thinking on the relationship between risk and the rate of return, and how it may interact with the benchmark efficient entity, we contracted Frontier Economics, working together with Professor McKenzie and Associate Professor Partington from the University of Sydney to advise on these issues. The ToR for their advice were developed in consultation with stakeholders in the rate of return working groups—service providers, industry associations, consumer representatives and the ERA. We will publish the expert's draft report on the AER website. Stakeholder submissions should also consider the expert's advice when responding to this consultation paper. This section sets out the issues on which we are seeking views, both from the expert adviser and from stakeholders.

4.4.1 Types of risk and the required rate of return

Similarly to the conceptual definition and practical implementation of the benchmark efficient entity, considerations of risk and the rate of return can be split into conceptual and practical issues. Conceptual questions centre around what risks should be compensated for via the rate of return. Practical issues revolve around the extent to which the benchmark efficient entity is exposed to the relevant risks and how these may be measured.

On the conceptual considerations, we are interested in views on whether different risk factors affect one or more of the return on debt, the return on equity, and gearing. For the return on equity, an additional consideration is whether models (for example, the Sharpe–Lintner CAPM, Fama–French three factor model, and dividend growth models) differ in the systematic risks that they account for, or whether different models also account for non-systematic risk.

Our instruction to the consultants included a high-level list of risk factors, for which we are seeking advice on whether they are relevant for the required rate of return, how material they are, and how the degree of exposure to these risk factors may be assessed. In this context, it will be important to recognise the protections provided by the regulatory framework compared to companies that operate in competitive markets. It would also be important to recognise any obligations imposed on service providers that competitive firms may not be exposed to. Below we discuss this non-exhaustive list of risk factors. Stakeholders may want to consider additional risk factors, or characterise the ones that are on the list differently in their submissions.

- Demand risk is the risk that a company's revenues may differ from forecasts due to changes in the volume of consumption. For service providers, exposure to demand risk is clearly a function of whether the service provider is subject to a price or revenue cap, with the latter insulating it from demand risk completely. Within a price cap regime, exposure to demand risk may be influenced by the consumer base or weather.

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[86] CitiPower, Powercor and SA Power Networks, *Submission on rate of return guidelines issues paper*, 15 February 2013, p.9.

[87] Jemena, *Submission on rate of return guidelines - issues paper*, 15 February 2013, p.23.

- Delivery risk is the risk that a company's costs may differ from forecasts due to changes in the volume of the investment undertaken. Delivery risk may be a function of the scope and level of complexity of an investment.

- Input price risk is the risk that a company's costs may differ from forecast because of movements in the price of inputs (for example, labour, raw materials and machinery). Input price risk may be driven by wider economic factors. These may include: GDP growth, unemployment rates (for labour), and exchange rate fluctuations (for imported raw materials).

- General inflation risk is related to input price risk. It may affect companies by bringing about a mismatch between cost inflation and revenue inflation. Service providers are protected from this risk through the application of CPI-X profiles in determinations.

- Financial risk is the risk that a company's debt and equity costs (that is, its required return on capital) may differ from forecasts, or that it would not be able to raise finances at an attractive rate. In assessing the relationship between financing risk and the rate of return, it will be important to distinguish between risks that are mostly outside a company's control (for example, movements in Commonwealth Government Security yields) and those that are largely a function of management decisions (for example, exposure to default risk is a function of the level of gearing).

- Competition and new entry (or the threat of new entry into the market) may affect company revenues, as well as the prices they are able to charge. Service providers are largely protected from competition owing to the "natural monopoly" characteristics of energy networks. However, it is possible that wider changes to energy production and consumption patterns (such as distributed generation) may effectively introduce an element of competition in the long-run.

- We are interested in views on the extent to which the size and/or scope of a company's operations may affect its risk profile. Some argue that, rather than size, it is operational gearing that determines the degree of risk that exists in a company's operations. Operational gearing may be measured in different ways, but at a fundamental level relates to the amount of expenditure by the company as a function of its asset value.

- Some companies, especially those with large upfront investments in assets, may be exposed to stranding risk. Upfront investment that may not be recoverable is often referred to as "sunk costs". Service providers are largely protected from this risk once expenditure has been added to the RAB, as these costs will ultimately be recovered from consumers. The duration over which such costs are recovered may be a related, but potentially separate risk factor.

- Political and regulatory risks refer to the ever-present possibility that the policy decisions, legal frameworks, and regulatory constraints under which companies operate may change. The extent to which a company may be affected by such risks may be different across different industries.

4.5 Benchmark efficient entity

Some stakeholders have interpreted the rate of return objective to mean that the benchmark efficient entity must reflect the specific circumstances of each service provider at each particular determination. We note that the rate of return objective directs us to consider a benchmark efficient entity with "a similar degree of risk as that which applies to the [service provider] in the respect of the provision of *[regulated services]".*[88] The use of "similar degree of risk" rather than "same degree of risk" suggests that only material differences in these risks should result in different rates of return. The

[88] NER, cl. 6.5.2(c) and cl. 6A.6.2(c)

key consideration for defining a benchmark efficient entity in the guidelines, therefore, is whether there is a material difference in the degree of risk between sectors and between individual service providers. Further, the focus on the provision of regulated services lends itself to consideration of a "pure-play" benchmark efficient entity.

It is important to recognise that we need to identify the required rate of return for a benchmark efficient entity that faces a similar degree of risk to the service provider in question. We are not required to identify the required rate of return for the service provider itself. Once considerations of risk are addressed, the criteria set out in chapter 2 will help inform our approach to defining a benchmark efficient entity. Specifically, the criteria of favouring simple over complex approaches where appropriate support having the smallest number of benchmarks, as appropriate. The consultants' advice on what are the relevant risk factors and how they could be measured will inform our view on whether a single benchmark is appropriate. If the consultants' advice leads us to determine that more than a single benchmark may be needed, we will then need to consider what the demarcation criteria are for assigning the separate benchmarks.

It is also worth highlighting the trade-off between more specific definitions of the benchmark efficient entity and the AER's need to deliver accessible determinations that can be understood by a wide range of stakeholders. Investors, for example, may prefer a single clear benchmark over multiple benchmarks. This is because of the limited time and resources that they can dedicate to understanding and, crucially, pricing the risks in determinations when making their investment decisions. Therefore, specific benchmarks may, paradoxically, deter investment in the sector.

We seek stakeholder submissions on the choice between single and multiple benchmarks.

4.6 Issues for consultation

We seek submissions from interested stakeholders on the issues raised in this chapter, including responses to the following questions:

Question 4.1

Set out the risk factors that you consider should be compensated through the rate of return. How can we assess whether different companies are exposed to materially different degrees of these risks?

Question 4.2

Do different return on equity models account for systematic risk differently, or do they also account for non-systematic risk? If the latter, is it appropriate for the AER to set allowances that remunerate risks that could be diversified away from?

Question 4.3

Do you agree that the AER should seek to utilise the smallest number of benchmarks that capture materially different degrees of risk? How do we utilise different benchmarks while retaining the objectives of incentive-based regulation?

5 Return on equity

In chapter three, we stated our preliminary proposition on the final stage of estimating the rate of return. Specifically, we stated that we would determine the rate of return using the WACC formula and point estimates for the return on equity, return on debt and gearing ratio. We would also apply reasonableness checks to the resultant overall rate of return.

In this chapter, we discuss methods we could use to combine information on estimation methods, financial models, market data and other evidence in order to determine that return on equity point estimate. Views on the stability of the return on equity over time may inform such considerations, and is hence discussed in this chapter. Additionally, this chapter discusses the use of different return on equity models in different circumstances and whether an interim step of estimating the return on equity for a market average firm is appropriate. These were two specific issues raised in stakeholder submissions on the issues paper.

5.1 Background

The current rules do not require the use of the Sharpe–Lintner CAPM under either the gas or electricity frameworks. Rather, the current rules require us to set out, in our guidelines, the approach we propose to use in estimating the allowed rate of return. This includes the estimation methods, financial models, market data and other evidence we propose to take into account.

A wide variety of options are potentially available under the current rules. For example, in the guidelines we could propose to; use the Sharpe–Lintner CAPM deterministically, cross check and adjust the results of this model, use the results in conjunction with other return on equity estimation models or use a combination of these methods. The key consideration is that the final approach contributes to a rate of return that is commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of regulated services.

5.2 Propositions for stakeholder consultation

In this chapter we set out the following propositions for consultation:

We will not specify (in the rate of return guidelines) which return on equity models are likely to perform better in particular circumstances (section 5.7).

5.3 Summary of submissions

Submissions on the return on equity were received from network service providers, industry associations, and consumer groups. These submissions primarily focused on how multiple models and sources of information can be combined to form a single estimate of the return on equity. The submissions from the Energy Networks Association (ENA) and the Australian Pipeline Industry Association (APIA) were comparatively detailed. Their respective approaches are summarised below.

ENA approach—estimating the return on equity

The ENA described their approach as containing four stages. These can be broadly summarised as follows:

1. Determine the set of relevant models and information.

2. For each model, determine point estimates of the return on equity for the average firm. Following this, distil the multiple return on equity estimates for the average firm into a single value.

3. For each model, determine point estimates of the return on equity for the benchmark firm.

4. Distil the multiple return on equity estimates for the benchmark firm into a single value.

The ENA's rationale for first estimating the return on equity for the average firm was that this should ensure consistency across all models. That is, different approaches will only produce different estimates to the extent that they determine the benchmark firm to differ from the average firm.[89]

The ENA, however, did not provide any substantive guidance on how to distil estimates from multiple models into a single estimate. The ENA simply stated we would need to provide detailed reasons in support of our exercise of regulatory judgement.

APIA approach—estimating the return on equity

The APIA approach can be broadly summarised as follows:

1. Determine the set of relevant models and information.

2. For each model, determine a range for the return on equity for the benchmark firm.

3. Distil the multiple return on equity ranges for the benchmark firm into a single point estimate.

4. Consider whether the estimate of the return on equity for the benchmark firm should be further adjusted to reflect the unique risks of the specific service provider.

The APIA also provided some guidance on how its third step could be implemented. This approach was based on separate reports from the Brattle Group, and Professor Stewart Myers. Notably, the APIA proposed that economic, industry and company factors should inform the relative weighting of models (and relevant information).[90] For example, certain models should be afforded greater weight dependent on the level of market volatility or the risk free rate.[91] These factors would be specified in the guideline.

In regard to its fourth step, the APIA stated that these risks are those that expose the service provider to systematic risk. For example, these include supply risk, market (downstream) risk, regulatory risk, competitive risk and operating risk.[92]

Other submissions

Generally, network service providers were supportive of the approach proposed by the ENA or the APIA.[93] Consumer group submissions, more broadly, proposed that estimates of the return on equity should be tested against market data.[94]

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89 ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p. 24.

90 APIA, *Response to issues paper*, 10 February 2013, pp. 26–27.

91 Additional factors listed by the APIA include the market beta of the relevant industry, the stability of growth forecasts, whether an industry is exposed to financial distress or significant merger activity, and the prevalence of share buy backs.

92 APIA, *Response to issues paper*, 10 February 2013, p. 18.

93 For example, CitiPower, Powercor and SA Power Networks, SP AusNet, and ActewAGL supported the ENA approach. The APIA submission stated that it was the agreed position of the owners of regulated gas transmission infrastructure. CitiPower, Powercor and SA Power Networks, *Submission to the AER*, 15 February 2013, p. 10; SP AusNet, Submission

5.4 Relevant estimation methods, financial models, market data and other evidence

In determining the allowed rate of return, the current rules require that we have regard to relevant estimation methods, financial models, market data and other evidence. For the purpose of estimating the return on equity, this facilitates the consideration of a number of alternative models and information sources. To provide greater certainty to stakeholders the rate of return guidelines will outline the approaches we propose to take in estimating the allowing rate of return, including estimation methods, financial models, market data and other evidence that we propose to take into account at the time of a determination to estimate the return on equity.

Further guidance on our approach to estimating the return on equity, including the specific methods and models we propose to use will be provided as the draft and final guidelines are developed. In particular, we propose to hold a workshop to discuss the strengths and limitations of specific models prior to the publication of the draft guideline. The draft guideline, therefore, will include our preliminary views on individual models. These views will be informed by the current rules, and an assessment against the WACC criteria outlined in chapter two. To facilitate this workshop, appendix E provides a summary of the models previously considered by us and other stakeholders.

5.5 Combining relevant information

As discussed in chapter three, it is our view that we will determine a single point estimate of the return on equity before estimating the rate of return. It is possible, however, that we will need to select that point estimate from within a return on equity range and from other information. Therefore, a key question for the guideline is how we should distil this information into a single return on equity point estimate. This section outlines four broad approaches to determining a return on equity point estimate. We seek stakeholders' comments on which of these approaches is preferred and why. Additionally, we seek comments on whether there are additional broad approaches that we should consider. A key difference between these four approaches is how the estimates from models and other information are brought together, and the amount of regulatory judgment used to do so. These four broad approaches are:

(1) The use of one model. This approach implies that the outcome of a single model is used to determine the return on equity. Other models would not form part of the estimation. Adjustments of the model outcome would not be made.

    This model is simple and transparent. Applying this approach will produce outcomes that can be easily replicated and predicted in advance. However, as it relies on a single model, it loses the benefit that estimates from a wider pool of evidence and information may bring. It also does not take into account the fact that no single model is perfect and that all models have uncertainty.

(2) Use of one primary model with reasonableness checks. The reasonableness checks could be other return on equity models or information such as broker WACCs and market sentiment. Generally we would expect that the output from the primary model would be adopted as the final return on equity (as per example 1). However, where the reasonableness checks suggest the output from the primary model is not reasonable, the return on equity would be determined based

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to the AER, 18 February 2013, p. 1; ActewAGL, Submission to the AER, 15 February 2013, p. 1; APIA, *Response to issues paper*, 10 February 2013, p. 5.

[94] See, for example: MEU, *Comments on the issues paper*, February 2013, p. 24; PIAC, *Submission to the AER's issues paper – rate of return guidelines*, February 2013, pp. 24–25.

on our judgment taking account of the reasonableness checks (informative use of primary model). In these instances, the weighting of the primary model and reasonableness checks would be qualitative with no explicit weights mentioned. Thus, the final number could not be 'reverse engineered'.[95]

This approach would provide the benefit of reducing the significance of weaknesses in one particular model. The approach also maintains simplicity and transparency for most decisions, while providing the flexibility to depart from the primary model if the model or application of that model leads to unreasonable outcomes.

(3) Use of several primary models with quantitative but non–complicated fixed weighting. For example, this might entail the choice of two models with broad, simple weightings (such as 70:30).

This approach provides the benefit inherent from using more than one model. It reduces the significance of weaknesses in any one model. Additionally, the use of a small number of models with simple weighting and no reasonableness checks provides simplicity and transparency, and avoids the impression of false accuracy by avoiding complicated weightings.

The Brattle Group report submitted by APIA provides an example of a US regulator that adopts this approach. The report states 'the Mississippi Public Service Commission annually updated the return on equity for the company using a combination of the Sharpe–Lintner CAPM, empirical CAPM, risk positioning and dividend discount models. In this specific circumstance, the weights assigned to each method are predetermined'.[96]

(4) Use of multiple models and other information. The final return on equity would be determined based on our judgment taking into account the models and other information. No explicit weights would be mentioned, but models and other information could be given qualitative weighting (for example, 'most weight', 'less weight', and 'low weight'). Because explicit weights would not be given, stakeholders could not reverse engineer the exact final number or how it was reached.

This approach provides the benefit inherent from using more than one model. It reduces the significance of weaknesses in any one model or source of other information, and does not seek a false level of precision. Also, the approach may provide a more stable outcome.

Again the Brattle Group report provides examples of similar approaches. These examples demonstrate that when regulatory judgment is involved, it is not possible to fully justify or outline why a particular outcome was adopted. The Brattle report states:[97]

- The Georgia Public Service Commission approved a settlement including a return on equity of 11.5%, but did not specify how it was arrived.
- The British Columbia Utilities Commission acknowledged giving weight to dividend discount models, equity risk premiums, the CAPM and the comparable earnings method, but did not specify the exact weights used.

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95 Our current approach lies somewhere between approaches one and two. Our current approach uses a primary model. It also uses cross checks, although at the overall rate of return level rather than the return on equity level.

96 The Brattle Group, *Estimating the return on equity for regulated companies*, February 2013, pp. 53–54.

97 The Brattle Group, *Estimating the return on equity for regulated companies*, February 2013, pp. 54–58.

- The Ontario Energy Board averaged experts' calculations, and used regulatory judgment to determine that an appropriate premium was in the low–end of the range determined by the averages of the experts' ranges.

We may need to determine the return on equity from a single point estimate, a single range or multiple ranges. In determining the return on equity estimate, however, there is information that could be used informatively to adjust the outcome of a financial model, or to help choose a point estimate from within an estimation range. If for example a 'primary model' approach is adopted, then the outcomes of other financial models could be used informatively. We could have regard to qualitative information from investors. Additionally, information that does not provide an explicit estimate of the return on equity could be used. For example, dividend yields can indicate whether the return on equity in the market is increasing or decreasing.

Submissions called upon the AER to use multiple sources of information to determine the return on equity. We consider that the criteria will guide the use of our regulatory judgment and will promote transparency. For example, we will use regulatory judgment, in accordance with the criteria, to assess the relative merits of models and other information. If a 'ranges' approach was used, the relative merits of models and other information would inform the point estimate adopted. We agree with the submissions received that the use of regulatory judgment must be well reasoned. However, at this point no stakeholders have been able to clearly explain how the various information sources can be brought together transparently.

5.6 Stability of return on equity

We note that numerous stakeholders have referred to the desirability of stability in the return on equity estimate.

A relatively stable regulatory return on equity would have two effects:

- it would smooth prices imposed upon consumers
- it would provide service providers and investors with greater certainty about the outcome of the regulatory process.

These regulatory considerations could inform the application of an individual model, or the utilisation of a number of models. The theoretical and empirical evidence does not suggest the return on equity is precisely stable over time. Accordingly, the adoption of, a stable regulatory return on equity would at times arguably produce an estimate that would not reflect prevailing estimates. Therefore, a stable return on equity may over compensate service providers at times, while at other times it may under compensate them.[98]

Submissions in response to the issues paper did not discuss the empirics of this issue. There were, however, references to the importance of 'stable' estimates of the return on equity. For example, the ENA suggested actual returns are much more stable over time than regulatory estimates from the current approach would suggest.[99]

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[98] We will have regard to the requirement in clause 6.5.2(g) and 6A.6.2(g) of the NER, and rule 87(7) of the NGR, when we publish our approach in our Guideline.

[99] ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p. 19.

Also, we are mindful that the ENA suggested a more stable return on equity estimate is a desired outcome of the guidelines process. The ENA suggested the current (single model) Sharpe CAPM approach has produced return on equity estimates that are excessively variable.

We also seek stakeholder comments on regulatory considerations that should be taken into account, and on how the theoretical and empirical evidence should be overlaid with those regulatory considerations.

5.7 Appropriateness of different return on equity models in different circumstances

This section considers the extent to which the estimation methods, financial models, market data and other evidence used to estimate the return on equity should differ dependent on specific circumstances. This approach was raised by the APIA, and was supported by a report commissioned from the Brattle Group.[100] Specifically, the APIA proposed that particular models will outperform alternative models dependent on industry or firm specific factors, and market circumstances at the time of a determination. The APIA proposed that these models and circumstances should be specified in the rate of return guideline, and lead to greater weight being given to particular models.[101]

We consider that each return on equity model is designed to be applied across different market conditions, industries and firms. For example, the Sharpe–Lintner CAPM is not designed only for application during periods of 'average' interest rates, but also for application during periods of relatively high or low interest rates. Similarly, dividend growth models are not designed for application only to the consumer discretionary industry, but also to the utilities, mining and other industries. Therefore, in principle, we consider that the weights placed on different return on equity models should not differ dependant on market conditions, industry or firm. The Brattle Group would not seem to disagree with this point, though it is unclear from the report.

Rather, the Brattle Group's key point appears to be that some models will be easier or harder to properly estimate depending on market conditions, industry or firm. For example, the Brattle Group consider that when interest rates are low, the MRP may be high, but that estimating this change in the MRP within the Sharpe–Lintner CAPM is difficult.

There is a degree of imprecision inherent in the various return on equity models currently available. Given this imprecision, it is not feasible to take the additional step of determining which model may perform best in particular circumstances.

Notably, the approach proposed by the APIA would require assessing the prevailing level of specific market conditions. For example, one of the matrices outlined in the Brattle Group report requires determining whether the stability of prevailing industry growth forecasts are high, average or low relative to historical values. Consistent with the reasoning above, we consider that defining these thresholds would only introduce an additional layer of imprecision into estimates of the return on equity.

There is also the potential for tension to exist between the market circumstances and models subsequently proposed by applying the matrices in the Brattle Group report. For example, applying one matrix in the Brattle Group report suggests that using dividend growth models may be appropriate during periods of average stability in industry growth forecasts. However, another matrix suggests that

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100 The Brattle Group, *Estimating the return on equity for regulated companies*, February 2013.
101 APIA, *Response to issues paper*, 10 February 2013, pp. 26–27.

using dividend growth models is not appropriate during periods of average prevailing risk–free rates and average market volatility. To the extent that these (and other) market circumstances may coincide, the above example further highlights the practical limitations of the approach outlined by the Brattle Group.

In the rate of return guideline, we will make an assessment of each return on equity model. This might, for example, lead us to use some models as primary models and other models as cross checks. Similarly, it might lead us to determining qualitative or quantitative weights to be placed on the different models. However, at this stage we are not satisfied that it would be feasible to change the weights placed on different models over time based on differing market conditions, industry segments or firms.

5.8 Appropriateness of determining the return on equity for the average firm

The ENA's submission differed from that of other submissions with respect the second stage of its proposed four stage approach. That is, it proposed that for each return on equity model, we would determine a point estimate of the return on equity for the average firm before determining an estimate for the benchmark firm.[102] The ENA considered that:[103]

> The estimate of the required return for the average firm should be consistent across all models. Ensuring this consistency across approaches maintains the integrity and reliability of the estimation exercise, and will act to constrain the variation (across approaches) in the estimates of the required return on equity of the benchmark firm.

It is not yet clear what value is added by estimating the return on the average firm, because it is possible to directly estimate the return on equity for the benchmark firm. Therefore, we seek stakeholders' comments on the advantages and disadvantages of the ENA's proposed approach.

5.9 Issues for consultation

We seek submissions from interested stakeholders on the issues raised in this chapter, including responses to the following questions:

Question 5.1
Which of the four broad approaches to combining information to determine a return on equity is preferred and why? Are there additional broad approaches that we should consider?

Question 5.2
How can the various information sources relevant to estimating the return on equity be brought together transparently?

Question 5.3
Do stakeholders agree with our preliminary position that it is not feasible to change the weights placed on different return on equity models (over time) based on differing market conditions, industry segments or firms?

[102] ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p. 22.
[103] ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p. 24.

Question 5.4

What are the benefits of using financial models to estimate the return on equity for an average firm before estimating it for the benchmark firm?

6 Return on debt

This chapter sets out the considerations regarding the approach to estimating the required rate of return on debt. Key to these considerations is the change to the rules that now allows for us to use one or more of three approaches. We consider the merits of each approach in the context of our benchmark efficient entity and assess the extent to which they promote efficiency. The chapter also discusses gearing. Further considerations of both the return on debt and gearing are provided in appendix G.

6.1 Background

Prior to the November 2012 rule change final determination, we used the definitions in the previous rules so that the expected return on debt was the nominal risk-free rate plus the debt risk premium (DRP).[104] We estimated the DRP in our recent decisions using: an appropriate benchmark; and a method used to estimate the DRP that conforms to these benchmark parameters.[105] The risk free rate was the same as for the return on equity.

We and the Energy Users Committee both expressed concern during the rule change process that the approach under the previous rules was not producing an appropriate estimate of the return on debt for a benchmark efficient entity.[106] In the final rule change determination, the AEMC gave us the discretion to propose an approach that we consider best contributes to the achievement of the overall allowed rate of return objective.

The AEMC set out three approaches to estimating the return on debt that could reasonably be contemplated by a regulator, which should reflect one of:[107]

- The return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the making of the distribution determination for the regulatory control period.
- The average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the regulatory control period.
- Some combination of the above.

For simplicity, we refer to these as the "on the day", trailing average portfolio and hybrid portfolio approaches, respectively.

In terms of the producing the estimate of the DRP, we have previously identified that the extrapolated Bloomberg BBB rated fair value curve resulted in a higher DRP than that indicated from other market evidence. We proposed a means of estimating the DRP using market evidence on Australian bond

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104 NER, cls. 6.5.2(b) and 6A.6.2(b).

105 See, for example: AER, *Access arrangement final decision APA GasNet Australia (Operations) Pty Ltd 2013-17 attachment*, March 2013, pp.91-92; AER, *Access arrangement final decision Envestra Ltd 2013-17 attachment*, March 2013, p.150; AER, *Access arrangement final decision Multinet Gas(DB No.1)Pty Ltd Multinet Gas (DB No.2) Pty Ltd 2013-17 attachment*, March 2013, pp. 133-134; AER, *Access arrangement final decision SPI Networks (Gas) Pty Ltd 2013-17 attachment*, March 2013, pp. 112-113; AER, *Draft decision, ElectraNet transmission determination 2013-14 to 2017-18*, 29 November 2012, pp. 167-170; AER, *APT Petroleum Pipeline Pty Ltd access arrangement final decision Roma to Brisbane Pipeline 2012-13 to 2016-17*, August 2012, pp. 62-64;

106 NER, cl. 6.5.2(j); NGR, r.87(10).

107 AEMC, *Rule determination National Electricity Amendment Rule 2012, National Gas Amendment Rule 2012, 29 November, 2012*, p.90.

yields.[108] Prior to the implementation of this approach in a final decision, however, the Tribunal released its decision for the Envestra and APT Allgas reviews.[109] Notably, the Tribunal stated that the Bloomberg fair value curve should be used to determine the DRP unless there are sound reasons to depart from that practice. Moreover, any alternative method should be determined in consultation with the relevant regulated entities and other interested parties.[110] In light of these Tribunal statements, we continued to rely on the extrapolated Bloomberg fair value curve for estimating the DRP.

Subsequently, the Tribunal has made two decisions that also dealt with the determination of the DRP. These decisions upheld the use of the 'bond-yield approach' adopted by the Economic Regulation Authority (ERA). The ERA's approach estimates the DRP by averaging observed bond yields that met certain criteria.[111] We discuss the different methods for estimating the return on debt in appendix G.

The guideline development process gives us an opportunity to develop and consult on both our approach to estimating the return on debt and how to implement that approach.

6.2 Propositions for stakeholder consultation

In this chapter we set out the following propositions for consultation:

- A single approach to estimating the return on debt should be used for the definition of the benchmark efficient entity (or for each definition, if more than one benchmark is used) (section6.5).
- A portfolio approach may be preferable to the "on the day" approach, providing appropriate transitional arrangements can be devised to satisfy the NPV=0 condition (section 1.1.1).
- To determine gearing, we will rely on a range of quantitative evidence and methods to calculate the gearing of a comparator sample of businesses. We will then compare the results with the previously adopted level of gearing of 60 per cent (section 6.7.2).

6.3 Summary of stakeholder submissions

Submissions on the return on debt were received from network service providers, industry associations and consumer groups. These primarily focused on efficient financing practices and how they interact with the approach to estimating the return on debt.

The weight of stakeholder opinions appears to be in favour of a portfolio approach over the current "on the day" approach. There was a significant divergence on how to develop the portfolio approach, without consensus on a single preferred approach. Consumer groups largely supported the use of a portfolio approach—noting that it would be more reflective of actual business practice, as well as reducing price volatility for consumers.[112] Service providers stated that different financing practices

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108 More specifically, we proposed to set the DRP as the average of nine bonds with characteristics that were similar to the benchmark (7–13 years maturity, BBB/BBB+/A- credit rating, fixed/floating, not callable or subordinated, Australian issuance). AER, *Draft decision: Aurora distribution determination*, November 2011, pp. 216–219, 238–253.

109 Australian Competition Tribunal, *Application by Envestra Limited (No 2)* [2012] ACompT 3, 11 January 2012; see also Australian Competition Tribunal, *Application by APT Allgas Energy Ltd* [2012] ACompT 5, 11 January 2012.

110 Australian Competition Tribunal, *Application by Envestra Limited (No 2)* [2012] ACompT 3, 11 January 2012, paragraphs 95, 118, 120–121; see also Australian Competition Tribunal, *Application by APT Allgas Energy Ltd* [2012] ACompT 5, 11 January 2012.

111 Specifically, all bonds (sourced from Bloomberg) were from Australian companies, denominated in Australian dollars and issued in Australia. Further, bonds could be either fixed or floating and either bullet, callable or putable. Different scenarios used other slightly different criteria, such as a minimum term (two or five years), and a range of credit ratings (BBB-/BBB/BBB+ or BBB/BBB+).

112 Public Interest Advocacy Centre, *Better returns for consumers: PIAC submission to the AER's Issues paper—Rate of return guidelines*, February 2013, p. 25. Grattan Institute, *Rate of return issues paper—Submission by the Grattan*

were efficient for different companies, so there should be multiple benchmarks permissible in the guideline.[113] Service providers suggested that they should be able to nominate which benchmark in the guideline reflected their specific circumstances when submitting their revenue proposal.[114]

Submissions identified the size of the asset base as one of the factors that affect the efficient financing strategies employed by a firm. For example, it was suggested that a large service provider might not be able to refinance or hedge all of its debt requirements at the beginning of the regulatory control period (as assumed by the "on the day" approach), or that it would be inefficient to do so.[115] Similarly, a smaller service provider might not be able to efficiently issue debt at frequent intervals (as assumed by the portfolio approaches).[116]

Some submissions highlighted that, in practice, debt is acquired not only from the Australian bond market but also in overseas markets and in other forms, such as bank loans.[117] Some stakeholders also listed characteristics which they believe should be taken into account under a benchmark framework.[118] These include the costs of managing refinancing and interest rate risk, as well as liquidity management.

Some stakeholders suggested that service providers' current debt financing practices might be a product of the AER using the "on the day" approach, and would not be considered efficient in the absence of regulation.[119] Submissions suggested that we investigate the financing practices of unregulated capital-intensive businesses, as their approaches may reflect an efficient market outcome and, therefore, inform the guideline's benchmark.[120] One consumer group advocated a revealed cost approach to setting the return on debt—similar to the approach we have been using for opex.[121] We note, however, that such an approach would reduce service providers' incentive to finance efficiently. As such, it would be inconsistent with the rate of return objective.

Finally, stakeholders also raised the issue of transitional arrangements between different benchmarks.

6.4 Efficient debt financing

The rate of return objective requires us to estimate "the rate of return for a [service provider] is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the [service provider] in respect of the provision of [regulated services]".[122] In order to develop our approach to setting the allowed return on debt it is important,

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Institute, February 2013, p. 1. UnitingCare Australia, *Submission in response to the Australian Energy Regulator better regulation rate of return guideline issues paper*, February 2013, p. 10. Major Energy Users, *Australian Energy Regulator better regulation rate of return guidelines—Comments on the issues paper*, February 2013, p. 31.

113 Queensland Treasury Corporation, *Rate of return guidelines issues paper: Submission to the Australian Energy Regulator*, February 2013, p. 23. United Energy and Multinet, *Rate of return guidelines—Response to issues paper*, February 2013, p. 17. Australian Pipeline Industry Association, *Response to issues paper—The Australian Energy Regulator's development of rate of return guidelines*, February 2013, p 43.

114 ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p.28

115 ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p.30; NSW DNSP, *NSW DNSP submission on the rate of return guideline - issues paper*, 18 February 2013, p.7,

116 ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p.30; ActewAGL, Response to rate of return guideline issues paper, 15 February 2013, p.2.

117 ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p.17; MEU, Submission on *AER better regulation rate of return guidelines comments on the issues paper*, February 2013, p.28

118 ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p.44.

119 Envestra, *Submission to rate of return guidelines issues paper*, 15 February 2013, p.7.

120 ENA, *Response to the AER rate of return guidelines - issues paper*, February 2013, p.

121 Major Energy Users, *Australian Energy Regulator better regulation rate of return guidelines—Comments on the issues paper*, February 2013, p. 31-32.

122 For example, NER, cl. 6.5.2(c) for electricity distribution.

therefore, to be clear about how we identify efficiency and what would represent efficient debt financing costs.

Economists typically think of efficiency in three dimensions: productive, allocative and dynamic. In the context of debt financing:

- productive efficiency refers to least cost financing (i.e. the lowest required return on debt)
- allocative efficiency refers to the allowed return on debt reflecting the efficient cost of debt, and
- dynamic efficiency refers to the existence of appropriate investment incentives.

The AEMC's rule change determination recognised the above considerations by noting that the rate of return on debt framework should reflect the allowed rate of return objective and

> ...should try to create an incentive for service providers to adopt efficient financing practices and minimise the risk of creating distortions in the service provider's investment decision.[123]

For our determinations to be productively efficient we need to incentivise service providers to seek the lowest cost financing. Allocative efficiency can be achieved by setting the allowed return such that it reflects the lowest debt cost that a benchmark efficient entity could realistically achieve. We can encourage dynamic efficiency by setting an allowance that does not distort investment decisions.

When assessing the efficiency of different approaches, it is important that we consider practical constraints for debt financing, such as imperfect information, transaction costs, liquidity constraints and limitations in accessing markets. Failure to recognise these constraints could result in deciding on an approach that has unintended consequences and may lead to outcomes that are not in the long-term interest of consumers.

6.5 Relationship with the benchmark efficient firm definition

In Chapter 3, we set out our preliminary view that a single benchmark efficient entity may be appropriate, subject to the degree of risk being similar across determinations. But we also recognise that if there are material differences in the degree of risk for service providers in providing regulated services that are relevant for the rate of return, it may be appropriate to apply separate benchmarks.

Stakeholders have suggested that what represents efficient debt financing may depend on the funding needs of the benchmark entity. In particular, it might be inefficient to issue debt parcels smaller that some minimum size. In that case, the efficient debt issuance practices (e.g. the frequency of debt issuance, debt tenor, etc.) for smaller businesses might differ from that of larger service providers. One way to accommodate this difference is to consider two (or more) benchmark efficient entities with differing debt financing needs, such as a "small" and a "large" benchmark efficient entity. However, there was no consensus amongst stakeholders on the relevance of size for the benchmark.

We note that the assumptions on how the benchmark efficient entity raises debt do not need to exactly correspond to a particular company's actual approach. What is required is for the assumptions to result in an accurate and unbiased estimate of the efficient return on debt for the relevant benchmark efficient entity. Therefore, even if we identify the size of the regulatory asset base (RAB) to be a factor that affects the degree of risk, we would still need to consider whether it requires a

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[123] AEMC, *Rule Determination*, 29 November 2012, p. 73.

separate benchmark to be developed or whether it is sufficient to adopt different parameterisation of the same benchmark entity.

Service providers and their industry representatives advocated a "menu approach" in which each company can select the approach to estimating the return on debt that it sees as most relevant to it at a particular determination. We consider that such an option would not be consistent with the principles of incentive-based regulation. Specifically, it would not encourage efficient debt financing as a service provider would have an incentive to choose the option that maximises its total revenue.

For instance, if the prevailing rate of return on debt at the start of a regulatory control period is high relative to its historic average, a service provider might prefer the "on the day" approach to a portfolio approach. If the prevailing rate of return on debt subsequently fell by the beginning of the next regulatory control period, its preferences may change in favour of a portfolio approach.

Overall, our position at this time is that a single approach to estimating the return on debt should be used for the benchmark efficient entity (or for each definition of the benchmark efficient entity, if more than one benchmark is used).

6.6 Consideration of the three approaches

The current rules allow for three approaches to return on debt estimation, as outlined in the background section. We consider each approach in turn below.

6.6.1 On the day approach

Our current methodology of adopting an "on the day" approach estimates the return on debt of a network service provider as the prevailing return on debt as close as possible to the start of the regulatory control period.[124] Conceptually, this approach assumes that the benchmark efficient firm raises all debt required to satisfy its financing needs once (i.e. just ahead of the start of each regulatory control period) It also assumes that the latest market value of return on debt is the best estimate of the future borrowing cost experienced throughout the regulatory period.

A service provider can implement such a debt management strategy if it engages in one of the following two financing practices:

- It refinances the entirety of its debt in the prevailing market conditions at the beginning of the regulatory control period.
- It engages in some other financing practice, but enters into hedging arrangements to replicate a borrowing cost structure that would arise if it did refinance the entirety of its debt at the beginning of the regulatory control period.

Submissions from network service providers raised a question of whether the "on the day" approach reflects efficient debt financing behaviour. Specifically, it has been argued that, since financial markets are imperfect, a service provider's optimal approach to financing depends on the exposure to potential refinancing risk, as well as other (broadly defined) transaction costs.

Refinancing risk is the risk that a firm would not be able to efficiently finance its debt at a given point in time, either because the debt instruments that it seeks are not available to it, or because they are expensive. Refinancing risk is often due to systematic factors, such as macroeconomic trends or

[124] In practice, this approach uses a short averaging period of 20-40 days shortly before the determination is made.

changes in debt market liquidity. However, refinancing risk may also be brought about by company-specific matters. For example, if lenders knew that a company needed to refinance its debt at a certain time or risk bankruptcy, they would be incentivised to raise the interest rates that they demand from the company.

The significance of refinancing risk as a concern for businesses can be noted from the view of credit rating agencies, such as Standard & Poor's. The rating agency stated that:

> Even when analyzing highly creditworthy companies, it is necessary to be aware of the overall maturity structure and potential for refinancing risk.[125]

6.6.2 Trailing average portfolio approach

The trailing average portfolio approach recognises that the most efficient financing for the benchmark entity may be to spread its borrowing requirements over a time period, thus reducing overall refinancing risk. Furthermore, this approach is consistent with the nature of regulated services, by reflecting the need to finance investment in long-lived assets. A service provider can implement such a debt management strategy by holding a portfolio of fixed-rate debt with staggered maturity dates.

The return on debt produced by a benchmark debt portfolio with staggered maturity dates can be estimated as a trailing average of the returns on debt over a period spanning up to the start of the regulatory control period (or regulatory year). This reflects the forward-looking return on debt that will be incurred by the benchmark entity for debt raised incrementally.

Submissions discussed an implementation of this approach that would involve "refreshing" the trailing average on an annual basis, which would either result in allowed revenue changes in each year of a regulatory control period, or be applied with a retrospective (net present value-neutral) true-up at the next determination. An alternative is proposed in a paper issued by the ACCC's Regulatory Development Branch (RDB) on the return on debt, which suggests that many of the benefits of the trailing average portfolio approach could be retained without annual updating.[126]

6.6.3 Hybrid portfolio approach

As the name suggests, the hybrid portfolio approach incorporates elements from the "on the day" and trailing average portfolio approaches. Under this approach, the estimate of the risk free rate roughly corresponds to the one derived under the "on the day" approach (i.e. reflecting market conditions around the time of the determination). The DRP estimate roughly corresponds to the one derived under the trailing average portfolio approach (i.e. a long-term estimate). A service provider can implement such a debt management strategy by holding a portfolio of floating-rate debt with staggered maturity dates and using an interest rate swap overlay.

Like the trailing average portfolio approach, stakeholders have focused on an application of this approach that would include annual updating. However, the RDB paper notes that the approach could similarly be implemented without annual updating. The paper argues that many of the benefits of the hybrid portfolio approach could be retained.[127]

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125 Standard and Poor's, *2008 Corporate criteria: Analytical Methodology*, April 2008, pp. 31-32.
126 RDB, *Estimating the cost of debt*, April 2013, pp.30-35
127 RDB, *Estimating the cost of debt*, April 2013, pp.30-35

1.1.1 Our preliminary views

We agree with stakeholders that refinancing risk is a relevant consideration and, as such, a benchmark efficient entity may be better served by holding a portfolio of staggered debt issued at different dates. This is particularly true in light of the known issues with the "on the day" approach, as described above. Additional considerations in favour of such a portfolio approach are as follows:

1. It smooths movements in the return on debt over a number of years, which would result in lower price volatility for energy consumers and more stable returns for investors than the "on the day" approach.

2. It minimises the consequences of a single measurement error.[128]

3. It is more reflective of the actual debt management approaches of non-regulated businesses and, therefore, is more likely to represent efficient financing practice.

Nevertheless, we recognise that there are arguments in favour of the "on the day" approach. The "on the day" approach is simpler to calculate than a portfolio approach. Since we and other Australian regulators have used this approach for several years, it is well-understood by stakeholders, while the portfolio approach would represent a notable departure from previous practice. The "on the day" approach would satisfy the NPV=0 condition if it were efficient for the benchmark efficient entity to issue all its debt in one instance just prior to the commencement of a regulatory control period. However, the existence of refinancing risk means that it is unlikely to be efficient for all but the smallest companies to issue or hedge all its debt within a very short time period.

Efficiency properties of the three approaches

In the paragraphs that follow we provide a qualitative assessment of the "on the day" approach and the portfolio approaches (considered together) against the three types of efficiency set out in chapter 6.4.

For an approach to be productively efficient, service providers should be incentivised to seek the lowest cost debt financing. All other things being equal, any of the three approaches would incentivise productive efficiency if a benchmark is used to set the return on debt, and service providers are able to retain the benefit of "beating" the regulator's estimate. However, if service providers set out to mimic the benchmark entity, the "on the day" approach would perform less well in terms of productive efficiency. This is because a company adopting such an approach may incur higher debt costs, depending on the circumstances of its issuances and/or hedging.

If it is efficient for the benchmark entity to raise or hedge all of its debt in one go at the start of the regulatory period, then the "on the day" approach is allocatively efficient. However, where refinancing risk exists, the portfolio approaches perform better on this measure. This is because an allowance based on the "on the day" approach may incorporate additional costs that would not be incurred under a portfolio approach.

In terms of dynamic efficiency, investment distortions may exist under any of the approaches if the required return on debt is different from the allowance. The theoretical rationale behind the "on the day" approach is that the latest market value is recognised to be the best estimate of the borrowing cost at some future time.

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[128] Since a larger number of observations is used to come up with the final estimate, a single measurement will have a smaller distorting impact on the overall estimate than with the short averaging period used for the "on the day" approach.

However, there is still forecasting risk around an estimate derived from the latest market value. This could result in a difference between the cost of debt raised during the regulatory control period and the "on the day" allowance. A service provider would have no guarantee that the allowed return on debt at the next determination would reflect the cost of debt it incurred during the period, and would at the same time be exposed to refinancing risk. The divergence between debt costs and the allowed return on debt may result in sub-optimal investment decisions.

Under a portfolio approach, movements in the market return on debt are reflected in the allowed return on debt. This could be either during the regulatory control period, if annual updating is used, or between periods if a true-up or no annual updating are used. By reflecting market changes during the regulatory control period, the scope for sub-optimal investment levels is reduced.

Overall, the extent to which each of the three approaches promotes efficiency depends on the assumptions. We are satisfied that the portfolio approaches are productively, allocatively and dynamically efficient under reasonable assumptions.

Our views for consultation

Taking into consideration the above, as well as feedback from stakeholders, we are open to the application of a portfolio approach. This is within the constraint that we will only be using one approach to estimating the return on debt for the benchmark efficient entity (or for each definition of the benchmark efficient entity, if more than one benchmark is used). We set out some specific considerations regarding the application of a portfolio approach in appendix G.

We recognise consumers' concerns that—since long-term trailing averages are currently higher than the "on the day" approach—a change of approach may result in consumers incurring higher costs at the next set of determinations than if the approach were left unchanged. However, if the market return on debt increases in the future, the situation would be reversed, and the consumers' costs under the trailing average approach would be lower than if the "on the day" approach is adopted. While it is not possible for us to guarantee that a move to a portfolio approach would not be reversed at some future point, we consider that the guidelines act to enhance our regulatory commitment. Through the considered and consultative process that we are undertaking in developing these guidelines, a decision to change the return on debt estimation approach would be given credence. We would need very strong arguments to depart from it in future guidelines.

If we judge a portfolio approach to be preferable on economic grounds, we will need to convince ourselves that making the change is likely to be in the long-term interest of consumers, particularly if the short-term impact may be higher energy prices at the next set of determinations than under the "on the day" approach.

Additionally, it would be important to manage the transition so that both consumers and service providers are not unduly impacted. Any transition between two approaches should satisfy the NPV=0 condition, so as to mitigate the scope for sub-optimal outcomes in moving from one approach to the other. In appendix G, we set out in detail our considerations around transition.

6.7 Gearing

Gearing is defined as the ratio of the value of debt to total capital (i.e. debt and equity). It is used to weight the return on debt and equity when formulating a WACC. A business' gearing, also referred to as capital structure, will have a significant bearing on the expected required return on debt and the

expected required return on equity. According to the efficient markets theory, the level of gearing is unlikely to affect the overall return on capital.[129]

In theory, the optimal debt-equity ratio is the point at which firm value is maximised, where the marginal return on debt just offset the marginal benefits.[130] However, the actual optimal value of debt and equity for any given firm is dynamic and dependent on a number of business-specific factors. For the purposes of determining a level of gearing of a benchmark efficient entity, we consider that in the long run firms tend towards the optimal level of gearing. In our 2009 WACC review we determined that there was not a strong reason to depart from the adopted level of gearing of 60 per cent.[131]

6.7.1 Relationship with other WACC parameters

The current rules require the allowed rate of return to be a weighted average of the return on equity and the return on debt.[132] The level of gearing of a benchmark efficient provider may be used:

- to weight the expected required return on debt and equity to derive the WACC
- to re-lever asset betas for the purposes of analysing the level of systematic risk across businesses
- as a factor in determining a credit rating for deriving the debt risk premium (DRP).

Equity betas are discussed in chapter 6. Credit ratings are discussed in appendix G.

6.7.2 Proposed method for calculating gearing ratio

The 'true' value of the gearing ratio is unobservable and, therefore, must be estimated. We intend to estimate the gearing ratio by observing values of debt and equity for the same firms that will be included in the return on debt dataset—subject to information availability. We will rely on a range of quantitative evidence and utilise a variety of methods to calculate the gearing of a comparator sample of businesses. Then we will compare the results with the previously adopted level of gearing of 60 per cent. Further detail on our proposed approach to gearing is provided in appendix G.

6.8 Issues for consultation

We seek submissions from interested stakeholders on the issues raised in this chapter, including responses to the following questions:

Question 6.1
Do you support our proposal of having a single approach for estimating the return on debt should be used for the definition of the benchmark efficient entity (or for each definition, if more than one benchmark is used)?

Question 6.2

[129] The cost of capital is invariant over a broad range of gearing possibilities under the assumption of perfect information, no taxes and no transaction costs. See F Modigliani and M H Miller, The Cost of Capital, Corporation Finance and Theory of Investment, *American Economic Review*, Vol.48, No.3, 1958, pp. 261-297

[130] M. Jenson, Agency Costs of Free Cash Flow, Corporate Finance and Takeovers, *American Economic Review*, Vol.76, No.2, 1986, pp. 323-329

[131] AER, *Final decision: Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters*, 1 May 2009, p 126.

[132] NER, cl. 6.5.2(d)(1).

How do the "on the day" approach, trailing average portfolio approach, and hybrid approach to estimating the return on debt compare in terms of promoting efficiency?

Question 6.3

What are the considerations that we should have when setting the gearing level?

Additional questions on the cost of debt and gearing can be found at the end of appendix G.

7 Imputation credits

This chapter sets out the role of imputation credits in building block revenue determinations, and their relationship to the rate of return. It does not put forward any preliminary estimates, but raises conceptual questions to guide the draft decision estimate.

7.1 Background

Under the Australian imputation tax system, investors receive an imputation credit for tax paid at the company level. For eligible shareholders, this credit offsets their Australian income tax liabilities. If the value of tax credits exceeds an investor's tax liability, that investor can receive a cash refund for the balance. The credits are therefore a benefit to investors in addition to any cash dividend or capital gains from owning shares. Standard regulatory practice in Australia is to factor the value of imputation credits (known as gamma) into calculation of corporate tax allowances. Gamma has a range of possible values between zero and one.

Gamma is important in regulation because it affects the estimation of building block revenue allowances. However, the measurement and estimation of the building block revenue allowances, including the rate of return, depends on whether cash flows are pre-tax or post-tax. We use a post-tax framework with a rate of return that is after company tax but before personal tax. We discuss this point in greater detail in section 3.4. However, under the post-tax framework, the rate of return is not directly adjusted by gamma.[133]

Under a pre-tax WACC framework gamma is a WACC parameter. Tax credits provide value to investors by offsetting income tax liabilities. Considering this value, eligible investors would accept an investment with a lower rate of return than if there were no imputation tax credits. In contrast, under a post-tax WACC framework, gamma is not a WACC parameter. Instead, it is a direct input into the calculation of tax liability for the company, via the corporate tax component of the building block model. As a result, the rules[134] require adjustments to the estimated corporate tax building block to avoid double-counting the required return on investment.

To estimate gamma, we use the Monkhouse (1996) formula. The Monkhouse formula is a common way to model the value of gamma to investors. It implies that gamma is the product of a payout ratio and a utilisation rate. However, both of these parameters are conceptually complex and difficult to estimate. As a result, gamma has always been controversial in regulatory decisions. Experts on gamma have advocated a wide range of values that investors place on generated imputation tax credits. These span from zero, meaning no value, to one, meaning full value, and different points within this range. Australian regulators historically adopted the midpoint of this range (0.5).

In 2009, the AER conducted its own review of gamma as part of the last WACC review. In that review. we adopted 0.65 as the value for gamma, made up of:

- a payout ratio of 1

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133 However, in estimating the MRP, the AER 'grosses up' the measurement of excess returns because the share prices used to estimate these returns are post-personal tax. That is, investors trading in these shares have already incorporated their personal tax circumstances into bid prices. This is to be consistent with a framework that is after company tax but before personal tax,

134 NGR r. 87A; NER cl. 6.5.3 and NER cl. 6A.6.4.

- a utilisation rate of 0.65—calculated as an average of the Beggs and Skeels dividend drop off study (0.57)[135] and the Handley and Maheswaran tax statistic study (0.74).[136]

We then applied gamma of 0.65 in the Queensland and South Australian electricity distribution determination. Energex and Ergon successfully appealed this decision to the Tribunal. The Tribunal set the payout ratio to 0.7 and commissioned a divided drop off study from SFG.[137] The Tribunal adopted SFG's recommendation that theta be set at 0.35.

Since 2011, we have adopted gamma of 0.25, which is the product of:

- A payout ratio (F)—0.7
- A utilisation rate (θ)—0.35.

This was on the basis of the Australian Competition Tribunal adopting these values.[138] Prior to now, we have not sought to revisit gamma during individual regulatory determinations. This is primarily because the Tribunal process highlighted the need for a complete re-evaluation of gamma. This was not practicable given the time constraints and more limited scope for consultation during individual regulatory determinations. The development of the rate of return guideline is an ideal opportunity to undertake a further review of the issue.

Specifically, in making its decision the Tribunal recognised that:[139]

> The Tribunal has found some deficiencies in its understanding of the foundations of the task facing it, and the AER, in determining the appropriate value of gamma. These issues have not been explored so far because they have not arisen between the parties, who appear to be in agreement about how the Rules should be interpreted regarding the treatment of corporate income tax. They may be matters that the Tribunal will take up in its further final decision in these matters; or they may best be left until the next WACC review

And that:[140]

> Further, the Tribunal notes that estimation of a parameter such as gamma is necessarily, and desirably, an ongoing intellectual and empirical endeavour.

However, the appropriate value for gamma is not settled amongst Australian regulators. We have adopted the gamma parameters from the Tribunal's 2011 decision while other regulators have continued to apply higher gamma values.[141]

In the draft guideline, we will take into account further detailed technical analysis and stakeholder consultation to arrive at preliminary estimates of the parameters. To promote this stakeholder consultation, Appendix H includes some more detailed background. This includes our views on how estimates of the parameters may be affected by the conceptual questions raised in section 7.4. In particular, we will take into account further analysis, submissions on the consultation paper and expert evidence.

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135 D. Beggs and C.L. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, Vol. 82, No. 258, September 2006, p. 247.

136 J.C. Handley and K. Maheswaran, 'A measure of the efficacy of the Australian imputation tax system', The economic record, Vol. 84, No. 264, March 2008, p. 90.

137 Australian Competition Tribunal, *Application by Energex Limited (No 2) [2010] AComptT 7*, October 2010, para. 147.

138 Australian Competition Tribunal, *Application by Energex Limited (Gamma)(No 5) [2011] ACompT 9*, May 2011, para. 42.

139 Australian Competition Tribunal, *Application by Energex Limited (No 2) [2010] AComptT 7*, October 2010, para. 149.

140 Australian Competition Tribunal, *Application by Energex Limited (Gamma)(No 5) [2011] ACompT 9*, May 2011, para. 45.

141 This is summarised in the section H.4 of the imputation credits appendix (H).

7.2 Propositions for stakeholder consultation

In this chapter we set out the following propositions for consultation:[142]

- For this rate of return guideline, we will continue to estimate gamma as a product of a payout ratio and a utilisation rate (appendix H.6).
- In the past, estimation of both of these parameters has been contentious. Due to the nature of gamma and the underlying data, it is likely that this will continue to depend on imprecise evidence with a wide range of reasonable estimates. Therefore, to reach estimates of the parameters, we will consider a wide range of evidence having regard to its strengths and weaknesses (section 1.4. and appendix H.7–H.8).

7.3 Summary of submissions

We did not raise gamma in the rate of return issues paper and therefore did not receive any submissions on gamma. Instead, the issues paper focused on high level WACC considerations.

7.4 Conceptual issues

In the draft decision, we are likely to undertake a detailed technical review of individual gamma estimates for the draft guideline. However, prior to addressing these estimates, this consultation paper raises the conceptual issues that will guide the technical review. These include:

- The appropriateness of a definitive source of evidence—since there is considerable conceptual and empirical uncertainty about gamma, it may not be practical to rely on a single source of evidence. Instead, it may be more appropriate to consider several sources of evidence having regard to their strengths and weaknesses.
- The use of market value or face value—market value and face value are two distinct measures of the utilisation rate. Market value approaches estimate the trading price associate with imputation credits. However, imputation credits never trade separately in a market. In practice, this usually means trying to separate the value of dividends from their attached imputation credits. In contrast, the face value approaches to valuing the credits use the concept that the value of credits is related to the rate at which the credits are redeemed. At present, there is no definitive answer about which is more appropriate to estimate regulatory gamma. Neither the face value nor the market value is definitively correct or incorrect. Therefore, either or both of the approaches may be appropriate based on practical considerations. This is important because it has implications for the approach used to estimate the utilisation rate. This issue was raised late in the Tribunal appeal process and was not resolved.
- The representative investor—tax studies estimate gamma as valued by the average investor. In contrast, dividend drop off studies estimate gamma as valued by the marginal investor participating in transactions around the time of the distribution of the dividend. It is possible that the marginal investors in dividend drop off studies have distinct trading preferences that differ significantly from the average investor. In this case, it will be important to consider the relevance of both investors to the overall goals of the building block revenue determination.
- The scope of the gamma benchmark—to date, we have used an Australia-wide gamma benchmark. This means that we have estimated gamma using data and information from the

[142] This content is also discussed further in appendix H.

whole Australian economy. However other narrower bases for calculating gamma are possible. For example, we could calculate gamma for a specific industry, portfolio or company.

Addressing these questions will be important to ensure that our estimate of gamma is based on sound economic principles and robust analysis. Within this consultation paper, the conceptual issues are largely discussed in appendix I as part of the discussion of specific gamma parameters.

7.5 Issues for consultation

We seek stakeholder submissions on the issued raised in this chapter. We are particularly interested in stakeholder responses to the questions below.

Question 7.1
Should we still estimate gamma as an economy wide measure? Alternatively, should we seek to narrow the gamma benchmark? If so, what is a more appropriate benchmark?

Question 7.2
To what extent do stakeholders support the use of a definitive source of evidence, even where it has demonstrable shortcomings? Alternatively, to what extent do stakeholders support the use of a wider range of evidence, having regard to its strengths and weaknesses?

8 Debt and equity raising costs

This chapter sets out the considerations regarding our approach to allowing for debt and equity raising costs in the revenue building blocks.

8.1 Background

In previous decisions, we have been including allowances for debt and equity raising costs in the allowed revenue building blocks. The methodology for developing these allowances was set out in a report by the Allen Consulting Group (ACG).[143] This method was amended in the AER's decisions for the ACT, NSW and Tasmanian electricity service providers.[144] The application of this methodology has resulted in the allowances representing a very small proportion of the total allowed revenue building blocks. Nevertheless, the topic has proved contentious in a number of determinations, with network service providers seeking additional allowances for indirect equity raising costs and contending the particulars of our methodology. The methodology, along with related issues, has been set out in detail in our past determinations.[145]

8.2 Propositions for stakeholder consultation

In this chapter we set out the following proposition for consultation:

- We should not calculate a specific allowance for debt and equity raising costs in future determinations. Instead, we should seek to remunerate these costs elsewhere in the revenue building blocks. This could be either through the estimates of the return on debt and return on equity, or through incorporation into the capex and/or opex allowances (section 8.4).

8.3 Summary of stakeholder submissions

Debt and equity raising costs were not covered in the rate of return issues paper. However, at workshops carried out as part of the expenditure assessment guidelines development process, stakeholders suggested that these costs should be considered in the rate of return guideline stream. As part of the expenditure assessment consultation process, brief submissions on debt and equity raising costs were received from a few network service providers, one industry association and one consumer group.

The consumer group advocated that the allowances for debt and equity raising costs should be built up from the revealed costs of the service provider and applied to the amount of new funds required.[146] The industry association and service providers commented that the approach to estimating these costs should be applied in a consistent manner across all determinations, and that it should be consistent with the benchmark assumptions used to determine the revenue allowance.[147] The industry association noted that the benchmark for the return on debt may change as a result of the recent Rule

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143 ACG, Estimation of Powerlink's SEO transaction cost allowance–Memorandum, 5 February 2007

144 AER, *Final decision, Australian Capital Territory distribution determination 2009–10 to 2013–14*, April 2009, appendix H; AER, *Final decision, New South Wales distribution determination 2009–10 to 2013–14*, April 2009, appendix N; AER, *Final decision, TransGrid transmission determination 2009–10 to 2013–14*, April 2009, appendix E; AER, *Final decision, Transend transmission determination 2009–10 to 2013–14*, April 2009, appendix E.

145 See, for example: AER, *Final decision, Powerlink, Transmission determination 2012–13 to 2016–17*, April 2012.

146 MEU, *Expenditure Forecast Guidelines, Comments on the issues paper*, March 2013.

147 ENA, *Better Regulation – Expenditure forecast assessment guidelines for electricity distribution and transmission – Issues paper*, 8 March 2013.

change. It claimed that this may have implications for the estimate of debt raising costs, for example in terms of the tenor and types of debt that are considered.[148]

The industry association considered that the AER's methodology of estimating equity raising costs by modelling benchmark cash flows was appropriate, but had not been applied consistently across past determinations. It considered that the current approach to estimating debt raising costs should be enhanced to incorporate costs relating to liquidity and refinancing risk management, which it argued are required to maintain an investment grade credit rating.[149]

8.4 Our proposed way forward

The current methodology used by the AER to estimate debt and equity raising costs is complex. The methodology is also not universally agreed upon—resulting in debates during reset determinations and appeals to the Tribunal. The AER acknowledges that an efficient company may incur costs in raising debt and/or equity to finance its activities. Our analysis below shows that these costs are small and the input that goes into their calculation is disproportionate to the impact on allowances. From a cost-benefit perspective, we consider that resources of both the AER and service providers would be better spent on other areas of determinations, resulting in better decisions. This would be in the interest of both consumers and the service providers.

Our preliminary position is that we should not calculate a specific allowance for debt and equity raising costs in future determinations. This decision will not lead to inadequate compensation for efficient financing costs as we will seek to remunerate these costs elsewhere in the revenue building blocks. This could be either through the estimates of the return on debt and return on equity, or through incorporation into the capex and/or opex allowances. We seek stakeholder submissions on our preliminary position and on simpler approaches to allow for these costs.

We came to the above preliminary position after reviewing the PTRMs from all determinations made since the AER's last WACC review. Those PTRMs show that debt and equity raising costs amounted to a very small proportion of the allowed revenue building blocks—in all PTRMs they accounted for less than one percent of allowed revenue, and in 25 of the 32 PRTMs reviewed they accounted for less than half a percent. We note that allowances of such level would not pass the threshold for consideration under our pass-through arrangements.

There was no material difference between electricity and gas, or between transmission and distribution. Table 8–1 provides a statistical summary of the allowances for debt and equity raising costs in the PTRMs that we reviewed.

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148 ENA, *Better Regulation – Expenditure forecast assessment guidelines for electricity distribution and transmission – Issues paper*, 8 March 2013, p. 10.

149 ENA, *Better Regulation – Expenditure forecast assessment guidelines for electricity distribution and transmission – Issues paper*, 8 March 2013, p. 10.

Table 8–1 Debt and equity raising costs - summary statistics from review of PTRMs

Classification	Number of PTRMs	Average debt and equity raising allowance as share of revenue building blocks	Maximum debt and equity raising allowance as share of revenue building blocks	Number of PTRMs with zero allowance for equity raising cost
All PTRMs	32	0.40%	0.91%	15 (47%)
Electricity distribution	14	0.43%	0.63%	2 (14%)
Electricity transmission	6	0.46%	0.91%	1 (17%)
Gas distribution	9	0.35%	0.38%	9 (100%)
Gas transmission	3	0.36%	0.48%	3 (100%)
Tribunal varied PTRMs	13	0.43%	0.91%	4 (31%)

Source: AER analysis.

Submissions from some service providers and their industry association have highlighted the need to ensure consistency between the benchmark efficient entity used when estimating the return on debt, and the methodology used to estimate debt raising costs. We agree that any changes to the benchmark efficient entity might influence the selection of bonds used in the ACG methodology. We do not think, however, that any changes to the benchmark would change the costs that would need to be estimated to set the allowance for debt raising costs.

The submissions from some service providers and their industry association also considered that liquidity and risk management costs represent part of efficient practice and should be incorporated into the allowance. We note that there is no consensus on what represents efficient liquidity and risk management practice, and that risk management is a function of a company's shareholders' preferences. Furthermore, estimating these costs would require the AER to define what activities form part of efficient liquidity and risk management, and what the costs of each activity are. The data corresponding to these costs is unlikely to be readily available or comprehensive. We consider that including these costs in the benchmark would further increase the complexity and contentiousness of these estimates, while only having a marginal impact on allowances.

Overall, consideration of submissions does not change our view that, from a cost-benefit perspective, we should not calculate a specific allowance for debt and equity raising costs in future determinations. We think that these costs should be remunerated elsewhere in the revenue building blocks.

8.5 Issues for consultation

We seek submissions from interested stakeholders on the issues raised in this chapter, including responses to the following question:

Question 8.1

Do you support our preliminary position of not setting a specific allowance for debt and equity raising costs, and instead, remunerating them elsewhere in the revenue building blocks?

9 Forecast inflation

This chapter discusses the method we use to estimate forecast inflation. In this chapter we outline our current approach, an approach we have used in the past and a number of other approaches in use with other regulators in Australia.

9.1 Background

Forecast inflation has several uses in our regulatory models. One important use is to adjust the cash flows to maintain a real rate of return framework. As a result, it is an important parameter in the determination of the revenue allowance.

In the SP AusNet electricity transmission decision in early 2008 we considered forecast inflation in detail.[150]

Prior to that decision we had used the Fisher equation to calculate forecast inflation. The Fisher equation estimated the difference between the nominal risk free rate and the real risk free rate. Until that decision, the yield on nominal CGS and indexed CGS respectively were appropriate proxies for these parameters.

In its initial proposal, SP AusNet raised concerns about the appropriateness of indexed CGS as a proxy for the real risk free rate. These concerns were primarily about the liquidity of the market in the presence of a reduction of supply and an increase in demand.[151] We sought advice from the RBA and Australian Treasury on this matter. Their advice confirmed there were liquidity concerns in the indexed CGS market.[152] The RBA stated:

> In contrast to the regular issuance of nominal bonds that underpins the futures market contracts, there have been no indexed bonds issued since February 2003. Outstandings are now limited to just three issues, just one of which has a maturity in excess of 10 years. Moreover, demand for these bonds has increased as supply has fallen. Turnover in the bonds is low and the market is fairly illiquid.[153]

In the SP AusNet final decision we considered that combining RBA short term forecasts with the mid-point of the RBA target range produced the best inflation forecast. From that decision onwards we have used this methodology.[154] However, in the SP AusNet final decision we stated we would continue to review the issue in consultation with stakeholders.

In recent years the AOFM has begun issuing indexed CGS again.[155] As at 12 April 2013 there was approximately $17 billion of indexed CGS on issue. Therefore we are considering whether it is appropriate to move back to using the Fisher equation.

9.2 Summary of submissions

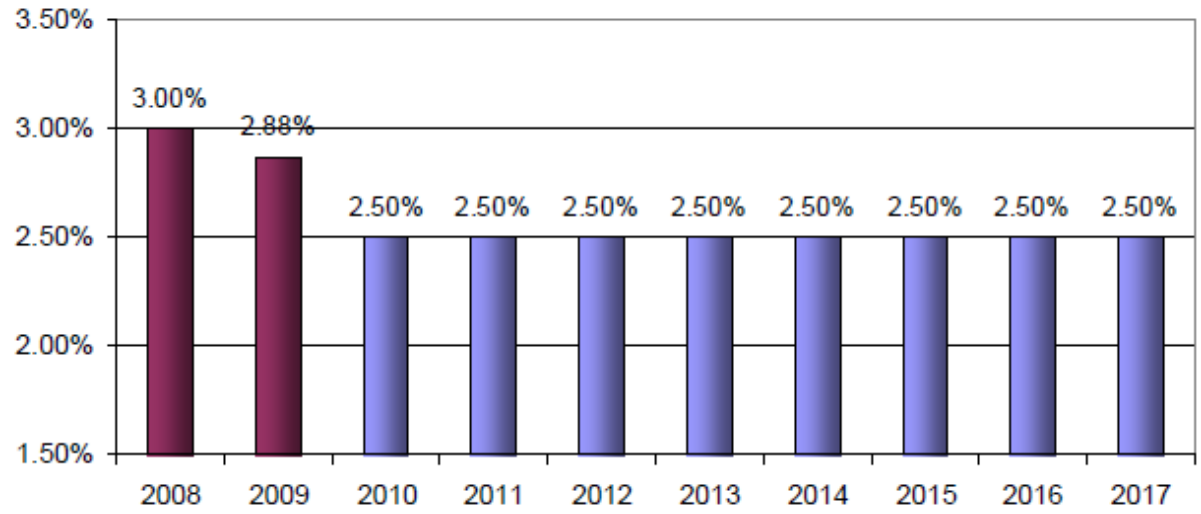
We did not raise forecast inflation in the rate of return issues paper and therefore did not receive any submissions on forecast inflation. Instead, the issues paper focused on high level WACC considerations.

150150 AER, *Final decision: SP AusNet transmission determination 2008-09 to 2013-14*, January 2008, pp. 99-106.
151 See, NERA, *Bias in Indexed CGS Yields as a Proxy for the CAPM Risk Free rate*, March 2007, pp. 10-11.
152 Australian Treasury, *The treasury bond yield as a proxy for the CAPM risk-free rate*, 7 August 2007; RBA, *Letter to ACCC*, 9 August 2007.
153 RBA, *Letter to ACCC*, 9 August 2007, p. 3.
154 The only change since the SP AusNet decision is that we now use a geometric average instead of an arithmetic average.
155 See, for example, Rob Nicholl, AOFM, *After the storm - Does it get easier*, Australian Business Economists Speech, Sydney, 22 May 2012, pp. 9-10.

9.3 Our current approach

Since the SP AusNet decision we have used a combination of RBA short term forecasts (found in its quarterly Statement on Monetary Policy) and the mid-point of the RBA inflation target (i.e. 2.5 per cent). The figure below provides an example, taken from the SP AusNet final decision. The simple average of 2.59 per cent was the figure used in the PTRM in that decision. We have since changed to using a geometric average.

Figure 9–1 Average of forecast inflation over ten years



Source: AER, *Final decision: SP AusNet transmission determination 2008-09 to 2013-14*, January 2008, p. 105.

9.4 Other potential approaches

We identify three alternatives to the current approach:

- Fisher equation (previous approach)
- Australia inflation-indexed swaps
- Forecasts

There are varied interpretations of these three approaches used by regulators in Australia:

- The ERA recently moved back to using the Fisher equation.[156]
- IPART has used inflation swaps since 2009.[157]
- ESCV combines a variety of inflation forecasts by different economists in a forecast range for inflation.[158]
- QCA appears to use the mid-point of the RBA inflation target.[159]

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156 ERA, *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network*, 5 September 2012, pp. 327-329.
157 IPART, *Final decision: Adjusting for expected inflation in deriving the cost of capital*, May 2009.
158 ESCV, *Draft decision: Water price review 2013 - Regional urban water businesses*, March 2013, pp.112-113.
159 QCA, *Final report: SunWater Irrigation price review 2012-17*, May 2012, p. 200.

The Fisher equation compares the yield on the nominal risk free rate with the yield on the real risk free rate using the following formula:

$1 + E(f) = (1 + Rn)/(1 + Rr)$

Where: E(f) is the expected rate of inflation

Rn is the nominal interest rate

Rr is the real interest rate

Inflation swaps are used by some businesses to offset inflation risk. This makes them an appropriate means of estimating forecast inflation. We considered using inflation swaps in the SP AusNet final decision. At the time we considered the inflation swaps market was not liquid enough to provide reliable inflation forecasts.

The approach we currently use employs forecasts of inflation. However, there may be alternative forecasts we could use. In the past, businesses have proposed the combination of a variety of different forecasts, rather than just RBA forecasts.

We are interested in receiving stakeholder input on the advantages of each of these approaches, and also whether there are any other approaches available.

9.5 Issues for consultation

We are seeking views and supporting information from interested stakeholders on the following:

Question 9.1
Should we continue to use our current approach to forecast inflation or move back to using the Fisher equation? Alternatively, should the AER use inflation swaps? Are there other approaches not identified in this paper that we should consider?

A Glossary

Glossary	Full title
ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
common framework	Refers to the largely consistent rules framework on the rate of return that applies to gas service providers (NGR), electricity distribution network service providers (NER chapter 6) and electricity transmission service providers (NER chapter 6A).
determination	In this document generally, in the context of the rate of return, the term "determination" refers both to regulatory determinations under the NER and access arrangement determinations under the NGR.
DRP	Debt Risk Premium
ENA	Energy Networks Association
ERA	Economic Regulation Authority
EUAA	Energy Users Association of Australia
EURCC	Energy Users Rule Change Committee
MRP	Market risk premium
MEU	Major Energy Users Inc
NER	National Electricity Rules
NEL	National Electricity Law
NEM	National Electricity Market
new rules	The National Electricity Rules and National Gas Rules that were published by the AEMC on 29 November 2012
NGL	National Gas Law
NSW T Corp	New South Wales Treasury Corporation

PIAC	The Public Interest Advocacy Centre
QTC	Queensland Treasury Corporation
RAB	Regulatory Asset Base
RARE	RARE Infrastructure Limited
RDB	Regulatory Development Branch
service providers	Electricity transmission network service provider, electricity distribution network service providers and gas service providers
SFG	Strategic Finance Group Consulting
subsequent regulatory control period for service providers	Expected to be 1 July 2015 to 30 June 2019.
transitional regulatory control period for service providers	1 July 2014—30 June 2015
transitional rules	Transitional rules contained in the *National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012 No. 9* (Network Regulation rule change) which the AEMC determined in November 2012. These transitional rules set out the transitional arrangements for the next ACT/NSW electricity distribution determinations.
the guidelines	Rate of return guidelines
WACC	Weighted average cost of capital
2009 WACC review	AER 2009 review of the weighted average cost of capital (WACC) parameters (published in May 2009).

B New regulatory framework for rate of return

B.1 National Electricity and Gas Laws – objectives

During the rule change consideration process, it was highlighted that there was a need to bring the focus of the rate of return estimate back to the National Electricity Objective (NEO), the National Gas Objective (NGO) and the Revenue and Pricing Principles (RPP).

The NEL and NGL provides that the AER must exercise economic regulatory functions, such as making a revenue determination for networks service providers, in a manner that will or is likely to contribute to the achievement of the NEO.[160] The NEO is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- price, quality, safety, reliability and security of electricity, and
- the reliability, safety and security of the national electricity system.[161]

This objective is at the heart of all decisions we make when regulating electricity service providers. Section 23 of the NGO provides similar provisions to promote efficient investment in, and efficient operation and use of, gas services for the long term interests of consumers of gas.

In addition, the NEL and NGL provides that the AER:

- must take into account the RPP when exercising a discretion in making those parts of a distribution determination or transmission determination relating to direct control network services, and
- may take into account the RPP when performing or exercising any other AER economic function or power, if the AER considers it appropriate to do so.[162]

Therefore, the NEO, NGO and the RPPs will each be relevant to the AER's determination of the allowed rate of return for each network service provider.

The RPP which are most relevant to the rate of return review are:

- providing a service provider with a reasonable opportunity to recover at least the efficient costs[163]
- providing a service provider with effective incentives in order to promote efficient investment, and[164]
- having regard to the economic costs and risks of the potential for under and over investment.[165]

B.2 National Electricity and Gas Rules – building block approach

The National Electricity and Gas Rules provide a building block framework for determining the allowable revenues for network service providers. The NER provide that the annual revenue

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160 NEL, s.16(1)(a).
161 NEL, s.7.
162 NEL, s.16(2); NGL, s. 28(2).
163 NEL, s.7A(2); NGL, s.24(2).
164 NEL, s.7A(3); NGL, s.24(3).
165 NEL, s.7A(6); NGL, s. 24(6).

requirement for a DNSP for each regulatory year of a regulatory control period must be determined using a building block approach, under which the building blocks are:[166]

(1) indexation of the regulatory asset base

(2) a return on capital for that year

(3) the depreciation for that year

(4) the estimated cost of corporate income tax of the Distribution Network Service Provider for that year

Rule 76 of the NGR provide similar building block approach for estimating the total revenue for the gas service providers.

B.3 The rate of return guidelines

The approach we propose to use to assess the service providers' rate of return on capital must be specified in rate of return guidelines. The guidelines are not binding on us or service providers, but we would expect that they would be the starting point for all service provider revenue proposals and our determinations on those proposals. Whilst non binding in nature, if service providers depart from the guidelines in their proposals or if we depart from the guidelines in making determinations, the service providers and us would need to provide reasons for doing so. [167]

The NER provide that the AER must, in accordance with the distribution consultation procedures, make and publish the rate of return guidelines at least every three years.[168] The guidelines provide an opportunity to undertake a comprehensive review of approaches for determining the rate of return on capital.

The guideline must set out:[169]

(1) the methodologies that the AER proposes to use in estimating the allowed rate of return, including how those methodologies are proposed to result in the determination of a return on equity and a return on debt in a way that is consistent the allowed rate of return objective; and

(2) the estimation methods, financial models, market data and other evidence the AER proposes to take into account in estimating the return on equity, the return on debt and the value of imputation credits referred to in clause 6.5.3 or 6A.6.4.

There must be rate of return guidelines in force at all times after the date on which the AER first publishes the rate of return guidelines under these Rules.[170]

The AER must, in accordance with the distribution consultation procedures, review the rate of return guidelines:[171]

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166 NER, cl. 6.4.3(a) and 6A.5.4(a); NGR, r. 76.
167 NGR, r. 87(18); AEMC, *Final rule determination*, 29 November 2012, pp. 28, 40.
168 NER, cl. 6.5.2(m) and 6A.6.2(m).
169 NER, cl. 6.5.2(n) and 6A.6.2(n).
170 NER, cl. 6.5.2(o) and 6A.6.2(o).
171 NER, cl. 6.5.2(p) and 6A.6.2(p).

(1) at intervals not exceeding three years, with the first interval starting from the date that the first Rate of Return Guidelines are published under these Rules; and

(2) at the same time as it reviews the guidelines made under clause 6A.6.2 or 6.5.2.

Rule 37(1) of the NGR requires the AER must make and publish on its website the first rate of return guidelines by 29 November 2013.

The rate of return on capital

The NER provide that the return on capital for each *regulatory year* must be calculated by applying a rate of return for the relevant DNSP for that *regulatory year* that is determined in accordance with the clause 6.5.2 (the allowed rate of return) to the value of the regulatory asset base for the relevant *distribution system* as at the beginning of that *regulatory year* (as established in accordance with clause 6.5.1 and schedule 6.2.[172]

The NGR also provide a similar provision for estimating return on capital for the gas service providers.[173]

Rate of return objective

The NER provide that the *allowed rate of return* is to be determined such that it achieves the allowed rate of return objective.[174]

The allowed rate of return objective is:

> The *allowed rate of return objective* is that the rate of return for a *Distribution Network Service Provider* is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the *Distribution Network Service Provider* in respect of the provision of *standard control services (the allowed rate of return objective*)..[175]

The NER provide that the *allowed rate of return* for a *regulatory year* must be:[176]

a weighted average of the return on equity and return on debt for the *regulatory control period* in which that *regulatory year* occurs[177]

(1) determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits[178]

The NER provide that in determining the *allowed rate of return*, regard must be had to:[179]

(1) relevant estimation methods, financial models, market data and other evidence[180]

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172 NER, cl. 6.5.2(a) and 6A.6.2(a).
173 NGR, r. 87(1).
174 NER, cl. 6.5.2(b) and 6A.6.2(b).
175 NER, cl. 6.5.2(c) and 6A.6.2(c); NGR, r. 87(3).
176 NER, cl. 6.5.2(d) and 6A.6.2(d); NGR, r. 87(4).
177 NER, cl. 6.5.2(c) and 6A.6.2(c); NGR, r. 87(5).
178 Referred to in NER, cl. 6.5.3 or 6A.6.4.
179 NER, cl. 6.5.2(e) and 6A.6.2(e).
180 NER, cl. 6.5.2(c) and 6A.6.2(c); NGR, r. 87(5)(a).

(2) the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt[181]

(3) any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.[182]

The NGR also provide a similar provision for estimating allowed rate of return for the gas service providers.[183]

Return on equity

The NER provide that the return on equity for a *regulatory control period* must be estimated such that it contributes to the achievement of the *allowed rate of return objective*.[184] In estimating the return on equity, regard must be had to the prevailing conditions in the market for equity funds.[185]

The NGR also provide a similar provision for estimating allowed rate of return for the gas service providers.[186]

Return on debt

The NER provide that the return on debt for a *regulatory year* must be estimated such that it contributes to the achievement of the *allowed rate of return objective*.[187] The return on debt may be estimated using a methodology which results in either:

(1) the return on debt for each regulatory year in the regulatory control period being the same; or

(2) the return on debt (and consequently the allowed rate of return) being, or potentially being, different for different regulatory years in the regulatory control period.

The NER provide that the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting:[188]

(1) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the making of the distribution determination for the regulatory control period;

(2) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the regulatory control period; or

(3) some combination of the returns referred to in subparagraphs (1) and (2).

In estimating the return on debt regard must be had to the following factors:[189]

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181 NER, cl. 6.5.2(c) and 6A.6.2(c); NGR, r. 87(5)(b).
182 NER, cl. 6.5.2(c) and 6A.6.2(c); NGR, r. 87(5)(c).
183 NGR, r. 87(1).
184 NER, cl. 6.5.2(f) and 6A.6.2(f); NGR, r. 87(6).
185 NER, cl. 6.5.2(g) and 6A.6.2(g); NGR, r. 87(7).
186 NGR, r. 87(6) and 87(7).
187 NER, cl. 6.5.2(h) and 6A.6.2(h).
188 NER, cl. 6.5.2(j) and 6A.6.2(j).

(1) the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective;

(2) the interrelationship between the return on equity and the return on debt;

(3) the incentives that the return on debt may provide in relation to capital expenditure over the regulatory control period, including as to the timing of any capital expenditure; and

(4) any impacts (including in relation to the costs of servicing debt across regulatory control periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one regulatory control period to the next.

The NGR also provides similar provisions for estimating return on debt for the gas service providers.[190]

Estimated cost of corporate income tax

The NER provide that:[191]

1. The estimated cost of corporate income tax of a DNSP for each regulatory year (ETCt) must be estimated in accordance with the following formula:

$ETC_t = (ETI_t \times r_t)(1 - \gamma)$

Where

ETI_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of reference services if such an entity, rather than the service provider, operated the business of the service provider;

r_t is the expected statutory income tax rate for that regulatory year as determined by the AER; and

γ is the value of imputation credits.

The NGR also provides similar provision for estimating cost of corporate income tax.[192]

189 NER, cl. 6.5.2(k) and 6A.6.2(k).
190 NGR, r. 87(8)–(10).
191 NER, cl. 6.5.3 and 6A.6.4(c).
192 NGR, r. 87A.

C Applicability of this guideline to future determinations

At the same time as we are developing the guidelines, seven NSPs are due to submit their regulatory proposals.[193]. Another eight are due to submit within 12 months of the guidelines' implementation in November 2013 (see tables C–1 and C–2). Given the degree of overlap between the guideline development and regulatory determination processes, some form of transitional arrangement is required to:

- enable the new rules and guidelines to be applied in the next round of regulatory reviews
- minimise the resourcing burden that the guideline development and regulatory determination processes may otherwise place on us, NSPs and other stakeholders.[194]

The AEMC has included transitional arrangements in the final rules to enable us to apply the new rules as soon as possible. This will allow the benefits of the new rules to flow through to consumers more quickly.

Although the guidelines are non–binding in nature, in practice we and the service providers will be expected to follow the guidelines when setting the rate of return. Service providers would need to justify with evidence in their regulatory proposals why they are proposing a different approach to that established in the guidelines. Any deviation we proposed to make from the guidelines in setting a service providers rate of return would also need to be explained.

Table C-1 Timetable for regulatory determinations (electricity)

Service provider		Framework and approach paper published	Regulatory proposal due	Regulatory period commence
ElectraNet and Murraylink (SA transmission and interconnector between VIC and SA)*		n.a.	Already submitted	1 July 2013
SP AusNet (Vic transmission)*		n.a.	Already submitted	1 April 2014
2014–15 Group of NSPs	TransGrid and Transend (NSW and Tas transmission)	31 January 2014	Transitional: 31 January 2014 Full: 31 May 2014	Transitional: 1 July 2014 Full: 1 July 2015
	ActewAGL, Ausgrid, Endeavour Energy and Essential Energy (ACT and NSW distribution)	Part 1: 31 March 2013 Part 2: 31 January 2014	Transitional: 31 January 2014 Full: 31 May 2014	Transitional: 1 July 2014 Full: 1 July 2015
Directlink (Interconnector between Qld and NSW)		31 January 2014	31 May 2014	1 July 2015
2015–16 Group of DNSPs	Ergon Energy, Energex and SA Power Networks (Qld and SA distribution)	30 April 2014	31 October 2014	1 July 2015

193 AEMC, *Final determination*, November 2012, pp. 228–229.
194 AEMC, *Final determination*, November 2012, pp. 229, 481, 484.

Post 2016 Group	Jemena, United Energy, Citipower, Powercor and SP AusNet (Vic distribution)	31 October 2014	30 April 2015	1 January 2016
	Aurora Energy (Tas distribution)	31 July 2015	31 January 2016	1 July 2017
	Powerlink (Qld transmission)	31 July 2015	31 January 2016	1 July 2017
	ElectraNet (SA transmission)	31 July 2016	31 January 2017	1 July 2018
	Murraylink (Interconnector between SA and Vic)	31 July 2016	31 January 2017	1 July 2018

Source: AEMC, *Final rule determination*, 29 November 2012, p. 229.
* ElectraNet, Murraylink and SP AusNet transmission determinations are made under the old rules.

Table C-2 Timetable for regulatory determinations (gas)

Service provider		Regulatory proposal due	Access arrangement period commence
Gas Distribution			
2014–15 Group of NSPs	Envestra (Wagga Wagga), Jemena (NSW Gas Distribution)	June 2014	1 July 2015
Post 2016 Group	ActewAGL (ACT Gas Distribution)	June 2015	1 July 2016
	APT Allgas, Envestra (Qld), Envestra (SA) (Qld and SA Gas Distribution)	June 2015	1 July 2016
	Envestra (Albury), SP AusNet, Multinet, Envestra (Vic) (Vic Gas Distribution)	Dec 2016	1 Jan 2018
Gas Transmission			
2014–15 NSP	Dawson valley pipeline (Qld Gas Transmission)	Sep 2014	September 2015
Post 2016 Group	Amadeus gas pipeline (NT Gas Transmission)	July 2015	1 July 2016
	Roma to Brisbane pipeline (Qld Gas Transmission)	August 2016	1 July 2017
	APA GasNet (Vic Gas Transmission)	Dec 2016	1 Jan 2018

Source: AER analysis.

D Reasonableness checks

In previous decisions, we have considered reasonableness checks of the overall rate of return. Typically, we have evaluated a range of other evidence and compared it with a WACC derived from the individual WACC parameter values. This appendix contains a summary of the following reasonableness checks, including their limitations, which we have used in our recent decisions:

- asset sales
- trading multiples
- broker WACC estimates
- recent decisions by other regulators and the AER
- recent decisions by overseas regulators
- the relationship between the return on equity and the return on debt
- cash flow analysis.
- This appendix also discusses other reasonableness checks which we have not previously used, including financeability and credit metrics, and other possible sources of information.

Generally, these reasonableness checks have confirmed that our overall rate of return estimates have been commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services. For some recent decisions, however, our determined WACC has been at the low end, or lower, than the broker WACC range. This has been the only reasonableness check which has indicated a potential concern.

This appendix also includes the relevant reasonableness checks data published in our Victorian Gas final decisions in March 2013. It is reproduced to highlight the available metrics and the limitations in assessing these reasonableness checks.

D.1 RAB acquisition

For recent transactions of regulated assets, for which relevant data is available, we have previously compared the market value (that is, the sale price) with the book value (that is, the regulatory asset base). If the market value is above the book value, this may imply that the regulatory rate of return is above that required by investors. Conversely, when the market value is below the book value, this may imply that the regulatory rate of return is below that required by investors.

Caution must be exercised, however, before inferring that the difference indicates a disparity in WACCs, particularly where the difference is small. A range of factors may contribute to a difference between market and book values. A RAB multiple greater than one might be the result of the buyer:[195]

- expecting to achieve greater efficiency gains that result in actual operational and capital expenditure below the amount allowed by the regulator

[195] Each of these reasons assumes the purchasing firm is making a rational purchasing decision. Another reason for a RAB multiple greater than one might be that the purchasing firm misjudged the value of the target assets and paid too much for those assets. Each transaction considered by the AER involved sophisticated investors with significant knowledge of the industry. Accordingly, the AER does not consider it likely that the RAB multiples greater than one result from poor valuations of the target assets.

- increasing the service provider's revenues by encouraging demand for regulated services
- benefiting from a more efficient tax structure or higher gearing levels than the benchmark assumptions adopted by the regulator, and growth options
- expecting to achieve higher returns if regulation is relaxed.[196]

We considered that the above list was not exhaustive.[197]

Regulated asset sales in the market are also infrequent, allowing limited opportunity to conduct this analysis. This was of particular relevance recently, as we set a lower overall rate of return than in previous decisions. While asset sales in the future may reflect changes to the overall rate of return that are occurring at present, sales that have already occurred will not.

Regulated asset sales do, however, provide a useful real-world indication of whether market participants consider our benchmark WACC to be, broadly speaking, reasonable. The consistent positive trend as discussed below provides evidence that our WACC approach has not been unreasonable.

Further, CEPA consider the Market Asset Ratio [RAB multiple] to be a well established tool used by equity analysts to compare allowed and actual returns on capital.[198] Deloitte also confirm that a commonly used industry rule of thumb for valuing regulated assets is the RAB multiple.[199]

The RAB multiples from each of these transactions, together with the transactions discussed above, are summarised in Table D-1 from most recent to least recent. Further information on each of the transactions is provided in the final decision.

Table D-1 Selected acquisitions – RAB multiples

Date	Acquirer	Entity/Asset acquired	RAB multiple (times)
Dec 2012	State Grid Corp of China	41.1% of ElectraNet SA	1.29
Dec 2011	Marubeni Corp/RREEF	Allgas	1.20
Dec 2011	Marubeni Corp/RREEF	Allgas	1.02
July 2011	ATCO	25.9% of West Australian Gas Networks	1.20
July 2011	DUET	20% of Multinet Gas	1.13
July 2011	DUET	20% of Dampier to Bunburry Natural Gas Pipeline	0.95[200]

196 Grant Samuel & Associates Pty Limited, *Financial Services Guide and Independent Expert Report in relation to the Recapitalisation and Restructure of Babcock and Brown Infrastructure*, 9 October 2009, p. 77 (Grant Samuel, *Expert report: Babcock and Brown Infrastructure*, October 2009).

197 SFG have provided alternative explanations of the sale price in excess of the RAB. SFG, *The required return on equity: Response to AER Victorian gas draft decisions*, 7 November 2012, p. 47.

198 CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, February 2013, p. 51.

199 In theory, where the WACC applied is the same as the regulatory return determined and the regulator and market have the same view as to the costs of operating the regulated asset, the RAB multiple should be one. Deloitte, *Determining the fair value of Australia's water infrastructure assets*, March 2010, p. 11.

Source: AER, *Final decision: SPI Networks (Gas) Pty Ltd access arrangement, Part 3: Appendices*, March 2013, p. 60.

D.2 Trading multiples

We have previously compared the asset value implied by share prices against the regulatory asset base—often expressed as a 'trading multiple'— providing insight into the required rate of return.[201]

As with regulated asset sales, a trading multiple above one may imply that the market discount rate is below the regulated WACC. We have acknowledged there are other factors which may explain a trading multiple above one.[202] The same cautions with interpreting the results of the regulated asset sales approach apply to trading multiples. In addition, this assessment relies on the assumption that share prices reflect the fundamental valuation of the company.

Recent broker reports have identified RAB trading multiples.[203] These multiples have been consistently greater than one. Below are examples of recent relevant broker report trading multiples.

Table D-2 JP Morgan trading multiples

Date of report	Company	2010–11	2011–12	2012–13
16 January 2013	DUET	1.26	1.18	1.20
16 January 2013	ENV	1.20	1.25	1.29
16 January 2013	SKI	1.26	1.22	1.27
16 January 2013	SPN	1.21	1.20	1.24

Source: JP Morgan, *Utilities 2013 Outlook: Regulatory Risks Recede*, 16 January 2013, pp. 54, 58, 61, 64.

200 Dampier to Bunbury Natural Gas Pipeline (DBNGP) presents an unusual case because it is 96% contracted until 2016 under shipper contracts. As the Economic Regulation Authority (ERA) of Western Australia states, these contracts 'are substantially independent of the access terms and reference tariffs established under the access arrangement for the DBNGP.' ERA, *Final decision: DBNGP access arrangement*, October 2011, p. 14. For this reason the DBNGP RAB multiple appears to be not driven by regulatory rates of return and does not provide a useful comparison for RAB multiples analysis.

201 The AER has not made any calculations of its own in this section. Trading multiples have only been stated where they could be identified in an external report. The AER does not have specific information regarding the precise nature of the brokers' calculations.

202 CEPA have identified factors which may result a trading multiple above one - expectations of earnings from incentives and efficiencies; an actual cost of capital that is below the allowed cost; and wider stock market or M&A activity. The AER considers that this list is not exhaustive. CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, February 2013, p. 53.

203 Noting that the brokers do not always provide these figures. Where possible, trading multiples for the previous year have also been presented to provide context, but only for those broker reports where a recent update was available.

Table D-3 Credit Suisse trading multiples

Date of report	Company	2012	2013
12 February 2013	DUET	1.15	1.19
12 February 2013	ENV	1.35	1.43
12 February 2013	SKI	1.39	1.39
12 February 2013	SPN	1.14	1.18

Source: Credit Suisse, *Regulated Utilities Monthly*, *Sector review,* 12 February 2013, p. 10; Credit Suisse, *Regulated Utilities Monthly*, *Sector review,* 7 November 2012, p. 14.

D.3 Comparison with brokers' discount rates

We have previously considered published equity analysts' broker reports on listed companies operating regulated energy networks in Australia. These reports generally include WACC estimates along with a range of information, including analysis of current financial positions and forecasts of future performance.

The limitations of the use of broker WACC estimates include:

- The broker reports generally do not state the full assumptions underlying their analysis, or provide thorough explanations of how they arrive at their forecasts and predictions. As such, caution should be exercised in the interpretation of these broker reports.[204]
- The five listed companies considered undertake both regulated and unregulated activities, which are assessed by the brokers in aggregate. However, only the regulated activities are directly relevant to the risk in providing reference services. It is generally considered that the regulated activities of the firms—operation of monopoly energy transmission and distribution networks—tends to be less risky than the unregulated activities they undertake in competitive markets. As the regulated activities tend to be less risky, the return required on these activities could be expected to be less than the return required by these firms as a whole.[205] This means that the overall WACC estimate implied by broker reports may overstate the rate of return for the benchmark firm.
- It is generally not clear what assumptions the brokers have relied upon when developing their WACC estimate. Further, variation in WACC estimates suggests that these assumptions are not consistent across the different brokers.
- The broker reports have not always provided sufficient information for us to have calculated a nominal vanilla WACC estimate. Only those brokers who report the WACC in nominal vanilla form or provide sufficient detail to enable conversion to this form were considered. These figures were

[204] In particular, the AER considers that the price and dividend forecasts from these reports do not constitute a sufficiently reliable basis for calculation of an overall rate of return. However, the broker reports do often report discount rates, which are equivalent to the broker's estimate of the WACC for the company.

[205] Associate Professor Lally makes this point in relation to dividend growth model (DGM) estimates of the return on equity which are based on listed regulated energy networks. That is, he states that as the unregulated activities tend to be have higher risk, the estimated return on equity (based on data which takes into account the entirety of the firm's activities) will tend to overestimate that for its regulated activities. Lally, *Cost of equity and the MRP*, July 2012, p. 14.

not necessarily precise estimates of the broker's nominal vanilla WACC, since we have had to rely on our interpretation of the information provided.

For example, based on this analysis, Table D-4 sets out the range for the broker WACC estimates (converted to a nominal vanilla WACC).[206] As the WACC information in the broker reports are published infrequently, the most recent range does not necessarily align with current market circumstances. It is sensitive to the date range used, and as such may be lagged.

Table D-4 Broker WACC estimates (per cent)

Measure	Minimum	Maximum
Broker headline post-tax WACC	6.20	8.60
Calculated nominal vanilla WACC	7.38	10.02

Source: AER, *Final decision: SPI Networks (Gas) Pty Ltd access arrangement, Part 3: Appendices*, March 2013, p. 66.

D.4 Comparison with takeover valuation report discount rates

We previously considered surveys of market practitioners and academics to be relevant as they reflect the forward looking MRP applied in practice. We applied the criteria noted by the Tribunal to the survey evidence and concluded the survey results are still relevant to inform the forward looking 10-year MRP.[207]

We noted that survey based evidence needed to be treated with caution as the results may be subject to limitations. The relevance of some survey results depends on how clearly the survey sets out the framework for MRP estimation. This includes the term over which the MRP is estimated and the treatment of imputation credits. Survey based estimates may be subjective, because market practitioners may look at a range of different time horizons and they are likely to have differing views on the market risk. This concern may be mitigated as the sample size increases.[208]

Table D-5 summarises the key findings of the surveys.

Table D-5 Key findings of MRP surveys

	Numbers of responses	Mean	Median	Mode
KPMG (2005)	33	7.5%	6.0%	6.0%
Capital Research (2006)	12	5.1%	5.0%	5.0%
Truong, Partington and Peat (2008)	38	5.9%	6.0%	6.0%
Bishop (2009)	27	na	6.0%	6.0%
Fernandez (2009)	23	5.9%	6.0%	na
Fernandez and Del Campo (2010)	7	5.4%	5.5%	na

206 The table presents broker reports from August 2012 to February 2013.

207 Australian Competition Tribunal, *Application by Envestra Limited (No 2) [2012] ACompT 3*, 11 January 2012, paragraphs 159–163.

208 Australian Competition Tribunal, Application by Envestra Limited (No 2) [2012] ACompT 3, 11 January 2012, paragraphs 159–63.

Fernandez et al (2011)	40	5.8%	5.2%	na
Asher (2011)	45	4.7%	5.0%	5.0%
Asher (2012)	49	4.6%	5.0%	4.0-6.0%
Ernst & Young (2012)	17	6.26%[209]	6.0%	6.0%
Fernandez et al (2013)	73	5.9%	6.0%	na

Sources: KPMG (2005), Capital Research (2006), Truong, Partington and Peat (2008), Bishop (2009), Fernandez (2009), Fernandez and Del Campo (2010), Fernandez et al. (2011), Asher (2011), Asher (2012), Fernandez et al. (2013).

McKenzie and Partington place significant weight on survey evidence due to the triangulation of that evidence.[210] The idea behind the triangulation is that a specific survey might be subject to a particular type of bias (although there is no compelling demonstration of it). However, that the type of bias would likely be much less consistent across surveys using different methods and different target populations.

Lally also supported the use of survey evidence and suggested the recent Fernandez survey is the most relevant survey evidence. However, its average of 5.9 per cent should be considered as an upper bound as some respondents to this survey will have provided responses for an MRP defined against bank bills.[211]

D.5 Comparison with other regulators' rates of return

We have previously reviewed a range of returns approved for other gas and electricity service providers and also the rates of return in recent decisions by other Australian regulators. This provided a test of the reasonableness of the overall rate of return.

Table D-6 Recent decisions by Australian regulators (per cent)

Regulator	Decision	Date	Nominal vanilla WACC
ESCOSA	Advice on a regulatory rate of return for SA Water – Final decision	Feb 2012	8.07
QCA	SunWater – Final decision	May 2012	7.49
ESCV	V/Line Access Arrangement – Final Decision	Jun 2012	8.65
IPART	Sydney Catchment Authority – Final decision	Jun 2012	8.16–8.38[a]
IPART	Sydney Water Corporation – Final decision	Jun 2012	8.16–8.38[a]
ERA	Western Power – Final decision	Sep 2012	5.78
QCA	Seqwater - Draft decision	Dec 2012	5.86

209 Ernst & Young only presented mid-point MRP in its report. Therefore the actual mean from those 17 valuation reports might be different to what is presented here.

210 McKenzie and Partington, *Supplementary report on the MRP*, February 2012, p. 19; McKenzie and Partington, *MRP: regime switching framework and survey evidence*, August 2012, p. 28.

211 Lally, *Review of the AER's methodology*, March 2013, p.32.

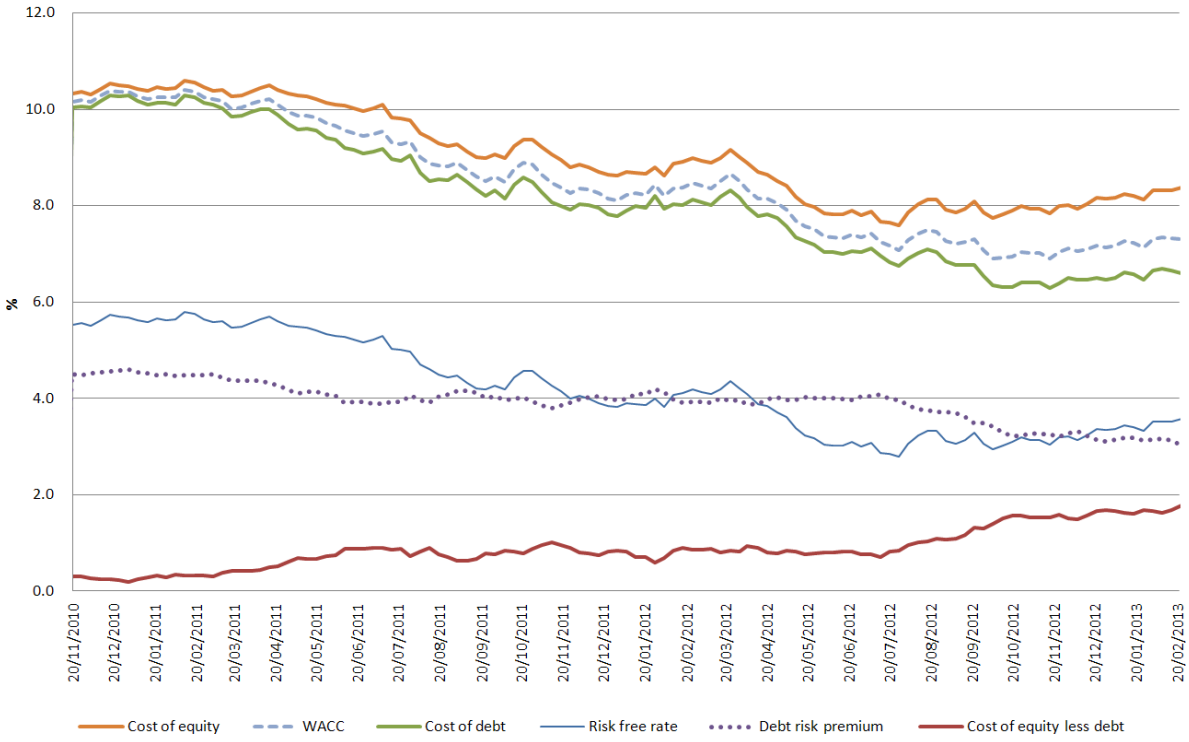
Notes: For comparative purposes, all WACCs have been converted to the nominal vanilla WACC formulation consistent with the AER's reported figure for SP AusNet (which excludes debt raising costs).
(a) Ranges are presented for recent decisions by the IPART where the point estimate (real post-tax or real pre-tax) was not sufficiently disaggregated to allow precise conversion to the correct formulation (nominal vanilla WACC).

In this context, we did not agree with proposals which stated that there is circularity in considering our recent decisions against our current decision.[212] Rather recent decisions are more likely to reflect similar market conditions.

D.6 Comparison of return on equity and return on debt

We previously compared the return on equity against the return on debt. Equity investors are residual claimants on a firm's assets in the event of default. It is typically expected, therefore, that equity investments are riskier than debt investments, and that the return on equity should exceed the return on debt. This relationship has held in all of our WACC decisions to date, as shown in Figure D.1.

Figure D.1 Comparison between the AER's estimates of the costs of debt and equity



Source: AER analysis.
Note: The return on debt in the above chart is estimated using the paired bonds approach, adopted in recent decisions.

The relationship between debt and equity returns, however, is more complex than any simple heuristic implies. For example, the size and strength of any relationship between debt and equity premiums is inconclusive. Notably, no academic consensus exists on the extent of any such relationship.

Comparisons between the relative costs of debt and equity, therefore, should be considered with caution. In particular, to the extent that debt and equity returns are compared as an overall reasonableness check, it is important that comparisons between the costs of debt and equity are

212 SFG, *The required return on equity: Response to AER Victorian gas draft decisions*, 7 November 2012, p. 51.

made on a consistent basis. In the context of debt and equity returns, two primary factors are relevant:

- promised versus expected returns
- pre–tax versus post–tax returns.

This section also discusses recent market evidence of observed debt issuances, and compares these to the allowed regulatory returns on debt and equity.

D.6.1 Promised versus expected returns

The return on equity estimated by us has been an expected return, while the return on debt is a promised return. That is, debt returns are calculated based on promised cash flows (or coupons), while equity returns reflect market expectations of returns. SFG, in a report commissioned by the Victorian gas networks, supported this view.[213]

The importance of comparing debt and equity premiums on a consistent basis is that any adjustments will widen the spread between the two premiums. That is, promised returns will always exceed expected returns. As such, if the return on debt was adjusted to reflect an expected return, the return would fall. The corresponding spread, therefore, would increase. This has provided us with some comfort that the recent spread between allowed returns on debt and equity have been reasonable.

D.6.2 Pre–tax returns versus post–tax returns

We estimated the return on debt as a pre–company tax measure. Conversely, we estimated the return on equity on a post–company tax basis. This reflected the relevant financing costs faced by the benchmark firm.[214]

Similar to the impact of adjusting promised and expected returns, any adjustments to compare pre–tax and post–tax returns will widen the spread between the debt and equity premiums. That is, pre–tax returns will always exceed corresponding post–tax returns. This has provided us with some comfort that the recent spread between allowed returns on debt and equity have been reasonable.

D.6.3 Market evidence

Notwithstanding the complexity of the relationship between debt and equity returns, we previously compared the allowed regulatory returns on debt and equity against recent market evidence. This included two debt issuances from the APA Group. We considered, however, that the available market evidence is of limited use for regulatory purposes. That is, they were useful as a broad reasonableness check only.

Specifically, in September 2012, the APA Group completed the issuance of $515 million of subordinated notes in Australia. This hybrid capital was issued at 450 basis points above the BBSW. Shortly thereafter, in November 2012, the APA Group raised £350 million of debt financing in the UK. The APA Group swapped this debt into AUD at an average fixed rate of 7.36 per cent. Envestra

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213 Specifically, as SFG stated, using expected debt yields implies that debt investors in the benchmark firm should expect a return that is materially lower than the allowed return on debt (because there is a material chance the revenue the regulator has allowed will be insufficient to pay what has been promised to those debt holders). However, a determination that resulted in there being a material chance that the revenue the regulator has allowed will be insufficient to pay what has been promised to those debt holders would likely be inconsistent with the NGL. SFG, *The required return on equity: Response to AER Victorian gas draft decisions*, 7 November 2012, p. 38.

214 For clarity, both the return on debt and equity are estimated on a pre–personal tax basis.

highlighted both these issuances as evidence that recent allowed regulatory returns on equity were too low.[215]

We considered that while market evidence can provide an important reasonableness check, the financing costs of a single entity should not be considered to be reflective of either the market as a whole, or the benchmark regulatory firm. This was consistent with the Tribunal's direction regarding the estimation of the debt risk premium.[216] It is also notable that the term of the UK debt financing was 12 years and carried a BBB credit rating. This compared to the previous benchmark term of 10 years and a BBB+ rating.

Additionally, the yields on hybrid forms of capital depend heavily on the characteristics of the product itself. While the corresponding yields should fall between the issuers respective costs of debt and equity, hybrid financing can be structured to have greater debt, or greater equity features. Further complicating where along the spectrum of debt and equity yields hybrid financing should be is the correlation with the market itself. As put by Macquarie Research, hybrids perform like debt when equity markets perform well, and perform like equity when equity markets perform poorly.[217] In this context, it may not be unreasonable that the yield on the hybrid debt is near the return on equity estimated by us (as proposed by Envestra).[218] The preceding discussion on the return on debt versus equity is also relevant, insomuch as comparisons are made between promised debt yields and expected equity returns.

Finally, comparisons between the return on debt and equity implicitly assume that both debt and equity markets are efficiently priced. In practice, this may not be the case. For example, to the extent that relative spread between the allowed regulatory returns on debt and equity is considered to be too narrow, this may reflect an overly conservative estimate of the regulatory return on debt.

D.7 Financeability and credit metrics

Financeability is the term applied to a business' ability to finance its activities. In the context of regulated energy networks, these activities are the ones set out in service providers' licences. That is, the regulated services that are subject to AER determinations.

The question of whether a business is financeable is typically answered by considering the revenues and cash flows of the businesses in relation to its financial liabilities. Credit rating agencies such as Moody's and Standard & Poor's carry out an assessment of the financeability of businesses from the perspective of debt investors. They do so by ranking companies on a scale of credit ratings. Rating agencies' assessments are taken into account when companies and investors price debt. Their methodologies provide the first point of call when market participants typically consider financeability. Similarly, when regulators have considered financeability they have often referred to the methodologies used by credit rating agencies.

Rating agencies assess companies with respect to two broad areas - business risk and financial risk. The former relates to the relationship between a company's costs and its revenues, and the degree of

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215 Envestra, *Letter to Andrew Reeves*, 21 August 2012.

216 Australian Competition Tribunal, *Application by United Energy Distribution Pty Limited [2012] ACompT 1*, 6 January 2012, paragraph 429; Australian Competition Tribunal, *Application by Envestra Limited (No 2) [2012] ACompT 3*, 16 January 2012.

217 Macquarie Investment Management, *Hybrid securities: Lured by yield, Investment perspectives*, Issue 6.

218 Specifically, the return on equity in this decision is 7.94 per cent. In comparison, the corresponding yields on the APA Group bond and hybrid capital are approximately 7.64 and 7.36 per cent respectively. (The yield of 7.64 per cent on the hybrid issuance is likely to be a slight underestimate, as the margin of 450 basis points was quoted relative to the BBSW). For clarity, the APA Group yields have been estimated using the same risk free rate used to estimate the return on equity for this final decision.

certainty and influence that the company has over both. For regulated network companies, this also includes consideration of the regulatory regime. This is because regulatory regimes would provide a degree of matching between costs incurred by a company and the revenues it is allowed to charge.

Financial risk refers to the company's ability to finance its ongoing and ultimate obligations (that is, the ratio of its cash flows to interest costs and debt levels). Financial risk is primarily assessed through credit metrics. Such ratios include Funds From Operations / Interest Cost, Funds From Operations / Net Debt, and Net Debt / RAB. It is important, however, to recognise the financeability relates to more than just an assessment of credit metrics. Credit metrics typically account for 30–40 percent rating agencies such as Moody's and Standard & Poor's assessment of regulated network utilities. For example, table E.1 sets out the weighting in Moody's methodology for rating regulated energy networks.

Table D-7 Moody's rating methodology for regulated energy networks

Broad rating factors	Broad rating factor weighting	Rating sub-factor	Sub-factor weighting
Regulatory environment and asset ownership model	40%	Stability and predictability of regulatory regime	15%
		Asset ownership model	10%
		Cost and investment recovery	10%
		Revenue risk	5%
Efficiency and execution risk	10%	Cost efficiency	6%
		Scale and complexity of capital programme	4%
Stability of business model and financial structure	10%	Ability and willingness to pursue opportunistic corporate activity	3.33%
		Ability and willingness to increase leverage	3.33%
		Targeted proportion of operating profit outside core regulated activities	3.33%
Key credit metrics	40%	Adjusted Interest Cover Ratio or Funds From Operations / Interest	15%
		Net Debt / RAB	15%
		Funds From Operations / Net Debt	5%
		Retained Cash Flow / Capex	5%

Source: Moody's

It can be seen from Table D-7 that the regulatory framework and the low business risk associated with a natural monopoly business are the key credit-supportive factors for regulated energy networks.

Subsequently, network service providers have been able to achieve higher credit ratings than those implied by their metrics. It is important, therefore, to recognise that any financeability considerations by a regulator should amount to more than just the assessment of credit metrics against their target levels. As a result, financeability assessment—whether by rating agencies or by a regulator—necessarily involves judgement.

UK regulators and IPART use financeability assessment when making determinations on regulatory control periods. UK regulators do so in order to fulfill their "financeability duty" - which is described by Ofgem as follows:

> In carrying out its functions in accordance with the principal objective, [Ofgem] must also have regard to the need to secure that licence holders are able to finance the activities which are the subject of obligations on them.[219]

Ofgem interprets this as ensuring that its determinations are consistent with the notional company achieving a credit rating in the BBB to A range.[220] We note that the AER does not have a financeability duty. To that extent, financeability testing would only be used by the AER to ensure consistency between the assumptions used to set the allowances, and the overall impact of the determination on the benchmark efficient entity's financial stability. However, having regard for financeability is not a requirement for AER determinations.

IPART uses a financeability test to examine whether the utility will be financially sustainable over the proposed price path. Section 15 of the *Independent Pricing and Regulatory Tribunal Act 1992 requires IPART* to consider the impacts of prices on "borrowing, capital and dividend requirements" and "standards of quality, reliability and safety". In IPART's view, if the utility is not financially sustainable it may affect its capacity to provide the necessary services (including new capex) and meet reasonable debt and dividend requirements. Because IPART uses the financeability to check the capacity of the utility to fund its operations in practice during a regulatory period it conducts the financeability test using actual gearing (that is, as a debt or equity provider would see the firm). It uses the same ratios and adjustments commonly used by the rating agencies.

IPART expects that the building block model—with an appropriate WACC—will allow the utility to recover its efficient costs over the life of the assets. However, in some circumstances a utility may encounter short-term financial sustainability issues. This can be due to capital expenditure cycles and/or the differences in the timing of the recognition of expenses and revenues. In response to IPART's current review of its financeability policy, utilities have proposed that it should use the financeability test as a reasonableness check of the WACC assumptions in the building block analysis. This would entail using the notional gearing and return on debt assumptions and regulatory accounts for the financeability test. IPART has commissioned consultants to examine the practical implications of this.

D.8 Other possible sources of information

Other reasonableness checks not previously used which may also be included in the set of relevant information include:

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219 Ofgem, *RIIO-T1: Initial Proposals for National Grid Electricity Transmission plc and National Grid Gas plc Initial Proposals – Finance Supporting document*, July 2012, p. 26.

220 The notional company is a concept Ofgem employs in its determinations and which is analogous to the concept of a benchmark efficient entity in the Rate of Return Objective.

- Investor briefings by regulated utilities and similar non-regulated businesses. They may provide information on components, such as debt management strategies, return on debt, observations on the investment climate and expectations in the context of new investment decisions.
- Surveys of CFOs and analysts covering assumptions and expectations for returns. Although these may be infrequent, like surveys over time could give an indication of changes over time.
- Information obtained through briefings and discussions with analysts, investors and their advisors and managements of similar firms.

Stakeholders have also proposed the following reasonableness checks on the overall rate of return:[221]

- comparisons of allowed rates of return against the rates of return observed in other industries
- comparisons of allowed rates of return against service providers' actual rates of return over time
- comparisons of allowed rates of return set by economic regulators in other countries.

We consider, however, that the incentive framework limits the usability of reasonableness checks based on comparisons of actual rates of return. For example, service providers are incentivised to outperform regulatory benchmarks for opex, capex, debt, tax and service performance. The ability for a service provider to earn an actual return on equity higher than the allowed return on equity, therefore, may be due to the outperformance of these benchmarks. Importantly, outperformance does not necessarily imply that the regulatory rate of return is incorrect.

In section D.5 we outline our current reasonableness check of comparing our allowed rate of return with that of other Australian regulators who regulate similar natural monopoly industries. An extension of this approach could be to compare our allowed rates of return with those of overseas regulators who also regulated natural monology industries. However the allowed rates of returns set by overseas regulators are likely to be less comparable to our allowed rates than those set by other Australian regulators. In particular, differences in regulatory regimes and markets would likely be greater and result in different risk exposures, and consequently different required rates of return. Differences in regulatory approaches may also lead to different returns at particular points in time.[222] Notwithstanding these limitations, we will consider these proposed reasonableness checks in greater detail in the draft guideline.

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[221] Major Energy Users, *Australian Energy Regulator better regulation rate of return guidelines—Comments on the issues paper*, February 2013, pp. 32-33; UnitingCare Australia, *Submission in response to the Australian Energy Regulator better regulation rate of return guideline issues paper*, February 2013, p. 9; Energy Users Association of Australia, *Submission to the AER*, February 2013, p. 2.

[222] For example, it may be difficult to compare the return on debt for a regulator who adopts an on the day approach with a regulator who adopts a portfolio or trailing average approach. This issue of comparability may also be relevant to comparisons with other Australian regulators.

E Return on equity: Outline of different models

In determining the allowed rate of return, the current rules require that regard must be had to relevant estimation methods, financial models, market data and other evidence. The return on equity for a regulated firm, therefore, can be estimated using a number of alternative models. This appendix provides an overview of a selection of these models. This includes a high level explanation of each model, and a summary of any views on specific models expressed by us or stakeholders (in previous determination processes, or in submissions to our issues paper).

To the extent that the current rules facilitate consideration of a broader range of models, however, submissions should still be cognisant of engaging with our previous concerns regarding specific models. Notwithstanding that our previous views reflect the previous rules, they are likely to be informative of limitations which we will seek to address when contrasting alternative models.

E.1 Summary of stakeholder submissions

Our issues paper did not discuss specific models for estimating the return on equity. Accordingly, stakeholder analysis of the available return on equity models was limited. The exception was the submission from the APIA.

Consistent with the majority of stakeholder submissions, the APIA proposed that no individual return on equity model should be considered to meet the allowed rate of return objective in isolation.[223] Instead, the APIA stated that the following set of return on equity models should be considered:[224]

- CAPM (Sharpe–Lintner, Black, empirical, and consumption based)
- Fama–French three factor model
- Dividend discount models (single and multi–stage)
- Residual income model
- Risk premium approaches
- Build–up method
- Comparable earnings.

The APIA also stated that analyst reports, and market–to–book and earnings multiples should not be considered when estimating the return on equity. These views were supported by a report commissioned from the Brattle Group.[225]

E.2 Sharpe–Lintner CAPM

The Sharpe–Lintner Capital Asset Pricing Model (CAPM) estimates the return on equity as the sum of the risk free rate and the risk adjusted return of the market portfolio above the risk free rate. The standard CAPM formula is shown below:

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223 Australian Pipeline Industry Association, *Response to issues paper—The Australian Energy Regulator's development of rate of return guidelines*, February 2013, p. 40. See also: Energy Networks Association, *Response to the AER rate of return guidelines—Issues paper*, February 2013, p. 42.

224 Australian Pipeline Industry Association, *Response to issues paper—The Australian Energy Regulator's development of rate of return guidelines*, February 2013, p. 42.

225 The Brattle Group, *Estimating the cost of equity for regulated companies*, 17 February 2013.

$$k_e = r_f + \beta_e \times MRP$$

where:

k_e is the expected rate of return on equity

r_f is the nominal risk–free rate of return

β_e is the equity beta

MRP is the expected market risk premium

Under the Sharpe–Lintner CAPM, investors are only rewarded for holding non–diversifiable risk. That is, firm specific risks are assumed to be diversified away by holding a portfolio of investments. In this context, it is not the risk of an individual asset that is important, but how the asset contributes to the risk of the market portfolio. This covariance of the asset return with the market is captured by the equity beta.

A further feature of the Sharpe–Lintner CAPM is that it is a single period model. This requires the risk–free rate and the market risk premium to be held constant through the estimation period.

AER's previous positions

We have used the Sharpe–Lintner CAPM to determine the return on equity in each of our access arrangements and determinations to date. For electricity networks, this reflected legislative requirements under the NER.[226] The NGR were less prescriptive, but still required the use of a well accepted model.[227]

In previous decisions, we have stated that the Sharpe–Lintner CAPM is a well accepted financial model.[228] This followed the ubiquitous use of the Sharpe–Lintner CAPM amongst regulators, academics and market practitioners. Additionally, we have previously stated the following reasons for relying on the Sharpe–Lintner CAPM:[229]

- The Sharpe–Lintner CAPM had a sound theoretical foundation.
- The Sharpe–Lintner CAPM had empirical support, particularly when considering the conditions relevant to the benchmark firm—such as considering longer time periods, focusing on return expectations (not return outcomes), and adjusting for the effect of real options.
- The Sharpe–Lintner CAPM had relatively robust long-term parameter inputs. In particular, compared to parameter inputs for alternative models, the Sharpe–Lintner CAPM parameter inputs were considered to be well established, statistically robust and widely accepted.

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226 That is, the use of the Sharpe–Lintner CAPM was prescribed under the NER.

227 The previous NGR required the model used to estimate the return on equity to be well accepted. As such, assessing alternative models against this requirement has been a key focus in regulatory decisions to date (where models other the Sharpe–Lintner CAPM have been proposed).

228 See, for example: AER, *Final decision, Jemena Gas Networks, Access arrangement proposal for the NSW gas networks, 1 July 2010 – 30 June 2015*, June 2010; AER, *Final decision, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016*, June 2011.

229 AER, *Draft decision, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016*, February 2011, p. 67.

229 AER, *Draft decision, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016*, February 2011, p. 67.

- There were sound theoretical reasons why some conflicting empirical results were considered to not invalidate the CAPM. Empirical findings of a low–beta bias in the Sharpe–Lintner CAPM, for example, plausibly arose from flaws in testing methods (rather than any deficiencies in the model itself). These flaws included relying on invalid proxies and inappropriate statistical procedures.[230]

Stakeholder's previous positions

Given the legislative requirements outlined above, electricity network service providers have not typically expressed views regarding the reliability of the Sharpe–Lintner CAPM.[231] Instead, electricity networks have previously focused on our implementation of the model. As these concerns reflect the estimation of the actual parameter values (as distinct from the model itself), these issues are discussed in appendix F.

Gas network service providers have also raised concerns regarding the Sharpe–Lintner CAPM parameters adopted by us.[232] Additionally, gas networks have previously proposed that alternative return on equity models should be used either in conjunction with the Sharpe–Lintner CAPM, or as a replacement for the Sharpe–Lintner CAPM. Such submissions have been based on the view that, relative to the Sharpe–Lintner CAPM, alternative models provide better or equal estimates of expected returns.[233] It has also been proposed that the Sharpe–Lintner CAPM systematically underestimates expected returns for businesses with an equity beta less than one.[234]

Typically, submissions from consumer groups have supported estimating the return on equity based on, at least to some degree, the Sharpe–Lintner CAPM.[235]

E.3 Black CAPM

The Black CAPM estimates the return on equity using a similar formula to the Sharpe–Lintner CAPM. The Black CAPM, however, relaxes the assumption of risk-free borrowing and lending. This acknowledges that investors may not be able to borrow or lend at the risk–free rate. Instead, the Black CAPM relies on the expected return on the zero–beta portfolio—that is, the expected return on a portfolio that is uncorrelated with the market portfolio. The formula for the Black CAPM is shown below:

$$k_e = r_z + \beta_e \times (r_m - r_z)$$

where:

r_z is the expected return on the zero–beta portfolio

r_m is the expected return on the market portfolio

A key feature of the Black CAPM, relative to the Sharpe–Lintner CAPM, is that the slope of estimated returns is flatter under the Black CAPM. As a result, the Black CAPM will estimate higher returns than

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230 AER, *Final decision, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016*, June 2011, p. 45.

231 One exception was a report from CEG, submitted during the WACC review. CEG, *Estimation of, and correction for, biases inherent in the Sharpe CAPM*, 15 September 2008.

232 See, for example: AER, *Final decision, Envestra Ltd, Access arrangement final decision, 2013–17*, March 2013.

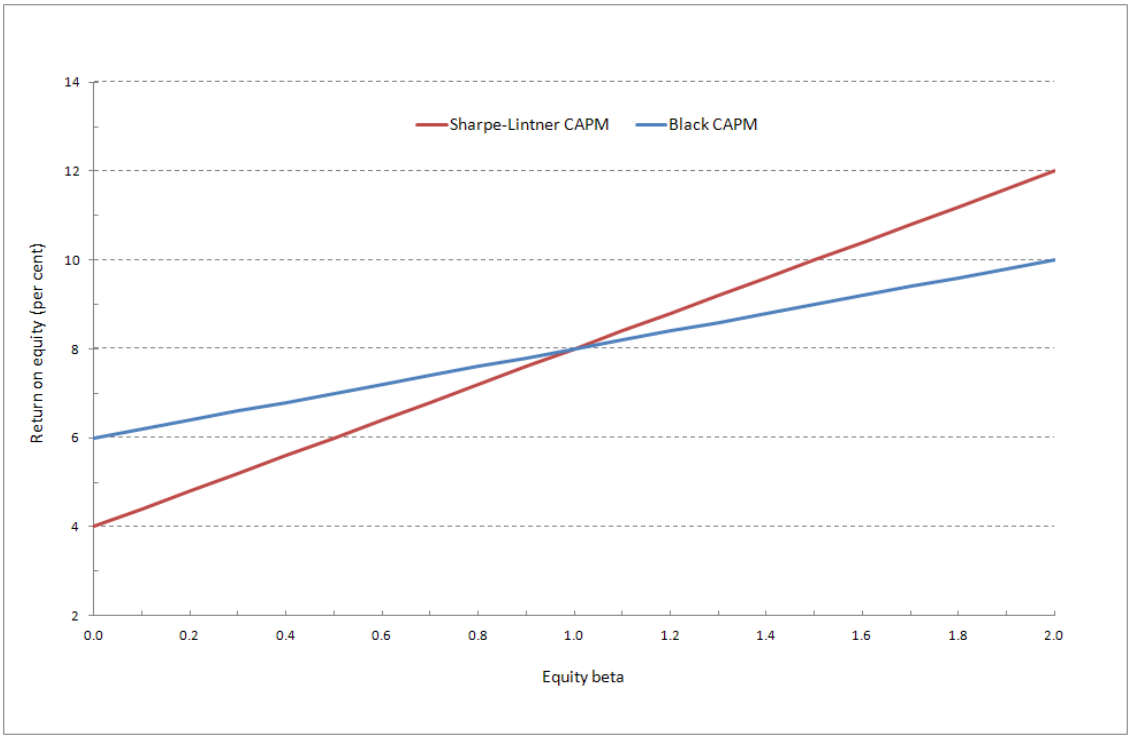
233 The alternative models proposed by networks have included the Fama–French three factor model, dividend growth models, and the Black CAPM. See, for example: Jemena Gas Networks (NSW) Ltd, *Further response to the draft decision, Attachment 1, Cost of capital*, 28 April 2010; Jemena Gas Networks (NSW) Ltd, *Initial response to the draft Decision, Appendix 5.1*, 19 March 2010.

234 See, for example: Jemena Gas Networks (NSW) Ltd, *Access arrangement information*, 25 August 2009.

235 See, for example: UnitingCare Australia, *Submission in response*, February 2012, p. 10.

the Sharpe–Lintner CAPM for assets with a beta less than one. For assets with a beta greater than one, however, the Black CAPM will estimate lower asset returns than the Sharpe–Lintner CAPM. This can be seen in Figure E.1.

Figure E.1 Slope of the security market line—Capital Asset Pricing Model



Source: AER analysis.

AER's previous positions

We have not used the Black CAPM to determine the return on equity in any regulatory decision to date. A comprehensive analysis of the Black CAPM was undertaken for Envestra's South Australian and Queensland gas networks.[236] We also engaged Professor Graeme Partington and Associate Professor Michael McKenzie to provide advice on the reliability of the Black CAPM during the recent review of the Victorian gas networks. In these decisions, we concluded that:[237]

- the Black CAPM was not a well accepted financial model
- robust parameter inputs—specifically, returns on the zero–beta portfolio—were not available
- estimates of the zero–beta portfolio returns were highly variable and most likely unreliable.

Stakeholder's previous positions

Gas network service providers have previously submitted reports stating that the Sharpe–Lintner CAPM has a low–beta bias.[238] These reports claimed that the actual returns for portfolios with equity betas less than one were systematically greater than the corresponding returns estimated by the

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236 See, for example: AER, *Final decision, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016*, June 2011.

237 See, for example: AER, *Draft decision, SPI Networks (Gas) Pty Ltd, Access arrangement final decision, 2013–17, Part 3,* September 2012, p. 66.

238 See, for example: Envestra (SA) gas network, *Access arrangement information*, Appendix 9–1.1, 21 October 2010.

Sharpe–Lintner CAPM. Given regulatory estimates of the equity beta have been less than one, network service providers proposed that this has led to unreasonably low estimates of the return on equity.

Network service providers have also previously submitted reports stating that the Black CAPM is a widely used and well accepted financial model.[239]

E.4 Intertemporal CAPM

The intertemporal CAPM relaxes the single period assumption of the Sharpe–Lintner CAPM. It introduces the concept that the correlation between returns in one period and the profitability of reinvesting those returns in the next period are important to investors.

AER's previous positions

We have not used the intertemporal CAPM to determine the return on equity in any regulatory decision to date. Although the intertemporal CAPM was discussed briefly during the WACC review, we considered that the predictive power of this model had not been substantiated. Accordingly, we considered that the model did not provide demonstrably better estimates of the return on equity than the Sharpe–Lintner CAPM.[240]

Stakeholders' previous positions

Stakeholders have not previously proposed the use of the intertemporal CAPM in any regulatory decision to date. During the WACC review, however, CEG submitted that the intertemporal CAPM may be able to explain the movement of utility stock betas during the technology bubble and commodity boom.[241] Notwithstanding this, CEG did not propose the use of intertemporal CAPM.

E.5 Dividend growth models

Dividend growth models (or similarly, dividend discount models) can be used to provide estimates of the return on equity by determining the discount rate required to equate current share prices with the present value of future dividends. The Gordon growth model is the simplest dividend growth model. It requires an estimate of the next dividend, which is assumed to increase in perpetuity by a constant growth rate. Rearranging the Gordon growth model to solve for the discount rate provides an estimate of the implied return on equity. The formula can be expressed as follows:

$$k_e = \frac{D_1}{P_0} + g$$

where:

D_1 is the expected dividend in year one.

P_0 is the price at time zero.

g is the expected growth rate in perpetuity.

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239 See, for example: Envestra (SA) gas network, Access arrangement information, Appendix 9–1.1, 21 October 2010.

240 AER, *Final decision, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters*, May 2009, p. 337.

241 AER, *Final decision, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters*, May 2009, p. 337.

Dividend growth models can also incorporate longer dividend forecasts and time varying discount rates.[242] Additionally, estimates of both the return on equity for the market, and the return on equity for regulated businesses themselves, can be generated using dividend growth models. The former can be used to provide estimates of the market risk premium (used in the various CAPMs). The latter, when applied to dividends and prices from those businesses, can directly estimate the return on equity for regulated businesses.

AER's previous position

We have not used dividend growth model estimates to determine the return on equity in any regulatory decision to date. Instead, previous decisions considered that dividend growth model estimates were highly contentious and could not be estimated with precision for Australian markets.[243] This reflected concerns with determining robust input parameter estimates from limited data sets. These small data sets were contrasted with the much larger sample of data available in the US, where dividend growth model estimates are used more extensively.[244]

The following table—representing data from the Victorian gas review final decision—shows the variability of dividend growth model estimates of the MRP over a short period of time.[245] The corresponding total cost of equity estimates were similarly variable—11.7–13.3 per cent excluding Lally's estimates, and 9.2–13.3 per cent including Lally's estimates. The variability across the dividend growth model estimates was considered to primarily reflect the sensitivity of dividend growth model estimates to the particular inputs used, particularly the dividend growth per share.

Table E-1 Recent dividend growth model estimates

	Dividend yield (per cent)	Dividend growth (per cent)	RFR (per cent)	MRP (per cent)
CEG (March 2012)	5.68	6.60	3.77	8.52
Capital Research (Feb 2012)	4.70	7.00	5.08	6.62
Capital Research (Feb 2012)	5.23	7.00	5.08	7.15
Capital Research (Feb 2012)	5.71	7.00	5.08	7.63
Capital Research (Mar 2012)	6.29	7.00	3.73	9.56
NERA (Feb 2012)	Bloomberg and IBES forecasts	5.65	3.96	7.72–7.75
NERA (Feb 2012)	Bloomberg and IBES forecasts	5.65	5.50	6.18–6.21
NERA (March 2012)	Bloomberg and IBES forecasts	5.65	3.99	7.69–7.72
CEG (November 2012)	5.34	6.60	3.05	8.89
Lally (March 2013)	5.34	A mix of long term and short term dividend growth	3.26	5.90–8.39

242 For further discussion of DGM models, see: AER, *Final decision, Access arrangement final decision: SPI Networks (Gas) Pty Ltd, 2013-17, Part 2*, March 2013, pp. 101-103.

243 See, for example: AER, *Draft decision, SPI Networks (Gas) Pty Ltd, Access arrangement final decision, 2013–17, Part 3,* September 2012.

244 See appendix J for further discussion of US regulatory approaches.

245 AER, *Final decision, Access arrangement final decision: SPI Networks (Gas) Pty Ltd, 2013-17, Part 2*, March 2013, p. 103.

Source: AER, *Final decision, Access arrangement final decision: SPI Networks (Gas) Pty Ltd, 2013-17, Part 2*, March 2013, p. 103.

Stakeholder's previous positions

Network service providers have previously proposed dividend growth model estimates for determining both the return on equity directly, as well as the market risk premium.[246] The predominant use of dividend growth models, however, has been to inform estimates of the market risk premium.

Network service providers have also suggested the use of these models by US regulators supports their use in Australia.

Stakeholder submissions

Submissions were generally supportive of the use of dividend growth models. For example, the ENA and APIA both submitted that we should consider these models when estimating the return on equity.[247]

As part of its submission, the APIA provided reports by Professor Stewart Myers and the Brattle Group. Each of these reports suggested that dividend discount models can be used to provide robust estimates of the return on equity. Specifically, the Brattle Group stated that these models are forward looking and easily replicated. The Brattle Group, however, also acknowledged that growth forecasts are generally only available for two to five years, and that outputs can vary substantially over time due to the variability of market prices. Professor Myers also suggested multi-stage dividend discount models are preferable to constant growth models.

E.6 Fama–French three factor model

The Fama–French three factor model was developed based on empirical research of historical US stock returns. The model seeks to explain the expected return on an asset by reference to three factors. These three factors include:

- the excess return to the market portfolio (above the risk–free rate)
- the difference between the return to a portfolio of high book–to–market shares and the return to a portfolio of low book–to–market shares; and
- the difference between the return to a portfolio of small capitalisation shares and a portfolio of large capitalisation share.

Based on these three factors, the formula for the Fama–French three factor model can be expressed as follows:

$$k_e = r_f + \beta_e \times MRP + \beta_{SIZE} \times r_{SMB} + \beta_{VALUE} \times r_{HML}$$

where:

246 See, for example: CEG, *Internal consistency of risk free rate and MRP in the CAPM*, March 2012.

247 Australian Pipeline Industry Association, *Response to issues paper—The Australian Energy Regulator's development of rate of return guidelines*, February 2013, p. 42; Energy Networks Association, *Response to the AER rate of return guidelines—Issues paper*, February 2013, p. 5.

r_{SMB} is the expected return to a portfolio of small capitalisation shares over the return to a portfolio of large capitalisation shares

r_{HML} is the expected return to a portfolio of high book–to–market shares over the return to a portfolio of low book–to–market shares

β_{SIZE} is the portfolios exposure to the risks of small capitalisation stocks

β_{VALUE} is the portfolios exposure to the risks of value stocks

AER's previous position

We have not used the Fama–French three factor model to estimate the return on equity in any regulatory decision to date. Most notably, a comprehensive analysis of the Fama–French three factor model was undertaken for the Jemena Gas Network (JGN) access arrangement. In this decision, we concluded that:[248]

- The Fama–French three factor model was not a well accepted financial model by academic groups, financial market practitioners or other regulatory bodies.[249]
- There was no strong theoretical basis to support the inclusion of the additional Fama–French three factor model risk factors for the rate of return on equity. For example, the model was dependent on empirical justification—that is, the systematic observance of the three factor risk premiums. Since these risk premiums were not systematically observed in the Australian market, there was no reasonable basis for the Fama–French three factor model to be applied in Australia.
- Evaluation of the academic literature did not support the Fama–French three factor model as a reliable or accurate financial model. In particular:
  - analysis from Australia showed that observed empirical evidence was not consistent with the Fama–French three factor model—notably conflicting and variable risk premiums, and inconsistent factor coefficients.
  - analysis from a global perspective (including the UK, Japan and Germany) showed that the observed empirical evidence was not consistent with the Fama–French three factor model
  - analysis from the US showed conflicting evidence that did not support the Fama–French three factor model for each time period analysed.

We also considered the Fama–French three factor model when assessing Envestra's access arrangement proposal for its South Australian and Queensland gas networks. Our reasons for not accepting the Fama–French three factor model for Envestra were consistent with those outlined in the JGN final decision.[250]

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248 AER, *Final decision, Jemena Gas Networks, Access arrangement proposal for the NSW gas networks, 1 July 2010 – 30 June 2015*, June 2010, p. 171;

249 AER, *Final decision, Jemena Gas Networks, Access arrangement proposal for the NSW gas networks, 1 July 2010 – 30 June 2015*, June 2010, p. 134.

250 AER, *Draft decision, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016*, February 2011.

Stakeholder's previous position

Gas network service providers have previously proposed the use of the Fama–French three factor model as an alternative to the Sharpe–Lintner CAPM. Contrary to our previous position (outlined above), gas network service providers have stated that the Fama–French three factor model is well accepted amongst academics and market practitioners.[251] These submissions have focused on the number of citations of the Fama–French three factor model in academic literature, the prevalence of the model in university curriculums, and the publication of factor estimates by data service providers. These submissions also stated that the Fama–French three factor model provided a more accurate estimate of the return on equity for a regulated energy utility than the Sharpe–Lintner CAPM.

[251] See, for example: Jemena Gas Networks (NSW) Ltd, *Further response to the draft decision, Attachment 1, Cost of capital*, 28 April 2010; Jemena Gas Networks (NSW) Ltd, *Initial response to the draft Decision, Appendix 5.1*, 19 March 2010.

F Return on equity: Estimation of Sharpe-Lintner CAPM parameters

We have consistently used the Sharpe-Linter CAPM in previous decisions. This included previous electricity decisions where the use of the Sharpe-Lintner CAPM (and only the Sharpe-Linter CAPM) was required by the rules. We also adopted the Sharpe-Lintner CAPM in previous gas decisions, where the rules did not mandate this approach, though the previous gas rules did specify that the Sharpe Lintner CAPM was an appropriate model.

A key issue for this guideline development process is considering which cost of equity models and other information we should use in addition to the Sharpe CAPM, and how such information should be distilled into a single cost of equity point estimate. Those issues are discussed in chapter 5 and appendix E.

In this this appendix we focus on the estimation of the Sharpe–Lintner CAPM. Specifically it includes discussion of:

- stakeholders' submissions on this model
- different forms of the Sharpe–Lintner CAPM
- the estimation of the risk free rate
- the estimation of the market risk premium, and
- the estimation of the equity beta

F.1 Summary of submissions

We have received few submissions commenting on the estimation of the Sharpe–Lintner CAPM parameters, since in the issues paper we stated:

> Within the Sharpe–Lintner CAPM (and other models) there are many parameters that need to be estimated. We do not seek views at this stage on the appropriate estimation of those parameters.[252]

The APIA attached reports prepared by the Brattle Group and Professor Stewart Myers as a part of its submission. The reports provide an overview and analysis of models used in estimation of the rate of return on equity, including the Sharpe–Lintner CAPM. Both reports agree that a portfolio approach to the equity beta estimation provides more accurate and consistent results and that:

> ...routine applications of the CAPM can now generate implausibly low estimates of the cost of equity. But there are good reasons to think that costs of equity have not fallen in lockstep with today's exceptionally low interest rates -- in other words, good reasons to think that the equity risk premium remains high post-crisis. [253]

MEU argues in favour of adopting a long-term perspective:

> When compared to the volatile outcomes from using the S-L CAPM approach (based on equity beta and market risk premium calculated over the long term and the short term risk free rate) and other models, there is potentially a better approach to setting RoE for regulatory purposes. This to set the RoE as the

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252 AER, *Rate of return guidelines*, Issues paper, pp. 21-22.
253 Stewart C. Myers, *Estimating the Cost of Equity: Introduction and Overview*, February 17 2013, p.13.

> long term average seen in the market over time using the long term average risk free rate coupled to the long term market risk premium moderated by the long term equity beta.[254]

MEU also argues that the averaging period for the risk free rate

> ...should be fixed and be longer than 1 month in order to smooth out short term variances...[255]

and comments that

> The MEU sees that relating the forecast rate of return to the duration of the regulatory period is consistent as the costs of debt and equity are reviewed (and changed to reflect the new market conditions) for the next regulatory period. The practice of setting a rate of return based on a 10 year forecast for a five year duration is not consistent.[256]

PIAC, on the other hand, suggests that it is important that the CAPM parameters reflect changing market conditions, especially in relation to the global financial crisis (GFC), as well as the long-term expectations of equity returns:

> [...] it appears that volatility in the Australian share market and in average shareholder returns since the GFC has seen investors look to the security of regulated assets with lower levels of risk. While the beta values that feed the CAPM model are intended to capture this lower risk, it may not do so adequately in times of high market volatility. That is, a lower beta may be more applicable given the changed relativities between the risks of investing in a regulated network versus investing the equity market in general.[257]

PIAC also notes that:

> [...] the models should deal appropriately with the special characteristics of regulated utilities from an equity investor's perspective, which includes revenue stability and growth through capital investments. [258]

F.2 Form of the Sharpe–Lintner CAPM

The form of the Sharpe–Lintner CAPM refers to the extent to which the Sharpe–Lintner CAPM recognises or segregates domestic and international investors. Since the WACC review,[259] we have applied a domestic Sharpe–Lintner CAPM that recognises foreign investors to the extent that they influence the Australian market. In effect, this is a 'partly integrated' domestic Sharpe–Lintner CAPM. The two alternatives to this approach are:

- a fully segregated domestic Sharpe–Lintner CAPM—this be limited to only Australian domestic investors in the Australian market
- a fully integrated Sharpe–Lintner CAPM—this would assume a single financial market across countries and unrestricted capital flow. This would depend almost fully on international investors and international data.

The choice of form has important implications for estimating Sharpe–Lintner CAPM parameters. This is in part because we use Australian market data to estimate these parameters. The Australian market includes both domestic and international investors. This means that the risk free rate, for example, is likely to reflect the preferences of both domestic investors and international investors to the extent that they invest in the Australian market.

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254 MEU, *Rate of return guidelines, Comments on the Issues Paper*, February 2013, p.24.
255 MEU, *Rate of return guidelines, Comments on the Issues Paper*, February 2013, p.20.
256 MEU, *Rate of return guidelines, Comments on the Issues Paper*, February 2013, p.16.
257 PIAC, *Better returns for consumers: PIAC submission to the AER's Issues Paper - Rate of return guidelines*, 15 February 2013, p.24.
258 PIAC, *Better returns for consumers: PIAC submission to the AER's Issues Paper - Rate of return guidelines*, 15 February 2013, p.24.
259 AER, *WACC review final decision*, May 2009, p. 101.

To apply a fully segregated domestic Sharpe–Lintner CAPM would require us to adjust observed market prices in order to remove the effects of the international investment in the Australian market. This would be a complex and imprecise exercise. It would therefore be likely to compromise the integrity of observed data and the overall estimate of the rate of return. It would also be unrealistic, as it would not recognise the presence of foreign investors in the Australian market. Similarly, a fully integrated Sharpe–Lintner CAPM would require us to assume predominantly foreign investment in the Australian market and unrestricted capital flows. None of these assumptions appear to reflect reality.

For these reasons, we consider the 'partly integrated' domestic Sharpe–Lintner CAPM remains the most appropriate choice and the simplest in practice to apply. It is consistent both with financial theory and with the observed realities of the Australian equity market. We therefore do not foresee any need to change to this choice of form. However, we welcome stakeholder comment on this issue.

F.3 Risk free rate

The risk free rate measures the return an investor would expect from an asset with no default risk. It compensates investors for the opportunity cost of not being able to invest in the next best equivalent 'riskless' investment. This includes compensation for:

- the time value of money
- the expected cost of inflation which is expected to decrease the purchasing power of the cash flows to be received, and
- other possible premiums for certain risks, which might include liquidity and inflation risk

A risk free rate is used as a direct input into the CAPM to determine the required return on equity. In addition, it is also used as an input in the calculation of the required return on debt.

The risk free rate cannot be directly observed. In recent decisions, we have estimated the risk free rate by adopting the prevailing yield on 10 year CGS averaged over a period which is short and as close as practicably possible to the commencement of the access arrangement period. We adopted this method because:

- An observable market proxy for the risk free rate is available.
- The yield on CGS is the best proxy for the risk free rate in Australia, as supported by RBA advice.
- The RBA, Commonwealth Treasury and AOFM advised in the recent Victorian Gas Access Arrangement Review that the CGS market is liquid and functioning well.[260]
- CGS yields are an observable market determined parameter.
- The prevailing rate at any point in time is the benchmark that returns on risky investments must better
- Prevailing 10 year CGS yields reflect expectations of the risk free rate over the appropriate forward looking investment horizon (which is 10 years).

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[260] Reserve Bank of Australia, *Letter to the ACCC: The Commonwealth Government Securities Market*, 16 July 2012, (RBA, *Letter regarding the CGS market*, July 2012); Australian Treasury and Australian Office of Financial Management, *Letter to the ACCC: The Commonwealth Government Securities Market*, 18 July 2012, p. 2 (Treasury and AOFM, *Letter regarding the CGS Market*, July 2012).

- Selecting an averaging period in advance ensures the method is unbiased.
- There is no clear evidence that CGS yields are abnormally low. McKenzie and Partington suggested that the current rates may be consistent with a longer term trend.
- In the recent decisions, the return on equity arising from the low risk free rate has been a contentious issue. However, we maintain the view that CGS yields represent the most appropriate proxy for the risk free rate because:
- CGS are low risk
- the CGS market is liquid and functioning well, as confirmed by advice from the Reserve Bank of Australia (RBA), the Australian Treasury and the Australian Office of Financial Management (AOFM)[261]
- the RBA advised 'CGS yields are the most appropriate measure of a risk free rate in Australia'.[262]

Stakeholders are welcome to comment if they have alternative views on the best risk free rate proxy.

F.4 Market risk premium

It is well recognised that the MRP cannot be directly observed. Unlike the risk free rate, the evidence available for estimating the MRP is imprecise and subject to varied interpretation. There is no consensus among experts on which method produces the best MRP estimate. In addition, different methods can produce widely different results at the same point in time. [263]

In the recent decisions, network service providers and their consultants submitted that we estimate a long term average MRP. However, we did not simply rely on the long term historical MRP estimates. Instead, we considered a range of evidence to inform the best estimate of the MRP and adopted an MRP of 6.0 per cent as:[264]

- historical excess returns—these estimates provide a range of 4.9–6.1 per cent if calculated using an arithmetic mean and a range of 3.0–4.7 per cent if calculated using a geometric mean.
- academic research on excess return predictability—over the past decade, there is an increased scepticism about the ability for particular variables to predict returns. New empirical evidence has cast doubt on previous empirical evidence that suggested particular variables were good predictors of returns. Some studies indicate there is no better forecast of excess returns than the historical average.
- forward looking MRP measures—these give mixed results, and are each subject to various limitations. On the one hand, dividend growth model (DGM) estimates suggest the MRP is in the range of 5.9–8.4 per cent. These estimates were provided by Associate Professor Lally who used CEG's DGM method, after adjusting for certain deficiencies in CEG's method. On the other hand, implied volatility based MRP estimates suggest the MRP is currently below its historical average level.

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261 Australian Treasury and Australian Office of Financial Management, *Letter to the ACCC: The Commonwealth Government Securities Market*, 18 July 2012, p. 2 (Treasury and AOFM, *Letter regarding the CGS Market*, July 2012). .

262 Reserve Bank of Australia, *Letter to the ACCC: The Commonwealth Government Securities Market*, 16 July 2012, (RBA, *Letter regarding the CGS market*, July 2012).

263 See: Damodaran, *Equity risk premiums: determinants, estimation and implications - the 2012 edition*, March 2012, p. 93. He also noted: "No matter what the premium used by an analyst, whether it be 3% or 12%, there is back-up evidence offered that the premium is appropriate."

264 AER, *Access arrangement final decision SPI Networks (Gas) Pty Ltd 2013-17 part 2: attachment*, March 2013, p.80

- survey evidence—surveys of market practitioners consistently support 6 per cent as the most commonly adopted value for the MRP. These surveys also indicate that the average MRP adopted by market practitioners was approximately 6 per cent.
- recent Tribunal decisions—the Tribunal held the view that it was open for regulators to adopt a 6 per cent MRP in all of the recent decisions where regulated businesses sought Tribunal review.
- consultant advice—Associate Professor Lally, Professor McKenzie and Associate Professor Partington all advised us that a 6 per cent MRP is reasonable in the prevailing market conditions in their most recent reports and CEPA found the valuation reports do support an MRP that is equal to about 6 per cent.
- recent decisions among Australian regulators—both the ERA and the QCA consistently adopted an MRP estimate of 6 per cent under the same CAPM framework. We also noted while the IPART consistently adopted an MRP range of 5.5–6.5 per cent, it has made an upward adjustment to the overall WACC in its recent decisions due to the current low risk free rate.

Although there was no specific comment on the MRP in the submissions on rate of return issues paper, service providers have raised concern in the recent decisions that an MRP of 6 per cent might not be appropriate in the current circumstances with the low risk free rate. We have identified the following two issues for consultation relevant to the MRP.

Market return predictability and the unconditional approach to estimate MRP

Over the past decade, there is considerable scepticism about evidence for a relationship between observable variables and the MRP. A few studies indicated there is no better forecast of excess returns than the historical average.[265]

Professor McKenzie and Associate Professor Partington in their most recent report recommended the adoption of an unconditional mean MRP and supplement it by triangulation and reasonableness checks using alternative approaches.[266]

Stakeholders are encouraged to comment on whether the unconditional approach in estimating the MRP should be adopted.

Consistency and the conditional approach to estimate MRP

SFG has recently proposed the use of various financial market indicators as relevant to the estimation of the conditional MRP. Different indicators give mixed results and they can be quite variable across a short period of time.

At the time of the Victorian gas decisions, DGM estimates suggested the MRP was slightly higher than its historical average, while implied volatility based MRP estimates suggested the MRP was below its historical average level. SFG presented implied volatility data as well as other market indicators in its previous reports. However, it did not present implied volatility data in the reports prepared for the Victorian gas businesses. Further, it did not explain why it no longer gives weight to the implied volatility.

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265 Boudoukh, Richardson and Whitelaw, *Myth of long-horizon predictability,* Review of financial studies, July 2008, vol. 21, no. 4, pp. 1577–605; Timmermann, *Elusive return predictability,* International journal of forecasting, January – March 2008, vol. 24, no. 1, pp. 1–18; Goyal and Welch, *A comprehensive look at the empirical performance of equity premium,* Review of financial studies v, 2008, vol. 21 n, no. 4, pp. 1455–508.

266 McKenzie, and Partington, *Review of the AER's overall approach*, February 2013, p.20.

If we are to adopt the conditional MRP approach, the same set of indicators should be applied consistently across time to avoid a bias in regulatory outcomes. In addition, we need to analyse the strengths and weaknesses of each indicator and assess them against certain criteria when determining the best proxies for a conditional MRP. We would welcome views on the conditional MRP approach.

F.5 Equity beta

The equity beta is a measure of a firm's (or asset's) systematic, that is, non-diversifiable, risk. It characterises relative riskiness of the business' assets compared to that of the broad market portfolio. We have reviewed and analysed a number of conceptual and empirical issues related to estimating the equity beta of a benchmark efficient service provider during the 2009 WACC Review[267]. Many of those considerations remain relevant. At the same time, due to the rule changes and changes in general economic and more industry-specific conditions that occurred since the last WACC review, some of the issues we considered previously need to be revisited and some new issues need to be addressed.

F.5.1 Conceptual Issues

The current rules require that the rate of return for a service provider to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk in providing the standard control services.[268]

In order to develop our thinking on the relationship between risks a benchmark efficient entity is facing and the corresponding rate of return we issued Terms of Reference (ToR) for expert advice on this matter[269]. Conceptually, we are seeking expert opinion regarding which risks (or types of risks) should be compensated for through the rate of return. In this respect it is important to consider that the capital asset pricing theory (and Sharpe–Lintner CAPM in particular) implies that equity holders should only be compensated for systematic, i.e. non-diversifiable, risk, since they have access to a broadly diversified asset portfolio. Therefore, if the Sharpe–Lintner CAPM is used to estimate the rate of return on equity, to the extent that any compensation for diversifiable risk is found to be appropriate, it should be provided through other mechanisms. We seek stakeholder's views on whether other cost of equity models compensate for risk in addition to systematic risk, or if rather, the different cost of equity models embody a different proposition on what is systematic risk.

Another conceptual issue concerns the relationship between the adopted return on debt approach, the efficient debt financing practices of the benchmark efficient entity, and risk faced by its equity holders. In particular, if we were to adopt a portfolio approach to the return on debt estimation instead of our current "on the day" approach, we need to understand how this move would affect the risk of the benchmark entity's equity holders. In its report for AEMC, SFG states that

> ...other things being equal, any differential between a firm's debt service payments and the regulatory allowed return on debt will flow through to the cash flow to equity. That is, the volatility of the cash flow to equity is reduced by ensuring a closer match between the debt service payments and the allowed return[270].

That is, to the extent that a portfolio approach improves the match between the benchmark efficient entity's return on debt and the allowed rate of return on debt during the regulatory control period, it

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267 AER, Final decision: Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters, 1 May 2009, pp. 239–344.

268 NER, cl.6.5.2(c)

269 For more detail on the ToR, please refer to chapter 4, Benchmark firm and compensation for risk, section 4.3.

270 SFG Consulting, *Rule change proposals relating to the debt component of the regulated rate of return*, 21 August 2012, p. 42.

would result in lower volatility of the cash flow to equity and, hence, lower associated risk compared to the "on the day" approach.

F.5.2 Empirical Issues

As with all other parameters of the Sharpe–Lintner CAPM, the equity beta is not directly observable. As a result, it must be estimated by reference to proxies and cannot be determined with certainty. During the 2009 WACC review we developed an estimate of the equity beta for the benchmark efficient service provider. We justified our position with respect to a number of empirical considerations, including:

- Data issues: selection of Australian and foreign comparator businesses.
- Methodological issues: use of discrete or continuous returns; method used to de-lever the equity beta from the actual level of gearing of the comparator firm and re-lever to the benchmark gearing ratio;length of estimation period and frequency of observations; treatment of outliers; testing of estimation results; calculation of portfolio or average equity betas; and application of Blume or Vasicek adjustments.
- Interpretation of empirical estimates.

As a part of the consultation process in developing new rate of return guidelines we welcome submissions on all of the empirical issues listed above. To further direct the discussion, we consider the following concerns to be of particular relevance.

De-levering / re-levering approach

- The comparator businesses chosen to inform the estimation of the equity beta might not, in general have the same gearing as that adopted for the benchmark efficient entity. Thus, to obtain the estimate of the benchmark entity's beta, equity beta estimates for individual businesses (or a portfolio) must be first converted into the corresponding asset beta estimates (i.e., de-levered) and then further transformed using the benchmark gearing (i.e., re-levered). To implement this approach, we need to make an assumption about the debt beta of the individual businesses (or a portfolio) and that of the benchmark efficient entity. A difficulty arises from the fact that debt betas are very hard to estimate empirically. We currently assume the debt beta to be zero. McKenzie and Partington comment that

> ...while this is a common assumption among academic and practitioners, it is nonetheless incorrect[271].

At the same time, they note:

> ... there is unlikely to be material error in the de-levering, re-levering process followed by the AER. This is because we understand that the AER's de-levering, re-levering was from an average leverage of 62% to the benchmark leverage of 60%. The change is leverage is small and consequently the method <of> de-levering and re-levering has little effect.

In case of small differences between the gearing of the comparator businesses and the benchmark gearing, an alternative to the zero debt beta assumption would be to use the actual beta estimates, without applying any de-levering / re-levering. We seek submissions on which approach provides a more reliable estimate of the benchmark equity beta.

[271] McKenzie, and Partington, *Review of the AER's overall approach*, February 2013, p.10.

Treatment of outliers

We would like to re-examine our longstanding position to treat the 'technology bubble' and the Global Financial Crisis (GFC) as 'unrepresentative events'.

There are two types of events that may create outlier observations and, thus, potentially lead to bias in the equity beta estimates: business-specific events (such as merger announcements) and events that may be 'unrepresentative' of the market (such as the 'technology bubble' or the GFC). Events are considered 'unrepresentative' when the market conditions during this period are unlikely to be reflective of the market in the future. Accordingly, 'unrepresentative events' are generally removed from the estimation period. During the last WACC review we considered that it was appropriate to treat the 'technology bubble' as an 'unrepresentative event'. At that time the 'technology bubble' represented a larger proportion of the estimation period than it currently does. As more observations become available, the effect of this event (if it is not removed from the observation period) on the beta estimate may diminish. Further, it is impossible to predict whether (or when) the financial markets would fully recover to their pre-GFC state. As such, it is unclear whether the GFC should be classified as an 'unrepresentative event', as a structural break, or as a normal part of the cycle.

We seek submissions on whether the 'technology bubble' and the GFC or any other periods should be removed from the estimation period.

Selection of comparator businesses

There are no businesses which fully reflect the benchmark. Therefore, in order to inform our estimation of the equity beta, we have to examine the available market evidence from businesses that are considered to be close comparators to the benchmark efficient entity. During the WACC review in 2009 we examined equity beta estimates of both Australian and foreign energy businesses. We considered that the equity beta estimates of the foreign businesses should be taken into account. But we afforded them less weight due to differences in regulatory regimes and market conditions. We seek submissions regarding the suitability of using foreign data to inform the equity beta estimate.

Other regulated industries, both domestic and foreign, may also add to a set of relevant comparators. For example, in their report on a regulatory rate of return for SA Water Dr Steven Bishop and Professor Bob Officer [272] observe:

> It is reasonable to use a beta assessed with reference to water and other regulated network betas i.e. gas and electricity distribution. At this time we do not think the estimation process is sufficiently accurate to distinguish water from gas and electricity networks.

Since no Australian water utilities are currently listed, this raises a question of whether foreign water utilities can be considered as comparator businesses to the benchmark efficient entity. It seems reasonable that, given the differences in regulatory regimes and market conditions, the corresponding beta estimates for the foreign water utilities should be afforded less weight that the equity beta estimates based on domestic energy businesses.

We seek submissions on whether foreign water utilities (as well as domestic water utilities, if any of them became listed in the future) can be considered as comparators to the benchmark efficient entity and if so, how much weight the corresponding equity beta estimates should be afforded. We also

[272] Value Adviser Associates Pty Ltd (2011), *Advice on Components of Regulatory Rate of Return, Final Report*, 9 November 2011, p.18.

seek submissions on whether any other foreign or domestic businesses should be considered as comparators.

Similarly we seek submissions on whether we should take into account the equity betas for water service providers adopted by other Australian regulators as part of our determination of equity betas for energy services providers.

G Return on debt and gearing

This appendix provides an assessment of several methods of estimating return on debt against the criteria stated in chapter 2. In particular, using a single approach for each benchmark definition is compared to using a menu of approaches, "on the day" approach is compared to the trailing average portfolio approach and the hybrid portfolio approach, and, within the portfolio approaches, different weighting schemes are compared.

The appendix also addresses a number of specific considerations should we decide to move to a portfolio approach for estimating the return on debt. It also considers the various options available to us in implementing any of the three approaches to the return on debt. For this consultation paper, we aim to draw out the issues regarding the return on debt that will require further analysis and seek stakeholder view. These will feed into our draft guidelines. The appendix also provides more detail on our approach to determining gearing.

G.1 Assessment against the criteria

G.1.1 Single approach or menu

Below we assess using a single approach for each benchmark definition and using a menu of approaches against the criteria stated in chapter 2. As discussed in section 6.5 of this consultation paper, we do not consider that a menu of approaches would incentivise efficient financing.

Table G-1 Assessment against the criteria: single approach and menu of approaches

Criteria	Single approach	Menu of approaches
(1) Reflects economic and finance principles and market information:		
Estimation methods and financial models are consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data	Consistent with the rate of return objective and the principles of incentive-based regulation.	Not consistent with the rate of return objective, nor the principles of incentive-based regulation. A service provider would have an incentive to choose the option that maximises its total revenue.
(2) Fit for purpose:		
Uses information that is consistent with the original purpose for which it was compiled and has regard to the limitations of that purpose	Not applicable – refers to implementation.	
Promotes simple over complex approaches where appropriate	Simpler to implement than a menu of approaches.	Likely to result in increased complexity.
(3) Implemented in accordance with good practice:		
Supported by robust, transparent and replicable analysis that is derived from available, credible datasets	Not applicable – refers to implementation	

(4) Where models of the cost of equity and debt are used these are:	
Based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation	Not applicable – refers to implementation
Based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale	Not applicable – refers to implementation
(5) Where market data and other information is used, this information is:	
Credible and verifiable	Not applicable – refers to implementation
Comparable and timely	Not applicable – refers to implementation
Clearly sourced	Not applicable – refers to implementation
(6) Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate:	Not applicable – refers to implementation

Source: AER analysis

G.1.2 Return on debt approaches

Below we assess the "on the day" approach, the trailing average portfolio approach, and the hybrid portfolio approach against the criteria stated in chapter 2.

Table G-2 Assessment against the criteria: return on debt approaches

Criteria	"On the day"	Trailing average portfolio	Hybrid approach
(1) Reflects economic and finance principles and market information:			
Estimation methods and financial models are consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data	Based on the Modigliani–Miller hypothetical context of efficient financial markets and zero transaction costs.	Explicitly acknowledges the presence of financial market imperfections.	Explicitly acknowledges the presence of financial market imperfections.
(2) Fit for purpose:			
Uses information that is consistent with the original purpose for which it was compiled and has regard to the limitations of that purpose		Not applicable – refers to implementation.	
Promotes simple over complex approaches where	Simplest of the three	Likely simpler than the hybrid portfolio approach, but more	Most complex of the three approaches. Annual updating

appropriate	approaches.	complex than “on the day”. Annual updating and transitional arrangements would add complexity.	and transitional arrangements would add complexity.
(3) Implemented in accordance with good practice:			
Supported by robust, transparent and replicable analysis that is derived from available, credible datasets		Not applicable – refers to implementation.	
(4) Where models of the return on equity and debt are used these are:			
Based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation	More sensitive to a single input or measurement error that portfolio approaches.	Less sensitive to a single input or measurement error that “on the day” approach.	Less sensitive to a single input or measurement error that “on the day” approach.
Based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale		Not applicable – refers to implementation.	
(5) Where market data and other information is used, this information is:			
Credible and verifiable		Not applicable – refers to implementation.	
Comparable and timely		Not applicable – refers to implementation.	
Clearly sourced		Not applicable – refers to implementation.	
(6) Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate:	Reflects the most recent market information at the time of the determination, but not within a control period.	Reflects market conditions over the duration of the trailing average. With annual updating the approach also reflects market conditions during the control period.	Reflects market conditions over the duration of the trailing average. With annual updating the approach also reflects market conditions during the control period.

Source: AER analysis

G.2 Specific considerations for portfolio approaches

The return on debt produced by a benchmark debt portfolio with staggered maturity dates can be estimated as a trailing average of the returns on debt (or the DRP, in the case of the hybrid portfolio approach) over a period spanning up to the start of the regulatory control period (or regulatory year).[273] The exact mathematical formula of the trailing average depends on the assumptions made regarding the following parameters of the benchmark entity's debt financing practices:

- typical debt tenor (e.g. 10 years)
- frequency of debt issuance (quarterly, yearly, etc.)

[273] It is more accurate to refer to a "debt margin" under the hybrid portfolio approach, as the base rate when swapped would be higher than the risk-free rate, as it would incorporate the swap premium.

- the proportion of debt issued in each period (i.e. whether equal parcels of debt are issued every period)

For instance, if the benchmark efficient entity issues 10-year fixed-rate corporate bonds in parcels of equal size uniformly once a year, the resulting return on debt estimate at the time of the final determination is a simple average of the returns on debt over the 10-year period immediately prior to the commencement of the regulatory control period.

The remainder of this section considers how a portfolio approach might be applied. Specifically, we assess the strengths and weaknesses of:

- the trailing average and hybrid variants of the portfolio approach
- simple and weighted averages, and
- annual updating.

G.2.1 Trailing average and hybrid variants

Some stakeholders suggested that under the portfolio approach the trailing average should apply only to the DRP and not to the entire rate of return on debt. The rationale is that it is possible to "lock in" the risk-free rate for the duration of a regulatory control period using swap contracts.[274] Such a debt management strategy is accommodated under the hybrid portfolio approach. A business might, however, incur substantial swapping costs if it needs to finance a large portfolio. Compared to the "natural hedge" provided by staggered debt issuances, this strategy, therefore, is unlikely to be considered as efficient for an entity with large debt financing needs.

Some market observers argue that movements in the risk-free rate and DRP at least partially offset each other. This is because the risk-free rate is driven by investors' appetite to avoid risk, while the DRP measures investors' willingness to take on risk. Assuming at least a partially offsetting relationship between the risk-free rate and DRP, a trailing average applied to the entire rate of return on debt will produce a more stable estimate (and hence, less consumer price volatility) compared to a trailing average applied only to the DRP.

Table G-3 provides an illustration of this point. For simplicity we assume a fully offsetting relationship between the risk-free rate and DRP. For each year of the regulatory control period covering years 1-5, we produce illustrative 5-year trailing averages for the risk-free rate and DRP (where the average is over the previous five years). When the trailing average is applied to the entire return on debt, the allowed return on debt remains stable at 6.5 per cent across all five years of the control period. When the trailing average is applied only to the DRP—and the risk-free rate is fixed for the duration of the period based on its value in Year 0—the allowed return on debt fluctuates between 6.62 and 6.70 per cent.

[274] In practice, the rate that can be locked in via interest rate swaps is the Bank Bill Swap Reference Rate, rather than the risk-free rate.

Table G-3 Illustration of volatility of return on debt estimate

Year	Risk-free rate	DRP	5-year trailing average risk-free rate	5-year trailing average DRP	Trailing average risk-free rate + trailing average DRP	"On the day" risk-free rate + trailing average DRP
Year -4	3.50%	3.00%	N/A	N/A	N/A	N/A
Year -3	3.60%	2.90%	N/A	N/A	N/A	N/A
Year -2	3.70%	2.80%	N/A	N/A	N/A	N/A
Year -1	3.80%	2.70%	N/A	N/A	N/A	N/A
Year 0	3.90%	2.60%	N/A	N/A	N/A	N/A
Year 1	3.80%	2.70%	3.70%	2.80%	6.50%	6.70%
Year 2	3.70%	2.80%	3.76%	2.74%	6.50%	6.64%
Year 3	3.60%	2.90%	3.78%	2.72%	6.50%	6.62%
Year 4	3.50%	3.00%	3.76%	2.74%	6.50%	6.64%
Year 5	N/A	N/A	3.70%	2.80%	6.50%	6.70%

Source: AER analysis

Applying the trailing average approach to the whole return on debt also requires the estimation of fewer variables, as it could be estimated on a top-down basis (rather than as the sum of separately calculated risk-free rate and DRP). It is, therefore, likely to be simpler from a computational perspective. Lastly, the trailing average approach is more likely to satisfy the criterion of using robust, transparent and credible datasets than the hybrid approach. This is because the latter requires an estimation of the interest swap rate (for the risk-free rate), for which data is less widely available than the bond data that is needed for the trailing average approach.

In light of the above, should we decide to adopt a portfolio approach, we consider that a trailing average that applies to the entire rate of return on debt may be preferred to the hybrid portfolio approach. We seek stakeholder submissions on this view.

G.2.2 Weighting

The choice of weights applied to the rates of return on debt within a trailing average depends on the assumptions made about the efficient financing practices and debt profile of the benchmark efficient entity. If it is assumed that the benchmark efficient entity issues debt uniformly over time in parcels of equal size (i.e. the debt balance remains constant over time), it is reasonable to apply equal weights to all the elements of the trailing average. However, if the benchmark efficient entity was faced with an increasing (or decreasing) debt balance, using a simple trailing average might result in a mismatch between the return on debt and the allowed return on debt. This might distort investment decisions.

We have considered the following alternatives to simple (unweighted) trailing average suggested by stakeholders:

- weights based on the actual debt issuance data
- weights based on the actual changes in RAB, adjusted by the benchmark gearing

- weights based on the debt issuance assumptions in the Post Tax Revenue Model (PTRM)

These approaches, however, raise a new set of concerns:

1. All three approaches imply that the weights used in a trailing average would be different for each individual network service provider. As such, this represents a departure from the benchmarking approach and the Rate of Return Objective.

2. Weighting schemes based on actual data (the first two approaches) do not provide a network service provider with incentives to minimise its return on debt and, therefore, to engage in efficient financing practices.

3. The third approach may also lead to investment distortions. During the regulatory control period, a service provider minimising its return on debt might choose not to follow the debt issuance profile assumed in the PTRM. For example, it might choose to postpone investment if the prevailing rate of return on debt is high. However, the incentive to delay the investment would be weaker if a trailing average based on the PTRM assumptions is used. This outcome is not desirable, since it would lead to financing practices that are unlikely to be efficient.

To summarise, we recognise that a simple trailing average might result in investment distortions for the benchmark efficient entity with an increasing or decreasing debt balance. However, we consider that the proposed alternatives carry more significant weaknesses. A simple trailing average is computationally and conceptually simple. On balance, it will provide a better incentive for service providers to seek efficient financing. In addition, if the changes in the debt balance are small relative to overall debt balance, a simple trailing average is a good approximation of a trailing average based on the benchmark debt profile.

Should we decide to adopt a portfolio approach, we consider that a simple (unweighted) trailing average may be preferable to a weighted average. We seek stakeholder submissions on this view.

Below we assess different weighting schemes within the trailing average portfolio approach against the criteria stated in chapter 2.

Table G-4 Assessment against the criteria: weighting schemes

Criteria	Simple average	Weighted according to actual debt	Weighted according to PTRM forecast
(1) Reflects economic and finance principles and market information:			
Estimation methods and financial models are consistent with well-accepted economic and finance principles and informed by sound empirical analysis and robust data	Consistent with setting the rate of return for a benchmark efficient entity, rather than for a specific service provider.	Not consistent with the rate of return objective, nor the principles of incentive-based regulation. A service provider would not be incentivised to seek the most efficient debt financing.	As long as actual investment is in line with the PRTM forecast, incentivises service provider to seek efficient financing. But not consistent with rate of return objective.
(2) Fit for purpose:			
Uses information that is consistent with the original purpose for which it was compiled and has regard to	Not applicable		

the limitations of that purpose			
Promotes simple over complex approaches where appropriate	Simplest option.	More complex than unweighted average.	More complex than unweighted average.
(3) Implemented in accordance with good practice:			
Supported by robust, transparent and replicable analysis that is derived from available, credible datasets	Not applicable		
(4) Where models of the return on equity and debt are used these are:			
Based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation	No modelling required.	Sensitive to errors in estimating actual debt proportions.	Sensitive to any errors that affect forecast cash flows in the PTRM.
Based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale	Not applicable		
(5) Where market data and other information is used, this information is:			
Credible and verifiable	Not applicable		
Comparable and timely	Not applicable		
Clearly sourced	Not applicable		
(6) Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate:	Not applicable		

Source: AER analysis

G.2.3 Annual adjustment

The rules allow for further two options in designing the return on debt estimation methodology:[275]

1. The same estimate applies to each regulatory year within the regulatory control period.

[275] NER, cls. 6.5.2(i); NGR, r. 87(9).

2. The estimate can be (potentially) different for different regulatory years within the regulatory control period.

Under a portfolio approach, option 1 implies that the trailing average is computed at the start of the regulatory control period and not updated until the next regulatory control period, while option 2 is consistent with the trailing average being updated annually. Stakeholders have also suggested that annual adjustments of the portfolio approach could apply at the following determination via an NPV-neutral true-up.

Each option has advantages and disadvantages. The key concern regarding option 1 is that it may lead to mismatches between the benchmark efficient entity's return on debt during the regulatory control period and the rate of return on debt that is captured in the building blocks allowance. This could create investment distortions for the benchmark efficient entity. The paper by the ACCC's Regulatory Development Branch (RDB) on the return on debt argues that the issue is partly resolved due to the inherent lagged self-correction mechanism that accounts for the changes in the return on debt at the next reset.[276] However, such self-correction does not take into account the time value of money.

Option 2 minimises the mismatches between the benchmark efficient entity's return on debt and allowed return on debt during the regulatory control period. However, it introduces additional complexity to the tariff computation (i.e. the CPI-X profile would need to be recalculated annually). It may also be more resource-intensive on both AER staff and stakeholders. The difference between the benchmark rate of return on capital computed with and without annual updating becomes less significant if the benchmark debt tenor is long (for example, 10 years).

One clear advantage of option 1 is that it would not be impacted if the data used to estimate the return on debt were to be discontinued or become unavailable during the regulatory control period. In fact, there would typically be time for the AER to consult on alternative data sources.

We consider that the decision on whether to use annual adjustments or not cannot be made without also considering the implementation issues. Specifically, whether the return on debt is estimated using a third-party dataset (such as the ones produced by Bloomberg) or an AER-created dataset. The AER is required to apply any annual adjustments in a mechanistic way.

Should the AER develop its own dataset, it would be required to make numerous decisions on which debt instruments to include and what estimation techniques to use. These decisions will be set out in detail in the Guideline. However, new types of debt instruments are introduced on a regular basis, and even the most detailed mechanistic approach may require the AER to exercise its judgement at times regarding the inclusion or exclusion of certain debt instruments. The greater number of decisions that the AER would need to make when using its own dataset would provide more opportunities to challenge. Annual updating may compound this risk. There is a risk that frequent appeals may undermine investor confidence in the sector, as well as placing a significant burden on AER and stakeholder resources. Therefore, an AER-created dataset might be better used with no annual adjustments.

At this stage we have not taken a position on annual updating. We note stakeholders' preference for annual updating (either within the period or via a true-up), as well as the arguments against it in the RDB paper. We seek stakeholder submissions on how the implementation issues around annual updating could be made to work.

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[276] RDB, *Estimating the return on debt*, April 2013, pp.30-35

G.2.4 Transitional arrangements

Should we decide to move from "on the day" approach used under the previous rules to a portfolio approach, it would be important to manage the transition so that both consumers and service providers are not unduly impacted. The rules state that:

> ...any impacts (including in relation to the costs of servicing debt across regulatory control periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one regulatory control period to the next... [277]

should be taken into account in estimating the rate of return on debt.

Network service providers supported the view that the transitional arrangements would be required if a portfolio approach were to replace the current "on the day" approach. Some service providers further sought the ability to choose a transitional arrangement that suited their particular needs. Consumers are predominantly concerned with service providers transitioning from one approach to another and back, depending on which approach provides them with the highest return on debt. We consider that our position of only allowing a single approach to estimating the return on debt for the benchmark efficient entity (or for each definition of the benchmark efficient entity, if more than one benchmark is used) addresses this concern.

We acknowledge that sudden changes of allowances can be disruptive to both businesses and consumers (to the extent that they may result in sharp changes in energy prices). Where appropriate, gradual changes may be more desirable. However, we do not support the notion that transitional arrangements should be specific to individual network service providers' debt financing practices. Such an approach would be inconsistent with the Rate of Return Objective and represent a break from the fundamentals of incentive-based regulation.

Should we decide to adopt a portfolio approach, we would consider the need for transition from the "on the day" approach. We consider that the basis to deciding on whether transition is required will be the impact of the change of approach on the service provider's cash flows in the PRTM, and on the allowed revenue profile. We would seek any transition to take place over the shortest period that is appropriate, preferably no longer than a single regulatory control period. We would not expect transition to occur more than once for each service provider, unless we were to change the approach to estimating the return on debt again at a future guidelines. We seek stakeholder views on how to assess the need for transition and the form in which it may be applied.

G.3 Implementation issues

This section discusses more technical issues regarding the various options for estimating the return on debt—whether under the "on the day" or portfolio approach. We will need to make decisions on the following matters:

- what types of debt to include in the calculation
- whether to use a third-party dataset (such as Bloomberg) or produce a dataset in-house
- how considerations of maturity, credit rating, issuer industry and country of issuance should feed into the calculation

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[277] NER, cls. 6.5.2(k)(4); NGR, r. 87(11)(d).

Most of these considerations come down to the need to achieve a balance between achieving statistically robust estimates by using the largest possible sample and ensuring that the sample reflects the benchmark efficient entity. The above options are discussed in turn below.

G.3.1 Type of debt

Companies are typically able to access various types of debt financing, such as fixed-rate bonds, floating-rate bonds, and bank loans. While recognising this reality, we have previously based our estimates of the required return on debt only on fixed-rate bonds.[278]

Incorporating different types of debt into the calculation would better reflect the options available to companies as they seek the most efficient source of debt finance. This, however, would require the AER to take a position on how the benchmark efficient entity selects between the different types of debt. There is a risk that taking a position on this matter might have unintended consequences, such as incentivising inefficient practices, and may introduce an opportunity for gaming.

It is also important to recognise that we should be striving to produce an estimate of the required return on debt that is accurate (i.e. lowest estimation error) and unbiased. That does not necessarily lead to reflecting in the benchmark the complex practices of companies in the real world, if a better estimate could be derived by using a simpler approximation. Such an approach—assuming it is accurate and unbiased—would be consistent with the preference under the criteria for simple over complex approaches. It would incentivise efficient financing and would also make for more transparent determinations.

Being consistent with the criteria also requires us to follow best practice by relaying on robust, transparent and replicable analysis that is derived from available and credible datasets. Attempting to capture the full degree of complexity of companies' debt portfolios would require reliance on extensive data sources. Some of these sources may not be publicly available, or may be based on a small sample size that does not lend itself to producing robust estimates. For example, comprehensive data on bank loans is not available to us. Similarly, there are issues around how to convert floating rate debt into a fixed rate. A simple approach is more likely to be consistent with the above principle, provided that an appropriate dataset can be identified.

We seek stakeholder views on whether including a range of debt forms would, ultimately, result in better decision-making.

G.3.2 Data set

In recent determinations we relied on the Bloomberg Fair Value Curve (BFVC) for estimating the DRP. The biggest advantage of this approach is that it relies on a publicly-available dataset. At the same time, there are known issues with relying on this dataset:

- Bloomberg may stop publishing the BFVC completely.[279]
- Bloomberg may stop publishing the BFVC at maturities and/or credit ratings that are consistent with the definition of the benchmark efficient entity.[280]

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278 AER, *Access arrangement draft decision SPI Networks (Gas) Pty Ltd 2013-17 part 2 attachments*, September 2012, pp. 89-92.

279 We previously considered CBA Spectrum dataset. However, it ceased publishing its estimates of fair yield curves across all credit ratings for Australian corporate bonds in September 2010.

- Since the Bloomberg's methodology is not shared publicly, it is harder to identify and correct for any divergences between the figures derived from the BFVC and the return on debt of the benchmark efficient entity.
- The lack of transparency around the Bloomberg methodology also reduces our confidence in the consistency of estimates over time and between different points on the BFVC.

These concerns have led the AER to consider whether it may be able to develop a more appropriate dataset in-house. Such a dataset could take one of two forms: either a yield curve-based approach that relies on econometric techniques—similar to the BFVC, or a simpler approach that uses weighted or unweighted averages—such as the 'bond yield approach' adopted in recent determinations by the ERA.[281] Through the guideline development process, we would be able to provide transparency on any such dataset.

Regardless of the approach, developing our own dataset would require us to make decisions at a number of stages. We would need to decide which debt instruments to include in the calculations; which regression technique (or techniques) or averaging approach (or approaches) to use; and how to adjust for any apparent anomalies in the data, if at all. We would include detail in the guideline on how such decisions are to be made. However, there is still a risk that these issues prove contentious, especially if the inclusion or exclusion of a particular debt instrument were to have a material impact on the allowed rate of return.

We seek stakeholder submissions on their preferences regarding the choice between Bloomberg (or any other third party) and an AER-developed dataset. Stakeholders should also provide their views on how to mitigate the issues with either option.

G.3.3 Bond selection

Maturity

One of the issues regularly raised under the "on the day" approach was whether the NPV=0 condition would only be satisfied if the maturity of debt matched the length of the regulatory control period. The AER has not subscribed to this view in past determinations, although some of our consultants have.282 This consideration becomes less relevant under our proposed portfolio approach. The key requirement for the portfolio approach is for the length of the trailing average to match the average maturity of debt.

A further consideration is whether the method should use a single benchmark maturity or a range of maturities, as utilised in the ERA's "bond yield approach". Table G-5 summarises the arguments for and against each option. We seek stakeholder submissions on this matter.

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280 Bloomberg had ceased providing yield estimates beyond 7 years from 18 August 2009. In addition, the Bloomberg only publish its estimated fair yield curves for broad rating categories. The definition of the benchmark efficient entity might refer to a specific rating notch.

281 ERA, *Measuring the debt risk premium: a bond yield approach*, 7 January 2011

282 Lally, *The cost of equity and the market risk premium*, 25 July 2012, p.28

Table G-5 Considerations for maturity choice

	Single maturity	Portfolio of maturities
Pros	Computationally simple. The benchmark does not need to reflect all the options available to businesses, rather provide an accurate and unbiased estimate of their return on debt.	More reflective of the portfolio of debt held by both service providers and firms in competitive markets.
Cons	If the yield curve is upward-sloping, service providers might be incentivised to issue shorter maturity debt than the benchmark and earn excess profits.	Computationally complex. Requires the AER to take a view on the benchmark efficient entity's choice of maturities at every given point in time. This could result in unintended consequences.

Source: AER Analysis

Credit rating

Our benchmark in recent determinations has been a credit rating of BBB+ (Baa1 in Moody's terminology). In the 2009 WACC review, we observed that different techniques provide a range of credit ratings from BBB+ to A-. Given there was no clear finding from the available evidence, we were not persuaded at the time that the previously adopted credit rating of BBB+ should be departed from. Therefore the credit rating of BBB+ would generate a return on debt that reflects the cost of borrowing for comparable debt.283 In reality, service providers hold credit ratings that may be one or more notches above or below this benchmark. This reflects the different risk preferences of each business' shareholders and management.

When deciding on the approach for estimating the return on debt, we could choose to use a single credit rating as the benchmark or a range. The decision between the two is mainly a choice between a tighter definition of the benchmark efficient entity or a wider sample. A further consideration is where to set the benchmark—for example, Bloomberg does not publish a BFVC for BBB+ but rather for the broad rating category BBB. This means that using the BFVC to estimate the return on debt for a BBB+ benchmark would likely result in an overestimate of the return on debt, since the BFVC incorporates bonds rated BBB and BBB-.

Table G-6 summarises the arguments for and against each option. We seek stakeholder submissions on this matter.

283 AER, *Review of the WACC parameters,* May 2009, pp.390-392

Table G-6 Considerations for credit rating choice

	Single credit rating	Range of credit ratings
Pros	Computationally simple. The benchmark does not need to reflect all the options available to businesses, rather provide an accurate and unbiased estimate of their return on debt.	A larger sample size would reduce the impact of any single measurement error. May be more consistent with the consideration of "similar degree of risk" in the Rate of Return Objective. More reflective of different risk appetites in the industry.
Cons	A smaller sample size would increase the impact of any single measurement error. Third-party data may only be available for broad rating categories. Companies may be given different ratings by different agencies.	Computationally more complex. Different ratings may be consistent with different gearing levels.

Source: AER Analysis

Issuer industry

Similarly to the decision regarding credit rating, which industries to include bonds from when estimating the return on debt is a choice between a tighter definition of the benchmark efficient entity or a wider sample. There is an insufficient number of bonds issued by pure-play regulated energy networks. Bonds issued by service providers' parent groups may not be reflective of the benchmark efficient entity if they are materially affected by non-regulated activities of those groups. Additionally, using only bonds issued by service providers and their parent groups may introduce perverse incentives. These companies may be incentivised to issue expensive debt, as that could result in a higher revenue allowance being granted to them.

Finding companies outside the sector whose risk profile provides an acceptable proxy for regulated energy networks is not simple. Regulated energy networks benefit from risk-mitigating factors that are not available to firms in competitive markets—the regulatory contract guarantees that their efficient costs will be fully recovered through revenue allowances. They also benefit from pass-throughs, are not exposed to competitive pressure or the threat of new entry, and have the value of their assets anchored by the RAB. They also have unique obligations in terms of service requirements set out in their licences. Other regulated companies, such as water networks, may represent comparable risk. Although this depends on the degree of similarity between the regulatory regimes.

Table G-7 summarises the strengths and weaknesses of four potential options:

- only including bonds issued by service providers and their parent groups
- only including bonds issued by companies that operate in the energy sector
- only including bonds issued by regulated network companies (e.g. energy, water, rail)
- including bonds by all companies that match the other selection criteria (i.e. maturity, credit rating)

We seek stakeholder submissions on these options or any alternatives.

Table G-7 Considerations for issuer industry choice

	Energy networks only	Energy companies only	Regulated networks only	All companies
Pros	Provides the closest match to the benchmark efficient entity.	Provides a broadly similar risk profile to the benchmark efficient entity. Likely to include a wider range of bonds than just energy networks.	Provides a broadly similar risk profile to the benchmark efficient entity. Likely to include a wider range of bonds than just energy networks.	Reduces the impact of a single measurement error by having the largest sample size.
Cons	There are likely to be very few bonds issued by pure-play regulated energy networks.	Inclusion of non-regulated companies may result in an overestimate of the return on debt since their risk exposure is higher.	May result in an over- or underestimate of the return on debt, depending on the degree of similarity between the regulatory regimes and business activities.	Provides the weakest match to the benchmark efficient entity. Likely to result in an overestimate of the return on debt as the majority of bonds included will reflect the higher risk profile of non-regulated companies.

Source: AER analysis

Currency of issuance

Companies can be expected to seek the cheapest source of finance available to them. That source may be international markets, although this option may not be available to all companies. It depends on whether the company is able to access those markets and whether international investors are able to assess the risk of the investment. Regulated energy networks are particularly likely to benefit from the availability of a more liquid market for long-term debt overseas than in Australia. Stakeholders have suggested that an efficient debt portfolio will likely include debt issued in the USA and/or Europe.[284]

Nevertheless, accounting for international debt in the estimate of the return on debt introduces some complexities. For example, in order to convert the cost into comparable terms of domestically-issued debt, we would need to estimate the cost of currency swaps between the country of issuance and Australian dollars. A further issue is how to ensure consistency between a return on debt estimate that includes international bonds and the estimate of the return on equity.

One option is to continue to use Australian bonds to estimate the return on debt, but to then perform a robustness check of this estimate against one derived from international bonds. We would then need to exercise our discretion (in a manner that would be set out in the guidelines) if the two estimates are at odds with each other.

Table G-8 summarises the arguments for and against each option. We seek stakeholder submissions on this matter.

[284] MEU, *Rate of return guidelines submission*, February 2013, p. 28 ; United energy / Multinet, *Rate of return guidelines response to issues paper*, February 2013, p.12.

Table G-8 Considerations for market definition choice

	Australia only	Australia and international	Australia only for estimation, sense-checked against international evidence
Pros	Computationally simpler. The benchmark does not need to reflect all the options available to businesses, rather provide an accurate and unbiased estimate of their return on debt.	More reflective of the range of sources of bonds held by both service providers and firms in competitive markets.	Would allow the AER to take into account changes in the Australian debt market, such as diminishing liquidity for longer-term bonds. More reflective of the considerations by both service providers and firms in competitive markets regarding where to raise debt.
Cons	May overestimate the return on debt if cheaper finance is available in international markets. The estimation method becomes vulnerable to changes in the domestic market, such as diminishing liquidity for longer-term bonds.	Computationally complex. The weight afforded to international debt may require the AER to take a view on the benchmark efficient entity's choice of issuances. This could result in unintended consequences. May be inconsistent with the approach used to estimate the return on equity.	Computationally more complex than Australia-only option. Would require the AER to set out how it would use its discretion in case the two estimates are materially different.

Source: AER analysis

G.4 Gearing

Gearing is the ratio of the value of debt to total capital (i.e. debt and equity). It is used to weight the costs of debt and equity when formulating a WACC. For the purposes of determining a level of gearing of a benchmark efficient entity, we consider that in the long run firms tend towards an efficient level of gearing. In our 2009 WACC review, we determined that there was not a strong reason to depart from the adopted level of gearing of 60 per cent.[285] This adopted level of gearing was based on prior regulatory practice.

G.4.1 Relationship with other WACC parameters

The Rules state that the allowed rate of return should be a weighted average of the return on equity and the return on debt.[286] The level of gearing of a benchmark efficient provider may be used:

- to weight the expected required return on debt and equity to derive the WACC
- to re-lever asset betas for the purposes of analysing the level of systematic risk across businesses
- as a factor in determining a credit rating for deriving the debt risk premium (DRP)

Equity betas are discussed in Chapter 6. Credit ratings are discussed earlier in this appendix.

[285] AER, *Final decision: Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters*, 1 May 2009, p 126.

[286] NER cl. 6.5.2(d)

G.4.2 Proposed method for calculating gearing ratio

The 'true' value of the gearing ratio is unobservable and, therefore, must be estimated. We intend to estimate the gearing ratio by observing values of debt and equity for the same firms that will be included in the return on debt dataset—subject to information availability. We will rely on a range of quantitative evidence and utilise a variety of methods to calculate the gearing of a comparator sample of businesses. Then we will compare the results with the previously adopted level of gearing of 60 per cent.

Our initial view on the methods of valuing gearing is based on our 2009 WACC review. To summarise this position, we consider that:

- The weight applied to the return on debt is to be the market value of debt as a proportion of the market value of debt and equity. Although this is no longer specified in the rules, these values are consistent with the efficient market theory, according to which the current market value of a company's debt and equity reflects all relevant information.
- Due to the limitations of calculating the market value of debt, the book value of gearing is likely to be a valid proxy for the market value of gearing.[287] This is a generally accepted proxy, especially in the case of regulated energy networks, for which the RAB anchors the asset value.
- A number of approaches covering market values and book values of gearing should be considered as each of the valuation approaches has some limitations.
- In times of financial market volatility, market values of debt and equity may diverge from their book values. We acknowledge that at such instances book values may not provide a reasonable proxy for market values. However, we consider that adopting different valuation techniques would allow us to identify an appropriate gearing level.
- It is not clear whether or not adjusting for double leveraging is more representative of the level of gearing.[288] In the absence of further evidence, both will be considered.
- It is inappropriate to use net debt, as cash could be funded by debt and/or equity.[289]
- The book value of loan notes should be removed from the book value of total debt.[290] This is because this amount does not reflect the ongoing debt of the provider, given this is an arrangement to delay a lump sum payment.
- We will use a range of independent and reputable data sources - such as the Bloomberg and Standard and Poor's data used in the 2009 WACC review.
- Providers excluded from the sample will be those that do not own or operate energy networks, have significant mergers and acquisition activities or are involved in substantial unregulated activities.[291] These excluded providers are unlikely to be representative of the conceptual

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287 Book value is the value on the company's balance sheet. Market value is the current published price of a traded bond or share. Investors consider the future growth potential, which may be above or below the book value.

288 Double leveraging is a workaround to access debt-based capital in some regulated industries (such as banks). A company funds the purchase of equity in a subsidiary by issuing debt, and hence increases its own debt-based capital.

289 Gross debt is the total debt. Net debt (for the purposes of gearing) is the total debt less the total amount of cash and cash equivalents. That is, cash is assumed to retire debt.

290 Loan notes are an agreement between two parties to make payments over a set period, in lieu of a lump sum payment. This could have tax or cash flow benefits for both parties.

291 Stapled securities are common in mergers and acquisitions. The pre-arranged financing details are made available to potential bidders in an acquisition, which expedites the bidding process.

definition of the benchmark efficient entity. Government-owned providers will be included in the sample of comparator businesses, as their equity value can be estimated using the book value.

- Semi-annual data from 2007 to 2013 is relevant for estimating the current gearing ratio. We will also consider the data over the period 2002 to 2007, which was used in the 2009 WACC review and compare it with the more recent data. Increasing the frequency of observations is unlikely to have a material impact on the quality of our estimate.

G.5 Issues for consultation

We are seeking views and supporting information from interested stakeholders on the following:

Question G.1

How should we address the issues regarding annual updating of the return on debt estimate?

Question G.2

What should be our considerations when deciding whether transition between benchmarks is required? How should we apply transition while retaining the properties of incentive-based regulation?

Question G.3

To what extent does the estimation method need to incorporate the different types of debt available to a business in order to be consistent with the Rate of Return Objective?

Question G.4

Should we develop our own dataset for estimating the return on debt or use a third-party source such as Bloomberg? What would be the key considerations in developing our own dataset and how should they be addressed?

Question G.5

When selecting bonds for use in the estimation—either in an AER-developed dataset or a third-party dataset—what should be our selection considerations in terms of maturity, credit rating, industry sector and country of issuance?

Question G.6

Do you support our proposed methodology for determining the gearing level?

H Imputation credit parameters

This appendix addresses in greater detail the value of imputation credits to investors. Specifically it includes discussion of:

- how the AER will reach a view on gamma parameters
- the stability of gamma
- the impact of the imputation tax system on the design of the regulatory framework
- relevant changes to Australian tax law
- the Monkhouse formula
- the imputation credit payout ratio
- the utilisation rate (theta).

This discussion does not include a preliminary view on these issues. Instead, for this consultation paper, we aim to draw out the issues that will require further analysis and stakeholder consultation. Then, at the draft decision stage, we aim to set out a preliminary view on our estimate of gamma.

H.1 How the AER will reach a view on gamma

The approach to estimating gamma has changed over time. Historically, regulators adopted a midpoint of 0.5. In general, this was based on a wide and pragmatic view of the available evidence. Subsequently, in the AER's WACC review and in the Australian Competition Tribunal's review of the AER's subsequent decisions, the estimate of gamma was driven by attempts at greater precision. For the Tribunal's final estimate in 2011, both the payout ratio and the utilisation rate depended exclusively on one source of evidence each. Specifically, for the payout ratio, the Tribunal used Hathaway's tax statistics estimated over two sample periods. For theta, the Tribunal adopted 0.35 based on a single dividend drop off study.[292]

Nonetheless, there is considerable evidence to suggest that both of these sources of evidence have meaningful shortcomings.[293] As a result, analysis of all conceptual questions and individual studies will be considered along with the practical requirements of estimating gamma. This will be done in accordance with similar criteria, derived from the NEO/NGO and RPPs, that we will use to assess the rate of return parameters. That is, we will ensure that all decision making is driven by economic principles and robust technical and conceptual analysis. Due to the difficulties of estimating gamma, this may require regulatory judgement. In particular, it is possible that no single source of evidence will be sufficiently robust to form a definitive estimate of that parameter. If this is the case, we will seek to transparently and robustly exercise our judgement on an appropriate estimate. This may balance a range of evidence while having regard to its strengths and weaknesses.

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[292] SFG, *Dividend drop-off estimate of theta*, March 2011, p. 37.
[293] This evidence is discussed in detail in sections H.6 and H.7.

H.2 The stability of gamma

Under the rules,[294] we are not required to apply a consistent gamma value for any length of time. Nonetheless, we recognise that the true value of gamma could change over time in response to plausible events or trends. These could include—but are not limited to—changes to corporate preferences about dividend distribution, changes in the density of foreign investors in the Australian market, or changes to tax laws. Given the broad nature of these changes, we expect they may take time to identify and to properly account for. We are also aware that undertaking robust estimates of gamma is a complex and resource intensive activity. It is not a parameter than can be simply or consistently updated over short time intervals. We therefore anticipate that the gamma estimate is likely to remain relatively stable between rate of return guidelines. Nevertheless, we will consider the merits of any new evidence on gamma as it becomes available.

H.3 The impact of the imputation tax system on the design of the regulatory framework

Since 1987, Australia has operated an imputation tax system. By paying Australian company tax, companies create imputation (franking) credits. Companies can then distribute these credits to their investors. Eligible Australian investors can then use these credits to offset their income tax. Specifically, $1 of franking credits allows eligible investors to reduce their tax liability by $1. This means that the company effectively pays tax on behalf of its investors. As a result, imputation credits are valuable to these investors. In contrast, foreign investors cannot use these credits to reduce their Australian tax liabilities. Imputation credits are therefore not directly valuable to foreign investors. Officer (1994) published the initial major paper on how to measure cash flows and the required rate of return in an imputation tax system. This framework is fundamental to analysis of gamma.

In a building block revenue determination, we estimate the required annual cash flows for service providers to maintain and attract investment in their networks. In general terms, service providers are allowed building block revenue to cover operating and tax costs, as well as a depreciation allowance and an estimated return on assets in the service provider's capital base. From this revenue, service providers can fund their operating expenses, service their debt and generate returns that can be distributed to shareholders as capital gains or dividends. This means that a change to either the rate of return or to the corporate tax building block affects the building block revenue, which in turn affects the cash flows that investors receive. Under the rules, the value of gamma affects the corporate tax building block, and hence the building block revenue.

H.4 Other regulators

Table H-1 summarises some recent decisions on gamma by other Australian regulators. This shows that regulators have not universally adopted that the Tribunal's decision on gamma.

[294] NGR r. 87A; NER r. 6.5.3 and NER r. 6A.6.4.

Table H–1 Recent Australian regulatory decisions on gamma

Regulator	Year	Gamma
ACCC[295]	2011	0.45
ERA (WA)[296]	2011	0.25
IPART[297]	2012	0.25
ESC[298]	2008	0.5
QCA[299]	2012	0.5
ESCOSA[300]	2012	0.5

H.5 Relevant changes to Australian tax law

The Australian imputation tax system was introduced in 1987. However, since this time there have been changes to the tax law that may have impacted on the distribution or value of imputation credits to investors. The three most important changes are:

- The 45-day holding rule—since 1999,[301] investors must have held a share for 45 continuous days around the issuance of dividends to redeem any imputation credits attached to these dividends. This means that any short term traders who hold shares for less than 45 days may receive the dividend and the imputation credit, but cannot redeem the credit and do not receive any tax offset.
- Cash refunds for unused franking credits—since 2000, shareholders have been able to claim a cash rebate for any imputation credits, even where the total rebate exceeds their tax liability. This means that the cash received upon the redemption of credits is the full face value of the credits and is no longer limited by the level of tax liability This applies to all entities that are otherwise eligible to redeem imputation credits.
- Reduction in company tax rate—in July 2001, the Australian company taxation rate was reduced from 34 per cent to 30 per cent. This affects the total value of credits that a company can generate and distribute.

H.6 The Monkhouse formula

The Monkhouse formula is a common way to model gamma. It is commonly specified as:

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295 Australian Competition and Consumer Commission, *Inquiry to make final access determinations for declared fixed line services—Final report*, July 2011, p. 49.

296 Economic Regulation Authority (Western Australia), *Final decision on proposed revisions to the access arrangement for the Dampier to Bunbury natural gas pipeline*, October 2011, p. 141.

297 Independent Pricing and Regulatory Tribunal, *Review of imputation credits (gamma)*, March 2012, p. 1.

298 Essential Services Commission (Victoria*), Gas access arrangement review 2008–12—Final decision*, March 2008, p. 489.

299 Queensland Competition Authority, *Final report, Sunwater irrigation price review 2012–17*, Volume 1, May 2012, p. 498

300 Essential services commission of South Australia, Advice on a regulatory rate of return for SA Water—Final advice, February 2012, p. 49.

301 While this law was introduced in 1999, it was applied retrospectively to 1997 onwards.

$$\gamma = F.\theta$$

where:

γ is gamma

F is the payout ratio— the number of imputation credits that shareholders receive divided by the number of imputation credits that companies generate, both within one period.

Θ is the utilisation rate (theta)— the proportion of value that an investor receives from $1 of face valued imputation credit. This can be less than one due to such factors as domestic or foreign residence, the investor's tax circumstances or transaction costs.

For example, a benchmark company may generate $1 million of imputation tax credits, but only distribute $0.8 million in a year. If we were to estimate a company specific F (the payout ratio),[302] this suggests the payout ratio would be 0.8 for this company.

Similarly, suppose a company distributes $0.8 million of imputation credits, and that its investors are 70 per cent domestic investors and 30 per cent foreign investors. The domestic investors may value each $1 of credit at the $1 refund they will receive. In contrast, the foreign investors are not eligible to receive any benefit and may place zero value to imputation credits. This suggests that the utilisation rate (theta) should be 0.7 for investors in this company. If both of these things were true, gamma for the benchmark company would be 0.56—the product of 0.8 and 0.7.

However, this model of gamma focuses only on the imputation credits generated and distributed within one year. It is also possible that investors value credits that are generated but not distributed in that year. We refer to these as 'retained credits'. It is likely that if retained credits have value, it is less than the value of immediately distributed credits. In part, this is because investors have to wait to access the benefits of the imputation credit, and could be earning a return in the interim from alternative investments. That is, the value of retained credits would decrease to reflect the time-value of money. The value of retained credits was a contentious issue during the WACC review.

H.7 Imputation credit payout ratio

The payout ratio is the proportion of generated imputation credits that the benchmark company distributes to shareholders every year. Because companies are not required to distribute all the credits that they generate, the payout ratio can be less than one. Retained credits or credits obtained from investment in other companies remain in companies' franking account balances until they are paid out.

- While companies typically distribute franking credits when paying ordinary dividends, other means of distribution such as special dividends or off-market share buybacks are also possible. Any calculation of the payout ratio must include all such distributions of franking credits. It is possible for the payout ratio to exceed one if a firm distributes more franking credits in the period than it generates in the period, drawing on retained credits from previous years to do so.We are now undertaking further analysis to form a view on the appropriate payout ratio. We will set out a preliminary view in the draft decision. This view will depend on further consideration of the existing evidence, information raised in submissions, and conceptual questions raised in the attachment, such as the appropriate gamma benchmark. The current estimates of both gamma sub-parameters are based on Australia-wide data. This may remain the case in the draft decision. However, it is also possible to estimate gamma using a narrower benchmark. For example, we could estimate the payout ratio and theta only for investors in energy utilities. A narrower

[302] The appropriate benchmark sample for gamma is not settled. This is discussed in section I.7.1.

benchmark would rely on different data sets, and may support a different estimate of the payout ratio.

- This section sets out issues for consultation considering both the current gamma benchmark and potential refinements. These are grouped into:
- the current estimate (0.7)—which is effectively the lower bound of the range of reasonable estimates with expert support
- full distribution (1.0)—which is the higher bound of the range of reasonable estimates with expert support.

H.7.1 The current estimate

We currently apply a payout ratio of 0.7, based on an average of estimates from two studies. Both of these studies measured the aggregate value of all franking credits accumulated against the amount of franking credits distributed for all Australian firms using tax office statistics. While we had regard to the first of these studies during the WACC review, we did not adopt this value at that time. The Australian Competition Tribunal first required the AER to adopt 0.7 for the payout ratio in its 2010-15 distribution determinations for Energex Ltd, Ergon Energy Corporation Ltd and ESTA Utilities.[303] Since then, we have consistently adopted 0.7. More recently, IPART and the ERA have also adopted payout ratios of 0.7. Nonetheless, we consider that this estimate is not definitive, and the payout ratio is not settled.

The two individual study estimates are:

- Hathaway and Officer (2004)—payout ratio of 0.71 from 1988 to 1992.[304]
- Hathaway (2010)—payout ratio of 0.69 for 1998 to 2008.[305]

The payout ratio may vary over time, as each year companies generate more credits and distribute some of them. In addition, companies have recently become able to distribute dividends based on their net assets. Previously, they were constrained to pay dividends out of their earnings. This has the potential to change companies' dividend and credit distribution behaviour.

However, previous studies have indicated potential issues in the calculations underlying the payout ratio. For example, as identified by Hathaway, the implied value of net imputation credits distributed as compiled from franking account balances (FAB) ($149 billion) is significantly different from the comparable figure derived using net taxation statistics ($115 billion).[306] Intuitively, we could expect these figures to be similar. We are currently planning further work to address some of these issues. Resolving these problems would allow for a better market wide estimate of the payout ratio. However, if they cannot be clearly resolved, we may still place weight on this estimate having regard to these shortcomings. We will set out clearly and transparently how we reach a final view, including the evidence used to reach this view and the reasons for its inclusion.

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303 Australian Competition Tribunal, *Application by Energex Limited (Gamma)(No 5) [2011] ACompT 9*, May 2011, para. 42.
304 N. Hathaway and B. Officer (Capital research pty ltd), *The value of imputation tax credits—Update 2004, Capital research Pty Ltd report*, November 2004, p. 8.
305 N. Hathaway, *Imputation credit redemption: ATO data 1988–2008, Capital research Pty Ltd report*, July 2010, p. 7.
306 N. Hathaway, *Imputation credit redemption: ATO data 1988–2008, Capital research Pty Ltd report*, July 2010, p. v.

Industry specific benchmark

Another option for estimating the payout ratio is to examine the payout ratio based only on companies in a specific industry sector. For example, we could use franking account distributions in the published annual reports for private energy utilities to estimate a sector-specific benchmark. There are reasons to expect the energy utilities to differ from the market average. For example, many utilities pay relatively high dividends. It is therefore reasonable to expect that they may pay out more of their accumulated franking credits than the 'average' Australian firm. To adopt this benchmark, we would need to consider at least:

- whether current dividend policy is efficient behaviour
- how the adoption of any changed benchmark would affect incentives
- how such a benchmark change would interact or be consistent with other aspects of the framework.

However, if we were to apply a narrower benchmark to estimate the payout ratio, it may also be necessary to use this same benchmark to estimate the utilisation rate. Data for the utilisation rate is less easily observable than it is for the payout ratio. A payout ratio can be directly measured from financial accounts, but the utilisation rate must be inferred from imputation credit redemptions or market trading data. These sources are much harder, if not currently impossible, to separate into investors within specific sectors. This results in a shortage of useable data for this benchmark. Because of this data shortage, a more specific theta benchmark is likely to be more difficult to estimate than a wider benchmark. Ultimately, we will consider the appropriate gamma benchmark holistically across the two parameters, having regard to the relevant criteria.

H.7.2 Full distribution of imputation credits

While most empirical analysis suggests a payout ratio of 0.7, there are conceptual reasons to expect a payout ratio at or close to 1. A payout ratio of 1 implies that companies distribute all franking credits that they generate. Some experts have suggested this appears to be an intuitively reasonable assumption.[307] In particular, these experts have observed that it is unlikely franking account balances could increase indefinitely without shareholders accessing these retained credits.

In its WACC review, we adopted a payout ratio of 1 because:[308]

- it was consistent with the assumption that companies will eventually distribute to shareholders all free cash flows.[309]
- we estimated the time value loss of retained credits and determined that this loss was not significant.[310] Therefore, as long as companies eventually distribute all of their franking credits, there is no need to adjust the payout ratio down from 1.

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307 For example: D.L. Handley, *Further comments on the valuation of imputation credits*, April 2009, p. 8,; M. McKenzie and G. Partington on behalf of the Securities Industry Research Centre of Asia Pacific (SIRCA) Pty Ltd, *Report to the AER—Evidence and submissions on gamma*, March 2010, pp. 26–27; M. Lally, *'Regulation and the cost of equity capital in Australia*', Journal of law and financial management, Vol. 2, No. 1, November 2003, p. 33.

308 AER, *Final decision: Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters*, 1 May 2009, pp. 420.

309 This was based on advice in Handley (2009), which in turn refers to Miller and Modigliani (1961), Miles and Ezzel (1980) and Officer (1994).

310 This was based in part on the Hathaway and Officer estimate that 71 per cent of credits generated in a year are distributed in that year. AER, *Final decision: WACC review*, May 2009, p. 420.

- the potential improvement in accuracy of a more detailed estimate did not justify the increased complexity required to reach this estimate

We subsequently adopted this decision in our electricity distribution determination for Energex and Ergon Energy. The service providers submitted that the AER should adopt an updated empirical estimate (0.70), and appealed our payout ratio of 1 in the Tribunal. During the appeal, we accepted that there was no empirical evidence in front of the Tribunal to support a payout ratio of 1. We also acknowledged that the empirical estimate of the payout ratio (0.7) was a long term estimate.[311] That is, the empirical estimate already included all credits distributed in that year, regardless of when they were generated. As a result, the Tribunal applied the empirical estimate.

Nonetheless, there is some empirical support for a payout ratio closer to 1. In one study, Associate Professor Martin Lally examined the observed payout ratio in 2002 for the eight largest listed firms in Australia.[312] For this sample, the payout ratio was 1. Lally concludes that the payout ratio for most industries should be at or close to 1. However, this study was based on a relatively small sample of firms, and by itself may not be conclusive evidence that the payout ratio should be 1 for energy utilities. Nonetheless, it suggests that a payout ratio at or close to 1 is plausible. It also suggests that firm or sector characteristics may be an important determinant of the payout ratio. This could support consideration of a narrower benchmark.

In the draft decision, we will explore the reasons for the difference between the 0.7 estimate and full distribution of imputation credits. Also, we will consider whether the 0.7 empirical estimate is likely to vary over time. For example, companies now have the ability to pay dividends out of net assets rather than only out of net earnings. This may cause companies to re-evaluate their dividend policies, which would affect the distribution of imputation credits.

H.8 Imputation credit utilisation rate

The imputation credit utilisation rate is the value investors receive from distributed imputation credits. This section includes discussion of two important conceptual questions for the utilisation rate. These are:

- face value or market value
- the representative investor.

Following this, the section includes discussion of the various sources of evidence that have been used to date in estimates of the utilisation rate. These are grouped into:

- tax statistics
- dividend drop off studies
- alternative market based valuation approaches.

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311 AER, *The Australian Energy Regulator's outline of submissions in the Australian Competition Tribunal (File no 3 of 2010)*, ,September 2010, para 54.

312 These were Telstra, News Corp, NAB, Westpac, Commonwealth Bank, ANZ, Rio Tinto and BHP. See: M. Lally, *'Regulation and the cost of equity capital in Australia*', Journal of law and financial management, Vol. 2, No. 1, November 2003, p. 33.

H.8.1 Face value or market value

It is unclear whether Officer's (1994) initial definition of theta implies or accommodates use of the face value and or the market value of the utilisation rate. However, in Officer and Hathaway (2004), the authors rely on both market value estimates and face value estimates as 'substitutable values' to estimate gamma.[313] This is important because, as identified in table H-2, market value and face value approaches use different methods of estimation.

Table H–2 The difference between face value and market value approaches

	What it measures	Primary method of estimation	Representative investor
Face value	Redemption rate of distributed franking credits	Tax value statistics	Average investor
Market value	Notional separate trading value of individual franking credits	Dividend drop off studies	Marginal investor involved in transactions around the time of distribution

Source: AER analysis.

- We will seek further input from stakeholders and experts about the choice of face value compared to market value. However, this does not necessarily mean that either method of estimation must be used in isolation. Gamma is complex to estimate, and there may not be a single definitive estimate of the utilisation rate using either approach. We will consider the practical advantages and weaknesses of different approaches in conjunction with the conceptual appropriateness of face value or market value.

H.8.2 The representative investor

The identity of the representative investor has important implications for the approach to estimate the utilisation rate. Specifically, tax statistics rely on an aggregate of credits paid to and redeemed by all eligible investors. This is an estimate of the utilisation rate for the average investor. In contrast, dividend drop off studies are based on share trading around the *cum-dividend* day. In market trades, the final share price should reflect the maximum bid of the marginal investor. Therefore, dividend drop off studies should give an estimate of the utilisation rate of the marginal investor participating in transactions around the time of dividend distribution.

These two representative investors may have different trading preferences which could affect their valuation of imputation credits. For example, it may be reasonable to conclude that an arbitrageur who trades frequently may value imputation credits differently to longer-term investors. This is because investors must have held a stock for 45 days to be eligible to redeem an attached imputation credit paid out with a dividend. An arbitrageur who trades frequently may still be inclined to pursue short term trades around the dividend day despite being ineligible to assume the franking credit. Such an investor would be unlikely to place much value on this credit. However, longer term investors who will be eligible for the tax offset may value these imputation credits more highly. This leads to the question about the more appropriate representative investor to consider in the model.

[313] N. Hathaway and B. Officer (Capital research pty ltd), *The value of imputation tax credits—Update 2004, Capital research Pty Ltd report*, November 2004, pp. 6–7.

It is difficult to identify or generalize about the identity of the marginal investor.[314] However, several theoretical models attempt to draw some conclusions on this question.[315] For example, models such as Boyd and Jagannathan (1994) suggest that ex-dividend data is likely to include a mix of arbitraguers and long term traders, and that:

- arbitrageurs tend to dominate trading in high dividend yield stocks because the transaction costs of the trade are a smaller proportion of the dividend yield
- long term traders tend to dominate trading in low dividend yield stocks.[316]
- However, this study was undertaken in the US context, which does not have an imputation tax system. It may be reasonable to conclude that in the Australian context, longer term investors who value imputation credits are less likely to trade within the 45 day holding period.
- Similarly, Graham (2003) observed that the ex-dividend drop off 'reflects the relative taxation of dividends and capital gains for a given stock's clientele of investors'.[317] Hathaway and Officer (2004) also identified that there is 'certainly strong evidence that this clientele effect is occuring'.[318] This suggests that the possible existence and makeup of investor clienteles for energy utilities may be relevant to estimating gamma. If it is possible to identify investor clienteles relevant to energy utilities, we will consider their implications for choosing an approach to estimate theta. However, we will weigh any conceptual strengths of a method against the practical merit of that method in determining how much weight to place on any estimate.

H.8.3 Tax statistics

Tax statistic estimates are a way to estimate the redemption rate of imputation credits. The redemption rate is the proportion of distributed credits that investors redeem to reduce their tax liabilities. The main advantage of tax statistic estimates is that they are based on direct observation of the only occasion on which imputation credits are 'traded' separately. That is, it is only at redemption that an individual imputation credit is exchanged for payment (the face value). In all market based approaches, imputation credits are packaged with dividends. It is therefore necessary in these cases to econometrically separate the value of the imputation credit from the value of the dividend, and to isolate both of these values from any other unrelated fluctuations in the market. This is discussed in greater detail in section H.8.4. However, it is an important advantage of tax statistic estimates that they avoid the need for these problematic adjustments.

In its WACC review, the AER relied partly on a tax statistic estimate by Handley and Maheswaran (2008) in reaching its estimate of theta. The Handley and Maheswaran estimate computed the redemption of tax credits from 1988 to 2004 in two separate periods: 1990–2000 and 2000–2004. We adopted the average of the two sample periods, and in turn averaged this value with an estimate derived from a dividend drop off study. The authors separated the two periods because of changes to tax laws in 2000 that allowed a rebate for unused franking credits. The authors concluded that this tax

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314 M. McKenzie and G. Partington on behalf of the Securities Industry Research Centre of Asia Pacific (SIRCA) Pty Ltd, *Report to the AER—Evidence and submissions on gamma*, March 2010, p. 24.

315 Such as E.J. Elton and M.J. Gruber, 'Stockholder tax rates and the clientele effect', *The review of economics and statistics*, Vol. 52, No. 1, February 1970, pp. 68–74 ; or J.H. Boyd and R. Jagannathan, 'Ex-dividend behaviour of common stocks', *The review of financial studies*, Vol. 7, No. 4, Winter 1994, pp. 711–741.

316 J.H. Boyd and R. Jagannathan, 'Ex-dividend behaviour of common stocks', *The review of financial studies*, Vol. 7, No. 4, Winter 1994, pp. 714–715.

317 J.R. Graham, 'Taxes and corporate finance: A review', *The review of financial studies*, Vol. 16, No. 4, 2003, p. 1106.

318 N. Hathaway and B. Officer (Capital research pty ltd), *The value of imputation tax credits—Update 2004, Capital research Pty Ltd report*, November 2004, p. 7.

change resulted in a 'significant reduction of double taxation'.[319] The estimates of the redemption rate were:

- 67 per cent (0.67) from 1990–2000
- 81 per cent (0.81) from 2000–2004
- 74 per cent (0.74) average of these two samples.
- Some experts have identified concerns with the use of tax statistics to estimate theta, and specifically with the Handley and Maheswaran study. For example, Hathaway (2010) presented a critical analysis of the Handley and Maheswaran tax study and suggested the AER should place no reliance on it. Handley (2010) subsequently responded to these criticisms in detail and rejected Hathaway's conclusions.[320]
- We are currently undertaking further work to improve our understanding of tax statistics and improve the way that we use tax statistics to estimate gamma. Since tax statistics are the only opportunity for direct observation of imputation credit redemption, they may be a valuable source of evidence.

H.8.4 Dividend drop off studies

Dividend drop off studies are a way to estimate the market value of dividends and franking credits by decomposing the change in share prices of a stock between trading days. Specifically, a dividend drop off study will generally use a price differential from:

- the cum-dividend date—the last day on which investors owning shares will be eligible to receive dividends and attached franking credits
- the ex-dividend date—the first day on which investors owning shares will not be eligible to receive dividends and attached franking credits.

That is, an investor that buys a share on the cum-dividend date will be eligible to receive a dividend from that company. An investor who buys a share on the ex-dividend date will not. The difference in these prices should therefore reflect the investors' valuation of the combined package of dividends and franking credits. Often, dividend drop-off studies will report this as a dividend drop off ratio. This is the reduction in the share price as a proportion of the face value of dividends paid out. For example, a dividend drop off ratio may be 1.2. This suggests that the share price has decreased by more than the face value of dividends paid out. This ratio should include the market value of the combined package of dividends of imputation credits paid out. However, the utilisation rate relates only to the value of the imputation credit. It is therefore necessary to separate the combined package value of dividends and imputation credits into individual components.

Dividend drop off studies have produced a wide range of estimates for the utilisation rate. In its WACC review, we relied partly on a dividend drop off estimate by Beggs and Skeels to reach our estimate of theta. The Beggs and Skeels (2006) study indicated a theta value of 0.57. During the subsequent appeal, Professor Skeels endorsed the use of a subsequent SFG study in place of the

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[319] D.L. Handley and Maheswaran, 'A measure of the efficacy of the Australian imputation tax system', *The economic record*, Vol. 84, Iss. 264, March 2008, p. 82.

[320] D.L. Handley, *Further issues relating to the estimation of gamma*, October 2010, pp. 21–34.

2006 estimate.[321] The Australian Competition Tribunal adopted a theta estimate of 0.35, based on SFG's (2011) dividend drop off study.[322] We have adopted this value since the Tribunal's decision.

Nonetheless, dividend drop off studies have well-documented shortcomings. We will take these shortcomings into account when deciding how much weight to place on any one dividend drop off study. The following is a non-exhaustive list of some of the problems experts have identified with the use of dividend drop off studies:

- Observability and allocation—dividend drop off studies estimate the market value of the combined package of dividend and imputation credit. The market value of the imputation credit by itself is never directly observable. As a result, the total dividend drop off ratio must then be allocated between dividends and imputation credits. [323] This process of allocation is controversial and can produce varying results. For example, suppose the combined package of $1 of dividends and attached franking credits is estimated to be valued at $1. This could imply the dividends are fully valued ($1) and imputation credits have no value. However, there are other possible allocations of this value. If dividends are less than fully valued, for example $0.6, this implies imputation credits are valued at $0.4. There is no consensus on how to robustly perform this allocation and it has critical implications for the estimate of the utilisation rate.

- Lack of variation in the data (multicollinearity)—dividend drop off studies attribute changes in a dependent variable (share price) to changes in independent variables (amount of dividend and amount of imputation credits). Separately identifying the effects of each of the independent variables (cash dividend and imputation credit) depends on there being variation in the relationship between these variables. However there is relatively little variation in Australian dividend drop off data. A large proportion of the dividends are fully franked. Of those that are not fully franked, the remainder are mostly unfranked. Typical consequences of such low variation include estimates being particularly sensitive to the addition or deletion of observations, and high standard errors associated with the individual dividend and imputation credit estimates.

- Market noise in the data—dividend drop off studies are based on the change in share prices between the two important trading days for dividend distribution. However, it is common that other overnight market developments lead to price fluctuations, which can distort or swamp the effects of the dividend payout.[324] One approach to control for market noise is to adjust the dividend drop off for the overnight market price change. However, particular market changes or information may affect some firms or some industries more than others. As a result, this adjustment may only partially address the problem.

- Other measurement errors—aside from market fluctuations, there are other common measurement errors that can influence the results of dividend drop off studies. For example, some shares go ex-dividend and ex-bonus on the same day.[325] This means that the price change should include both the dividend and imputation credit package and the market value of a bonus share issue. This is likely to bias the drop off ratio upwards. Other measurement issues include mid-sample changes in relevant tax rates, or inconsistent use of bid prices and ask prices. Some

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321 Australian Competition Tribunal, *Application by Energex Limited (Gamma)(No 5) [2011] ACompT 9*, May 2011, para. 28.

322 Australian Competition Tribunal, *Application by Energex Limited (Gamma)(No 5) [2011] ACompT 9*, May 2011, para. 42.

323 M. McKenzie and G. Partington on behalf of the Securities Industry Research Centre of Asia Pacific (SIRCA) Pty Ltd, *Report to the AER—Evidence and submissions on gamma*, March 2010, pp. 12–13; M. Dempsey and G. Partington, 'Cost of capital equations under the Australian imputation tax systems', *Accounting and finance*, Vol. 48, Iss. 3, September 2008, p. 441; S. Gray and Hall

324 M. McKenzie and G. Partington on behalf of the Securities Industry Research Centre of Asia Pacific (SIRCA) Pty Ltd, *Report to the AER—Evidence and submissions on gamma*, March 2010, pp. 14–15.

325 M. McKenzie and G. Partington on behalf of the Securities Industry Research Centre of Asia Pacific (SIRCA) Pty Ltd, *Report to the AER—Evidence and submissions on gamma*, March 2010, p. 18

of these measurement issues can be controlled for, but they are relevant considerations in reviewing a dividend drop off study.

H.8.5 Alternative market based valuation approaches

Outside of dividend drop off studies, there are some alternative market based valuation approaches to estimate the utilisation rate. Generally, these studies are designed to avoid the noise in the data that affects traditional dividend drop off analysis. However, in all cases these approaches still estimate the combined package of dividends and imputation credits. As a result, they are still subject to the allocation problem. Due to the infrequency of partially franked credits, these sources are also subject to concerns about multicollinearity. Some examples of alternative market based valuation approaches are:

- simultaneous trading of shares with and without entitlements
- simultaneous trading of derivatives and futures and of their underlying shares
- hybrid securities.

Simultaneous trading of shares with and without entitlements

In some limited situations, shares for a company are available for trading both with and without entitlement to the cash dividend and franking credit. There are different circumstances in which this occurs, but the same principle applies. If trades of both types of shares occur close to each other in time, the difference in share price is an estimate of the value of the cash dividend and the franking credit. This estimate is less likely to be affected by measurement issues affecting dividend drop off studies, such as movements in the overall market.

For example, a small number of shares on the ASX trade simultaneously with and without the dividend entitlement in the ex-dividend period at the request of a broker. The difference in share prices should reflect the market value of the dividend and imputation credit package. This eliminates some noise from the data and other market movements, because the share prices can be obtained at the same time and should therefore reflect the same market information. The extent to which this happens depends to some extent on how frequently the shares are traded. An example of this sort of study is Walker and Partington (1999), which found a utilisation rate of 0.88.[326]

Similarly, in non-pari passu rights issues, new shares are issued without the same dividend entitlement of existing shares. Therefore, shares can trade almost simultaneously with and without the market value of the dividend and imputation credit package. Chu and Partington (2001) estimated the utilisation rate using the difference between the two share prices. Overall, the authors estimated a dividend drop off ratio of 1.5, suggesting that investors value fully both dividends and franking credits.[327] However, the sample size in this study is small, which limits our ability to generalize the results.

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[326] S. Walker and G. Partington, 'The value of dividends: Evidence from cum-dividend trading in the ex-dividend period', *Accounting and Finance*, Vol. 39, Iss. 3, November 1999, pp. 293–294.

[327] The dividend drop off ratio is the drop in price as a proportion of the face value of the dividend. The maximum face value of attached imputation credits that can be embodied in this ratio is limited to the total value of Australian corporate tax paid. For example, suppose a company earns $100 in pre-tax operating profit and is subject to the Australian standard corporate tax rate of 30 per cent. The company will therefore pay $30 in tax, which it can distribute as franking credits. Further, its maximum dividend payout is $70 (100-30). So, if it pays out all of its post-tax profit as dividends and fully franks its imputation credits, fully valued imputation credits would be approximately 43 per cent (30/70) of the face value of the dividends. Therefore, a dividend drop off ratio of 1.43 or higher suggests that investors fully value both dividends and franking credits.

Chu and Partington (2008) also estimated theta in a study of a bonus share issue by CRA, which issued bonus shares without dividend entitlements.[328] As a result, there were shares trading simultaneously with and without the dividend entitlement. Chu and Partington found a drop-off ratio estimate of approximately 1.29, which suggests that investors value franking credits highly.

Simultaneous trading of derivatives and futures and of their underlying shares

Some studies infer the price of the dividend and imputation credit package by comparing the price of individual share price futures (ISFs) or low exercise price options (LEPOs) with the prices of their underlying shares.[329] Specifically, the studies compare:

- trading prices of ISFs and LEPOs for particular shares that mature after the current ex dividend date but before the next ex dividend date; with
- trading prices of the same underlying shares

These studies have several advantages, including large sample sizes. Also, because these futures trade in advance of ex-dividend days, the trades should not be affected by the activities of arbitrageurs involved in transactions around the dividend distribution.

However, two notable studies of this type have produced divergent results. Specifically:

- Cannavan, Finn and Gray (2004)—found that markets participants place a low value on franking credits since the introduction of the 45-day holding period rule. The sample covered the period May 1994 to December 1999.
- Cummings and Frino (2008)—extended the Cannavan, Finn and Gray approach for the period January 2002 to December 2005. In contrast to the earlier study, Cummings and Frino found that franking credits are worth at least half of their face value (0.5 or greater).
- Cummings and Frino (2008) attributed the different conclusion to the sample period.[330] If this is correct, it may suggest that imputation credits have become more valuable to investors over time in response to tax changes.

Hybrid securities

- Feuerherdt, Gray and Hall (2010) estimate the dividend drop off ratio for a sample of hybrid shares that pay dividends with attached franking credits but are relatively insensitive to market movements.[331] The authors find, for two different types of hybrid securities, mean dividend drop off ratios of one and close to one. To address the multicollinearity problem, the authors assume a market value for the dividend component. Specifically, they assume that the dividend is fully valued. Based on this assumption, the authors conclude that cum-dividend day prices on hybrid securities do not include any value for imputation credits. They conclude that the marginal investor in the Australian market appears to be a foreign investor who places no value on franking credits.

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328 H. Chu and G. Partington, 'The market valuation of cash dividends: The case of the CRA bonus issue, *International review of finance*, Vol. 8, Iss. 2, June 2008, p. 19.

329 For example; Twitte and Wood (2002), Cannavan, Finn and Gray (2004); Cummings and Frino (2008)

330 Cummings and Frino, 'Tax effects on the pricing of Australian stock index futures', *Australian Journal of Management*, Vol. 33, No. 2, December 2008, pp. 391–406.

331 Feuerherdt, Gray and Hall, 'The value of imputation tax credits on Australian hybrid securities', *International review of finance,* Vol. 10, No. 3, pp. 365-401.

I Summary of Australian and overseas regulatory practice

This appendix summarises the approaches that various regulators, both domestically and internationally, use to determine the WACC. The approaches demonstrate that regulators use differing amounts of regulatory judgment in deciding on the final WACC. For example, the Queensland Competition Authority deterministically adopts the results of financial models. The New Zealand Commerce Commission calculates a WACC range and then deterministically adopts the 75th percentile estimate from within the range. This approach uses regulatory judgment to determine the appropriate percentile to adopt. Regulatory judgment plays a greater role for regulators such as the Independent Pricing and Regulatory Tribunal, which selects point estimates having regard to, among other things, long term parameter estimates. This appendix also outlines estimation approaches such as the Energy Regulatory Authority of Western Australia's bond yield approach, and the discounted cashflow model used by the Federal Energy Regulatory Commission.

I.1 Australian Competition and Consumer Commission

The Australian Competition and Consumer Commission (ACCC) has generally employed an approach for WACC that has been very similar to that used by the AER. That is, it has generally used a nominal vanilla WACC with a 10 year term and incorporating parameter estimates similar to those estimated by the AER.

This section identifies two noteworthy points of difference. The first is the approach the ACCC uses to estimate the debt risk premium for Telstra. The second is the approach the ACCC accepted as reasonable in its draft decision on the NBN Co Special Access Undertaking.

The ACCC estimates the debt risk premium for Telstra using an approach that is different from what the AER has used in the past. For example, in the recent draft report on the Telstra Wholesale ADSL service, the ACCC estimated the debt risk premium using three bonds issued by Telstra itself.[332] This produced an estimate of 1.42 per cent.[333] In previous decisions the ACCC has also used one Telstra bond.[334]

Recently, the ACCC released its draft decision on the NBN Special Access Undertaking.[335] In that decision the ACCC accepted the approach proposed by NBN Co was reasonable in the current context. This approach involved the addition of 350 basis points to the prevailing risk free rate estimate and is a departure from the approach the ACCC has generally used in the past.

The ACCC offered two reasons for accepting the approach proposed by NBN Co:

> Firstly, the WACC for NBN Co cannot be estimated in accordance with observable parameters for NBN Co — for example, it is difficult to determine the appropriate credit rating for a firm such as NBN Co, particularly as it currently does not issue any of its own debt. Further, it is unclear what gearing ratio NBN Co will adopt during Module 1 — indeed its financing structure is likely to change significantly over the term of Module 1.

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332 ACCC, *Draft Report: Public inquiry to make a final access determination for the Wholesale ADSL service*, March 2013, p. 55.

333 We note Telstra has an A credit rating.

334 See, for example, ACCC, *Final Report: Inquiry to make final access determinations for the declared fixed line services*, July 2011, p. 69.

335 ACCC, *Draft Decision on the Special Access Undertaking lodged by NBN Co on 18 December 2012*, April 2013.

> Secondly, while the ACCC and the AER would typically estimate the WACC by assessing the different WACC parameters against appropriate benchmarks, appropriate benchmarks are unlikely to exist for the rate of return for the NBN investment.[336]

Given the circumstances and the unique characteristics of NBN Co, the ACCC's draft decision was that it was satisfied this aspect of NBN Co's proposed approach to the rate of return was reasonable. However, the ACCC noted that the approach is unlikely to be reasonable if suitable benchmarks exist, and there were other aspects of NBN Co's proposed approach to the rate of return that the ACCC was not satisfied were reasonable.[337]

I.2 Queensland Competition Authority

The Queensland Competition Authority's (QCA) most recent network decision was for SunWater. This decision was released in May 2012. To determine the rate of return, the QCA estimated the input parameters required and then used the resulting estimate deterministically. The QCA did not cross check the results with other information or market data.

The QCA adopted a nominal post tax WACC to determine the rate of return with a 60 per cent gearing assumption. To determine the return on equity, the QCA used the Sharpe-Lintner CAPM.[338] The QCA based the risk free rate on the 5 year Commonwealth government bond averaged over 20 days.[339]

To determine the return on debt, the QCA used the BBB+ margin above the risk free rate for 5 year corporate bonds. The QCA also made an allowance for credit default swap, interest rate swap and debt issuance costs in the return on debt estimate.[340]

Notwithstanding the Australian Competition Tribunal's decision for Energex to set gamma at 0.25, the QCA set gamma at 0.5. According to QCA, this was because 0.5 was consistent with regulatory precedent in Australia and NERA's analysis endorsed the QCA's approach.[341]

I.3 Independent Pricing and Regulatory Tribunal

The Independent Pricing and Regulatory Tribunal's (IPART) most recent final network decision was for Sydney Water Corporation.[342] This decision was released in June 2012. As discussed later, IPART has modified its approach in its most recent draft decision for Hunter Valley Water.

For Sydney Water, IPART applied its standard approach for setting the rate of return whereby it:

1. Estimates the possible range for the WACC by calculating values for each of the parameters that influence the return on debt and equity

2. Makes a judgement on the appropriate point estimate within the range.

IPART estimated a real post tax WACC with a 60 per cent gearing assumption.[343] IPART used the Sharpe-Lintner CAPM to determine the return on equity. IPART estimated a prevailing risk free rate from a 20 day average of 5 year Commonwealth Government bonds. A market risk premium range

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336 ACCC, *Draft Decision on the Special Access Undertaking lodged by NBN Co on 18 December 2012*, April 2013, p. 152.
337 ACCC, *Draft Decision on the Special Access Undertaking lodged by NBN Co on 18 December 2012*, April 2013, p. 152.
338 QCA, *Final report; SunWater irrigation price review 2012-17*, May 2012, p. 480-481, 503.
339 QCA, *Final report; SunWater irrigation price review 2012-17*, May 2012, p. 485, 503.
340 QCA, *Final report; SunWater irrigation price review 2012-17*, May 2012, p. 497, 500-503.
341 QCA, *Final report; SunWater irrigation price review 2012-17*, May 2012, p. 498, 503.
342 IPART, *Review of prices for Sydney Water Corporation's water, sewerage, stormwater drainage and other services*, June 2012.
343 IPART, *Review of prices for Sydney Water Corporation's water, sewerage, stormwater drainage and other services*, June 2012, pp. 197–198.

was estimated from the long term historic arithmetic average of market returns. IPART also used a range for the equity beta (0.6-0.8).

To determine a debt margin range, IPART used a sample of securities including the Bloomberg's BBB 7 year fair value curve and corporate bonds issued in Australia and the United States. The range is determined via an interquartile range approach. Under this approach, the upper and lower bounds are set at the top and bottom 25 per cent of values from the dataset and the median value is used as the midpoint.[344]

IPART estimated long term averages of the risk free rate, debt margin and inflation adjustment, to guide the decision making on selecting a WACC point estimates. According to IPART, if the mid-point WACC[345] using short term averages of market data is below that using long term rates, IPART would be more likely to use short term point estimates above the midpoint.[346] In the Sydney Water decision, IPART selected a WACC at the top of the range decision after considering long term parameter estimates and market uncertainty.[347]

IPART set gamma at 0.25 based on its imputation credits review.[348] Setting gamma at 0.25 was decided after taking account consistency; with academic studies, with the approach taken by other regulators, with commercial practice and stability of WACC and prices over time. Prior to this, IPART had used a gamma range of 0.3-0.5 with a midpoint of 0.4.[349]

IPART's most recent network decision for the Hunter Water Corporation draft decision was released in March 2013. IPART's used a three step approach to determine the rate of return, which was to:[350]

1. Estimated the possible range for the WACC, by calculating the WACC using its existing method (short term averages of the risk free rate and debt margin and long term averages of the market risk premium).

2. Estimating the possible range for the WACC by calculating it based on both the long term averages of all parameters, and based on short term averages of all parameters.

3. Making a judgement on the appropriate point estimate for the regulated business' WACC within the range estimated in step 1, with reference to the ranges estimated in step 2.

IPART concluded that:[351]

> We estimated an appropriate range for the industry WACC of between 2.9% and 4.2% with a midpoint of 3.5%. The midpoints of the [short term parameter approach] and [long term parameter approach] ranges were 4.1% and 5.4% respectively. On account of the other methods leading to higher estimates of the WACC, we decided an appropriate point estimate for the WACC is the upper bound of our range, 4.2%.

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344 IPART, *Review of prices for Sydney Water Corporation's water, sewerage, stormwater drainage and other services*, June 2012, p. 207.

345 The mid-point WACC is the WACC calculated using the mid point of the MRP and equity beta range, and the median of the debt market observations.

346 IPART, *Review of prices for Sydney Water Corporation's water, sewerage, stormwater drainage and other services*, June 2012, p. 205.

347 IPART, *Review of prices for Sydney Water Corporation's water, sewerage, stormwater drainage and other services*, June 2012, 2, p. 198.

348 IPART, *Review of prices for Sydney Water Corporation's water, sewerage, stormwater drainage and other services*, June 2012, p. 211; IPART, *Review of imputation credits*, 17 April 2012, p. 1.

349 IPART, *Review of imputation credits*, 17 April 2012, p. 3.

350 To see the specifications used for short and long estimates see; IPART, *Review of method for determining the WACC December 2012*, p, 93, 94.

351 IPART, Hunter Water Corporation draft report 1 July 2013 to 30 June 2017, March 2013, p. 181.

Another difference between this approach and that used previously was that IPART used a 40 day averaging period for the risk free rate, inflation rate and debt margin.

I.4 Essential Services Commission of Victoria

The Essential Services Commission of Victoria (ESCV) most recent network decision was for V/Line. This decision was released in June 2012. In this decision, the ESCV set the rate of return in a similar manner as that currently applied by the AER[352]—that is, the ESCV used the Sharpe-Lintner CAPM determinatively and used the Bloomberg BBB 7 year fair value curve extrapolated to 10 years.[353] Notwithstanding the Australian Competition Tribunal's endorsement of a 0.25 gamma, the ESCV adopted 0.25 for consistency in its decision making. While this approach is the most recent approach adopted, it is also useful to outline the approach used by the ESCV in its 2008-12 Victorian Gas Access Arrangement Review.[354]

During the Victorian Gas Access Arrangement Review, the ESCV estimated a real after-tax WACC with a 60 per cent gearing assumption for each gas service provider.[355] To estimate the return on equity, the ESCV used the Sharpe-Lintner CAPM.[356] The ESCV used the estimates from Bloomberg and CBA Spectrum of a 10 year BBB+ bond over 20 days to determine a range for the debt premium.[357]

The ESCV made single value estimates for input parameters where it considered evidence from capital markets allowed (the risk free rate and gearing). However, it estimated parameter ranges for the equity premium, beta and the debt premium because of methodological complexities or limitations to the statistical analysis.[358] The ESCV then calculated a rate of return range, based on the point estimates of the risk free rate and gearing, combined with the upper and lower bounds of other parameter estimates. The rates of returns proposed by the gas service providers were assessed against this range. Although one service provider's proposed rate of return was within this range (towards the top end), it was not accepted because the ESCV considered that a rate of return calculated from the upper and lower bounds of each range would constitute a systematic bias, and would be inconsistent with the requirements of the gas code.

To determine what rate of return should apply, the ESCV chose point estimates from within the parameter ranges. In so doing, the ESCV considered there to be no rigorous statistical or other method for determining such point estimates. To this end, the ESCV could not precisely justify the specific point estimates adopted.[359]

The ESCV's review of gamma suggested that that it should be between 0.75 and 1.0.[360] However, given the assumptions implicit in the empirical estimates, the ESCV thought it inappropriate to raise gamma from the previous value of 0.50.[361]

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352 More important, in this appendix, rather than how actual input parameters were derived, is the approach used to setting the overall rate of return.
353 ESCV's extrapolation method differed from the AER's.
354 The ESCV also set a rate of return in its 2008 Water Price Review, however, the approach largely drew upon that undertaken in the gas access arrangement review.
355 ESCV, *Gas Access Arrangement Review 2008-12*, March 2008, p. 448.
356 ESCV, *Gas Access Arrangement Review 2008-12*, March 2008, p. 447.
357 ESCV, *Gas Access Arrangement Review 2008-12*, March 2008, p. 488.
358 ESCV, *Gas Access Arrangement Review 2008-12*, March 2008, p. 490.
359 ESCV, *Gas Access Arrangement Review 2008-12*, March 2008, p. 490.
360 The gamma assumption was not based on a ranges approach, but rather, a range arose due to the uncertainty with estimating it.
361 ESCV, *Gas Access Arrangement Review 2008-12*, March 2008, p. 509.

I.5 Economic Regulatory Authority of Western Australia

The Economic Regulatory Authority of Western Australia (ERA's) most recent network decision was for Western Power Network.[362] This decision was released in September 2012. The ERA set a real pre tax WACC using 60 per cent gearing.[363] Similar to the AER, the ERA used the outcome of the Sharpe-Lintner CAPM to estimate the return on equity. Also, the ERA set gamma at 0.25, consistent with the Australian Competition Tribunal's decision for Energex.[364] On the other hand, some of the ERA's specific parameter estimation methods differed from the AER's methods. For example, the ERA estimated the risk free rate using yields from the 5 year Commonwealth government bonds averaged over 20 days.[365] Further, the ERA used a 5 year market risk premium.

Notwithstanding the different parameter estimation methods, it is the ERA's bond-yield approach to determining the return on debt, which is the key distinction between the ERA's and AER's approaches. The AER relies upon the Bloomberg 7 year fair yield curve (extrapolated to 10 years) to determine the debt risk premium. The ERA's bond-yield approach, however, relies on bond yields observed directly from the Australian financial market.[366] In the Western Power Network final decision, the ERA considered Australian corporate bonds of A-, BBB+ and BBB- rating and greater than a two year term to maturity. The ERA weighted these bonds (where more weight was given to bonds issued in greater amounts and longer terms to maturity) to determine the resulting debt risk premium.[367]

I.6 New Zealand Commerce Commission

The Commerce Commission of New Zealand's (NZCC) most recent network decision was for Vector and GasNet. This decision was released in December 2012. When setting the rate of return in determinations, the NZCC uses the 75th percentile rate of return estimate. When used for information disclosure purposes, the NZCC uses the midpoint rate of return.[368]

In its decision for Vector and GasNet the NZCC used a vanilla WACC.[369] Additionally, the NZCC used the simplified version of the Brennan-Lally CAPM to determine the return on equity. This is a version of the Sharpe-Lintner CAPM modified to recognise the presence of imputation credits and the general absence of taxes on capital gains.[370]

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362 ERA, *Final decision on proposed revisions to the access arrangement for the Western Australian Power Network*, 5 September 2012.

363 ERA, *Final decision on proposed revisions to the access arrangement for the Western Australian Power Network*, 5 September 2012, p. 330.

364 ERA, *Final decision on proposed revisions to the access arrangement for the Western Australian Power Network*, 5 September 2012, p. 422.

365 ERA, *Final decision on proposed revisions to the access arrangement for the Western Australian Power Network*, 5 September 2012, pp. 326–327.

366 ERA, *Discussion paper; measuring the debt risk premium, a bond yield approach*, December 2010, p. 8.

367 ERA, *Final decision on proposed revisions to the access arrangement for the Western Australian Power Network*, 5 September 2012, pp. 368–370.

368 Under the Commerce Act 1986, the NZCC must determine information disclosure requirements to ensure that sufficient information is readily available to interested persons to assess whether the purpose in Part 4 of the Act—'to promote the long-term benefit of consumers in markets where there is little or no competition and little or no likelihood of a substantial increase in competition' is met. Commerce Commission New Zealand, Information Disclosure for Electricity Distribution Businesses and Gas Pipeline Businesses: Final Reasons Paper, 1 October 2012. Commerce Commission New Zealand, *Cost of capital determination for Vector Limited and GasNet limited*, December 2012, p. 4.

369 Commerce Commission New Zealand, *Cost of capital determination for Vector Limited and GasNet limited*, December 2012, p. 2.

370 Commerce Commission New Zealand, *Input methodologies (EDBs & GPBs) reasons paper*, 22 December 2010, p. 147.

To calculate the 75th percentile estimate of the WACC, the NZCC makes point estimates, and then calculates the standard errors of the debt risk premium, asset beta and the tax-adjusted market risk premium (TAMRP).[371]

The debt risk premium standard error is the greater of 0.0015 or the result of the formula;[372]

$$\sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(\rho-\bar{\rho})^2}$$

N the number of qualifying issuers issuing bonds

ρ each qualifying issuer's arithmetic average spread for its bonds

$\bar{\rho}$ the debt premium

The asset beta standard error is calculated from the component parts that make up the asset beta.[373] The approach to estimating the standard error was outlined by Associate Professor Lally and applied by NZCC.[374]

The NZCC relied on Associate Professor Lally's estimate of the standard error for the TAMRP. The process placed equal weight on the standard deviation estimates from the Ibbotson, Siegel and Cornell approaches based on New Zealand data, the Ibbotson, Siegel and Cornell estimates from the US data, and the Ibbotson and Siegel estimates of 16 other countries' estimated standard deviations of the estimated TAMRP.[375]

In deciding on using the 75th percentile WACC estimate, the NZCC had regard to a range of factors which included that the short term costs to consumers of overestimating the rate of return are likely to be smaller than the costs of underestimating it. This would promote the outcome, favoured by the NZCC, of dynamic efficiency over static allocative efficiency. The NZCC also acknowledged, however, that the appropriate percentile is a matter of judgment.[376]

I.7 UK regulators

Britain's energy regulator, Ofgem, employs a different approach to setting the rate of return compared to the AER.

Ofgem has refined the building blocks approach to setting price controls under a regime labelled 'RIIO (Revenue = Incentives + Innovation + Outputs)'.[377] Under the RIIO framework, Ofgem sets its price

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371 Commerce Commission New Zealand, *Input methodologies (EDBs & GPBs) reasons paper*, 22 December 2010, p. 566.
372 Commerce Commission New Zealand, *Electricity distribution services input methodologies determination*, 2012, p. 117.
373 Commerce Commission New Zealand, *Input methodologies (EDBs & GPBs) reasons paper*, 22 December 2010, p. 548-550.
374 Lally, M, *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, appendix 3 <http://www.comcom.govt.nz/assets/Imported-from-old-site/industryregulation/Gas/CommissionReportsandDocuments/ContentFiles/Documents/comcom-lallyreportwaccforgaspipelinebusinesses-oct2008.pdf>. NZCC, Input methodologies (electricity distribution services) draft reasons paper, June 2010, < http://www.comcom.govt.nz/assets/Pan-Industry/Input-Methodologies/Draft-Determinations-CC-Papers/Input-Methodologies-Electricity-Distribution-Services-Draft-Reasons-Paper-June-2010.pdf>
375 Commerce Commission New Zealand, *Input methodologies (EDBs & GPBs) reasons paper*, 22 December 2010, p. 507.
376 Commerce Commission New Zealand, *Input methodologies (EDBs & GPBs) reasons paper*, 22 December 2010, p. 569-571.
377 Ofgem, *RIIO: a new way to regulate energy networks - final decision*, October 2010.

controls for a period of eight years. In December 2012 it issued the final decision documents for the first application of its RIIO price controls.[378]

In its price controls, Ofgem sets the allowed return (cost of capital) on a real vanilla basis, while the RAB is calculated on historic cost basis and uplifted for inflation. Ofgem considers its allowed return in the context of the entire price control package. It sets the allowed return such that it reflects Ofgem's assessment of the businesses' cash flow risk. This means that, where there is material difference in cash flow risk, Ofgem may set different allowed rates of return for companies within the same sector.[379] Ofgem's cash flow risk assessment consists of qualitative and quantitative comparisons of:

- the businesses to each other;
- the sectors (electricity transmission, electricity distribution, gas transmission, gas distribution) to each other; and
- the price control that is being set to the one that is currently in place.

Ofgem then tests the overall reasonableness of its allowed return in the context of the entire price control package by assessing financeability and the return on regulatory equity (RoRE).[380] Below are some of the significant areas of difference in Ofgem's approach to the components of the WACC and the cross-checks that it applies:

- Gearing—Ofgem sets the gearing component of the WACC on a notional basis. The decision is based on Ofgem's cash flow assessment, and cross-checked against financeability assessment, RoRE assessment, regulatory precedent, and the businesses' actual gearing.[381]
- Return on debt—Ofgem sets the return on debt component of the WACC by taking the 10 year trailing average of two indices, and deflating them by expected inflation.[382]
- Return on equity—In the initial (strategy) stage of its price control review, Ofgem seeks consultants' advice in order to derive a range for the return on equity.[383] Ofgem uses the consultants' advice informatively, rather than deterministically, and also carries out its own analysis.[384] The range reflects long term estimates of the risk free rate and MRP. The specific return on equity and, therefore, the beta are chosen from within the range following Ofgem's cash flow risk assessment. Ofgem may set different return on equity allowances for businesses within and across sectors, if it identifies material cash flow risk differences.
- Cash flow risk assessment—Ofgem's cash flow risk assessment covers a number of factors and places particular emphasis on the ratio of allowed capex to (opening) RAB when attempting to differentiate between the relative risk of businesses within and across sectors. It considers that this ratio best captures systematic risk, as represented in the CAPM framework by the asset beta.[385]

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[378] Ofgem, *RIIO-GD1: Final Proposals - overview*, December 2012; Ofgem, *RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas*, December 2012.
[379] Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 13.
[380] Ofgem, *RIIO: a new way to regulate energy networks - final decision*, October 2010, p. 40.
[381] Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 21.
[382] That is, Ofgem sets an overall return on debt allowance, without specifying the risk-free rate and DRP.
[383] Ofgem, *Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues*, 31 March 2011, p. 31-35.
[384] For example, Ofgem's consultants for the strategy phase for RIIO-T1 and GD1 advised on a range of 3.8-6.3%, while Ofgem decided to go with a range of 6.0-7.2%.
[385] Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 14.

- RoRE assessment—Ofgem's RoRE assessment provides an estimate of the rewards and penalties that are built into the price control package by assessing the impact of variations in expenditure from the allowance, as well as additional cash flows (or penalties) associated with outperforming (underperforming) the regulator's benchmark on various incentives and output measures.

- Financeability assessment—Ofgem has a duty to ensure that its decisions allow efficient companies to raise finance (the 'financeability duty').[386] This is at the core of Ofgem's approach to financeability testing. The assessment, however, also provides a cross-check to ensure that the allowed return is appropriate for the cash flow risks that the businesses would be exposed to during the price control period.

I.8 US regulators

The Federal Energy Regulatory Commission (FERC) sets the rate of return on a case specific basis. The most recent Opinion and Order for setting the rate of return was for Portland Natural Gas Transmission System (Portland). This was published in March 2013.[387]

The first step to estimate the return on equity for Portland was to determine a proxy group of companies. An equity return range was then derived by applying a discounted cashflow model to each proxy company (more information on selecting the proxy group and determining inputs to the model is outlined below).[388] Having regard to Portland's risk, FERC then determined the appropriate placement of Portland within the range of reasonable returns. In so doing, FERC's presumption is that 'pipelines generally fall into a broad range of average risk [i.e. the median proxy group return], absent highly unusual circumstances...'.[389] The FERC determined, however, that because Portland did not have an investment grade credit rating[390] (together with another, company specific, reason), Portland's return on equity would be set as the top of the proxy company range. [391]

FERC set Portland's return on debt based on the yield to maturity method, using Portland's outstanding long-term debt.[392] In addition, the FERC allowed the return on debt to include Portland's cost of settling interest rate swap (used to hedge construction loans).[393]

The gearing ratio assumption that applied to the return on equity and return on debt was determined by direct reference to Portland's actual gearing at the end of a test period.

I.8.1 Proxy group of companies

In addition to making determinations, the FERC issues Policy Statements on setting the rate of return. These statements are not binding on FERC or industry. One such Policy Statement is FERC's *Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity*.[394] This Policy

386 Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 27.
387 FERC, *Opinion No. 524; Portland Natural Gas Transmission System*. 21 March 2013.
388 FERC, *Initial Decision; Portland Natural Gas Transmission System*, 8 December 2011.
389 FERC, *Opinion No. 524; Portland Natural Gas Transmission System*. 21 March 2013, p. 122.
390 And because its credit rating was below that of all the proxy group companies.
391 FERC, *Opinion No. 524; Portland Natural Gas Transmission System*. 21 March 2013, p. 137-141.
392 FERC, *Opinion No. 524; Portland Natural Gas Transmission System,* 21 March 2013, p. 110; FERC, Exh. No. PNG-124 at 5; Portland Initial Brief. FERC, 18 C.F.R, 154.312 No. PSG-83
393 FERC, Opinion No. 524; Portland Natural Gas Transmission System. 21 March 2013, p. 110.
394 FERC, *Policy Statement Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity, 17 April 2008.*

Statement discusses how to determine a proxy group of companies. According to the Policy Statement, the proxy group has, historically, been composed of companies that:[395]

1. Are publically traded

2. Recognised as a natural gas or oil pipeline and the stock must be tracked by and investment service

3. The pipeline operations must constitute a high proportion of the company's business

However, because the number of such companies has declined, the FERC now includes Master Limited Partnerships in the proxy group (once various adjustments are made).[396]

According to the Policy Statement, to determine the constant growth rate of dividends to use in the discounted cashflow model, FERC combines short term and long term dividend growth estimates. Long term growth rates are set from long term measures of GDP. For Master Limited Partnerships, however, only 50 per cent of long term GDP is adopted for the long term growth rate.[397] Short term growth rates are taken from published security analysts' five year growth forecasts of the proxy group companies. Short term forecasts receive a two thirds weighting.[398]

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395 FERC, *Policy Statement Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity, 17 April 2008, p. 4.*

396 FERC, *Policy Statement Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity, 17 April 2008.*

397 FERC, *Policy Statement Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity, 17 April 2008, p.41.*

398 FERC, *Policy Statement Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity, 17 April 2008.*