24 September 2008

Mr Chris Pattas
General Manager
Network Regulation South Branch
Australian Energy Regulator
GPO Box 520
Melbourne Vic 3001

Dear Mr Pattas,

AER WACC Review – Response to Issues Paper

On behalf of the Energy Networks Association, Grid Australia and the Australian Pipeline Industry Association, please find attached the Joint Industry Associations' response to the Australian Energy Regulator's (AER) Issues Paper on the Review of the weighted average cost of capital (WACC) parameters for electricity transmission and distribution.

The AER's cost of capital review is of major importance to the owners of electricity and gas transmission and distribution businesses. The results of the review will be an important input into the regulatory environment affecting the regulated network sector. The review has broader significance because the electricity industry provides infrastructure that is critical to the general economic wellbeing of Australia and national prosperity.

The Joint Industry Associations look forward to engaging with the AER and other interested parties to develop the appropriate balance between ensuring that an adequate return on investment is provided, in order to attract the necessary capital to the industry, and ensuring that reasonable prices are offered to electricity consumers.

Please contact me should you wish to discuss this matter further.

Best Regards.

Andrew Blyth

Chief Executive Officer, Energy Networks Association

Gordon Jardine

Chairman, Grid Australia

Cheryl Cartwright

Chief Executive, Australian Pipeline Industry Association

Network Industry Submission

AER Issues Paper

Review of the Weighted Average Cost of Capital (WACC) parameters for electricity transmission and distribution

September 2008

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Overview

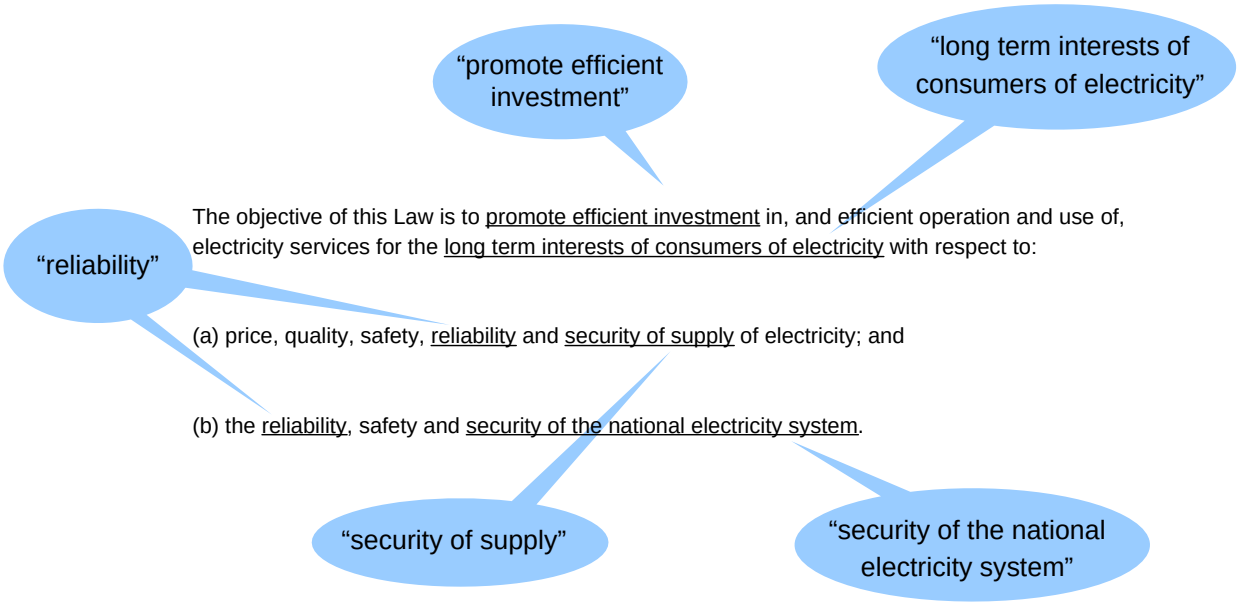
Introduction

The Australian Energy Regulator's (AER) cost of capital review (the Review) is of major importance to owners of electricity and gas distribution, electricity transmission and gas transmission pipeline businesses. The Review also has wider relevance because this industry provides infrastructure that is critical to the general economic well being of the Australian population and national prosperity.

The results of the Review will be a vital input into the regulatory environment affecting the regulated network sector. Existing businesses, with investments worth over $61 billion, will be significantly impacted by the Review. Furthermore, the Review will have a direct impact on the sector's ability to attract the substantial additional investment that the community requires to meet demand growth and to address the challenge of climate change. The cost of capital is one of the most important ingredients to an environment that fosters investment.

The national regulatory framework that was initially adopted when the National Electricity Market (NEM) was formed has been redesigned in recent years to put the incentives for efficient investment at its core.

National Electricity Objective:



In undertaking the Review, the AER must recognise that, while it will determine parameters for resets over the next 5 years, the cost of capital has a key role in setting incentives for investments in assets that typically have useful lives of more than 40 years.

The particular challenge for the AER is to balance the different aspects of the electricity market objective so that customers are delivered long term security of supply at a reasonable cost. That, in turn, requires network operators to be recompensed in an adequate and timely way for their investments.

The Joint Industry Associations note the context for the Review:

- this is the first Review under the new electricity regulatory framework and builds on the work of the Australian Competition and Consumer Commission (ACCC) in its Statement of Regulatory Principles for Transmission which provided the first detailed framework for cost of capital reviews;

- the ACCC's Statement was further developed by the Ministerial Council on Energy (MCE) and the Australian Energy Market Commission (AEMC) during reforms of the National Electricity Rules (NER) that regulate the sector. These reforms deliberately provided additional investment certainty that the ACCC could not provide under the original NER. By setting the weighted average cost of capital (WACC) parameters 5 years before the 5 yearly resets, and by linking one 5 year Review period to the next through the 'inertia principle' (discussed further below), a '5 plus 5 plus 5' year framework for certainty is provided;

- a successful Review will provide a foundation for investments in long–lived, critical infrastructure assets for the future. The last resets undertaken using the parameters set in this Review will occur in 2013. Investments will still be being made under those reset decisions in 2018 and the assets constructed will continue to provide a wide range of economic activity for many years beyond this date; and

- in its attempt to achieve that outcome, the Review faces particular challenges because it coincides with significant financial market instability which highlights the need for the regulatory arrangements to be resilient to, and respond appropriately to, financial market shocks. It is also occurring at a time where significant levels of new investment will be required in order to ensure a reliable supply of greenhouse-friendly energy.

This submission provides a wealth of detailed technical material and, before turning to the specific chapters on each topic, this Overview is designed to place that material within the following overall context. This Overview covers:

1. the investment incentives needed to attract critical infrastructure investment;

2. how the Review will contribute to an outcome that ensures investment incentives are set at the correct level; and

3. the key contributions to the Review provided by the Joint Industry Associations and the outcomes sought from the Review.

Investment Incentives to Attract Investment in Critical Infrastructure

The investment outlook over the Review period

The WACC is one of the key incentives for investment in energy networks. The Expert Panel, established by the MCE noted:[1]

> …the need to ensure that the regime continues to provide the incentive and capacity for owners of energy networks to continue to undertake timely and efficient infrastructure investments.

The energy industry clearly requires a stable, transparent and rewarding investment environment in order to attract funds for critical infrastructure investment. The sector is characterised by large capital upfront investments with long lives, and payback periods of up to 40 to 50 years which is longer than almost any other industry. The risks associated with investing in the sector for the long term must be reflected in the allowance of cost of capital.

This Review will set the direction for investments over the next 10 years. Investment during this particular period will be challenging and, in the face of these challenges, a successful Review will set solid pro-investment fundamentals to address the following:

- 1st Challenge: All parts of the national grid need new investment. Some localities are experiencing steeply growing energy demand and in some areas, many of the assets are approaching the end of their useful lives and the system needs rejuvenation. In order to meet these investment requirements, Australian investment projects must compete with international demand for infrastructure capital;

- 2nd Challenge: The Australian community has high expectations for its policy makers to improve climate outcomes. These expectations can only be met if the policy settings induce a redesign of the energy supply system from 'top to bottom'; from generation to transmission to distribution and retail. This cannot be done without significant new investments (as well as retaining much of the existing infrastructure to provide the security of supply that renewable energy sources often cannot provide); and

- 3rd Challenge: The world economy is clearly entering a period of uncertainty. Risk has been and is continuing to be re-priced, and there are consequent increases in the hurdle rates for investment funds. On the one hand the Australian energy industry has some attractive investment fundamentals. On the other, this industry must compete with many other infrastructure projects, domestically and internationally.

Some further detail on each point is warranted.

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[1] Expert Panel, *Energy Access Pricing: Report to the Ministerial Council on Energy*, April 2006, page 11

Demand growth and replacement infrastructure needs

A step change in investment requirements is upon the industry. The drivers of this prospective investment are:

- the continued demand for energy by Australian businesses and households;
- the need to invest in energy infrastructure to support the continued growth of Australian export industries;
- the need to replace ageing infrastructure;
- the need to meet the demands of climate change; and
- the need to improve the security of energy supplies.

This is occurring at a time of continuing and increasing global demand for energy and resources infrastructure, fuelled by rapid economic growth experienced in both China and India. Australian firms will be competing globally with other firms seeking to attract finance to fund investment in this infrastructure. The magnitude of the energy sector investment required has been forecast by the International Energy Agency in its World Energy Outlook 2007. For its business-as-usual case it states:[2]

> …globally the power sector requires US$ 11.6 trillion of capital expenditure for the period 2006 – 2030. More than half of the investment in the electricity industry is needed for transmission and distribution networks and the rest for power stations.

This projection highlights the global competition for investment in the energy infrastructure sector. Even if growth is substantially less than projected, it is still significant. Without appropriate incentives, including an adequate cost of capital to facilitate ongoing investment, Australia will become a less desirable location for investment.

> Australia is experiencing increased demand for energy infrastructure investment to replace ageing assets and expand capacity in many locations. The Review must allow capital to be attracted to this investment at a time when many other parts of the world are also competing to attract funds for their infrastructure needs.

[2] International Energy Agency 2007, *World Energy Outlook 2007*, pages 94-95

Investment capital required to redesign and build the energy supply chain to meet community climate change expectations

Just as a step change in investment will be needed to meet demand growth and asset replacement, there is about to be a step change in the investment required to meet the climate change challenge. The introduction of a Carbon Pollution Reduction Scheme (CPRS) and the expanded Renewable Energy Target Scheme (RET) is expected to result in significant restructuring in the production and delivery of electricity in Australia, and will require substantial investment in energy infrastructure. Of course, this sector is not involved in energy generation but changed patterns of generation impact the delivery infrastructure substantially. As well as geographic location, many renewable energy sources are intermittent requiring generation and networks to be duplicated to maintain security. Meanwhile, as the climate becomes more volatile, demand for energy also becomes more volatile with accentuated peaks and the system must accommodate this additional volatility.

Compared with the previous environment faced by the energy industry, this is an unprecedented risk for the industry. For the first time, this industry is to be directly impacted by a highly uncertain policy process designed to address climate change where previously the energy industry has predominantly been affected indirectly by economic shocks. Industry is ready and willing to play its part in the important work of climate change but it will only be able to play its part if the regulatory environment provides it with a suitable framework and economic incentives to undertake the infrastructure reconfiguration that will be needed.

This expected restructuring will have two quite separate and opposing impacts.

The first is that investors may consider that there are increased risks from investing in long term assets given the unknown potential structural and regulatory changes, as identified by the *Australian Government Green Paper* on applying CPRS to existing generation assets:[3]

> If the change in regulatory arrangements was unanticipated and implemented without compensation, and investors viewed this as evidence that the Government was likely to change the regulatory regime in future in an unpredictable way, then investors might regard Australia's electricity market as a riskier investment proposition. An increased perception of risk would increase the expected returns required by investors before they would invest, potentially delaying new investments in the generation sector. The extent of this risk is unquantifiable as it is based on the subjective views that investors may have held in the past and the view that they may take of the stability of the new investment environment in electricity

The second is that increased investment will be needed in network infrastructure to facilitate the transition to a low carbon economy.

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[3] Australian Government, *Carbon Pollution Reduction Scheme, Green Paper, Summary,* July 2008, page 30

Professor Ross Garnaut in his *Climate Change Review* stated that:[4]

> A well integrated national energy network with the capacity to cope with potentially large shifts in energy flows will allow for structural change and the smoothing of shocks following the introduction of the emissions trading scheme…

> The Review must recognise that, because of the increased uncertainty for the industry brought about by government policies to address climate change, the cost of capital allowance will need to increase.

An uncertain and contractionary financial market outlook

The values for risk related parameters such as beta, Market Risk Premium (MRP) and debt margin were originally quantified for regulatory purposes in an era where the cost of equity and debt were relatively cheap and the risk premiums required by investors were low.

In the 'credit crisis' world, debt and equity investors are significantly more risk averse and compensation is being sought for the risk of events previously thought extremely remote, such as banking failures and illiquidity in the inter-bank lending market. Risk has been and is being repriced with investors now requiring a much higher hurdle rate. Funds are being rationed and made available only to opportunities which provide the appropriate ex-ante reward/risk ratio. Since September 2007 the corporate bond market has been effectively closed to businesses outside of the finance industry.

The negative outlook for financial markets will inhibit an individual network operator's ability to access equity or debt to fund expanding capital investment programs. There is a real risk that in a post 'global credit crisis' period, the individual network operators may not be able to compete for scarce funds if the appropriate investment incentives are not provided as part of this Review.

At the same time as capital markets are being more selective and in some cases contracting, the demand for capital is far from abating. Obtaining finance for infrastructure will be difficult because there are also numerous competing national and international infrastructure projects that require funding. On the one hand, the fundamentals of the Australian energy industry are sound (which enhances its prospects of attracting investment funds). On the other hand, the long term settled gearing ratio is 60 per cent compared with a market average of 30-35 per cent (this makes it more difficult to raise investment funds). Clearly, if this industry is to attract the capital required for necessary infrastructure investment, the returns on capital must remain competitive.

For example, the emerging funding demands for the 'climate effects' in all sectors of the global economy will place further constraints on the energy network operators' access to funds.

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4 Garnaut Climate Change Review, *Draft Report*, June 2008, page 427

The AER should recognise that re-pricing of risk and reduced availability of funding in financial markets requires a higher cost of capital allowance to attract finance for the new investment needed by the community. Also the recent volatility in financial markets demonstrates that the rate of return required by regulated entities in the longer term must be sufficient to enable the business to manage the ongoing volatility inherent in financial markets.

The importance of maintaining high quality, reliability and security

> Critical energy infrastructure refers to those facilities, supply chains, information technologies and communication networks within the liquid fuels, gas and electricity sectors, which, if destroyed, degraded or rendered unavailable for an extended period, would adversely impact on the social or economic well-being of the nation or affect Australia's ability to ensure national security.[5]

Australia has been fortunate not to have suffered widespread or enduring blackouts in recent years but this has not been by chance. The investment framework to date has been competitive, enabling significant investment in networks in the face of ongoing demand growth. This has contributed to the reliability and security of supply and policy makers, regulators, industry and users share in this success. The community rightly expects high quality service, reliability and security.

Other developed economies have not been so fortunate. During the same period, widespread and enduring blackouts in North America, Italy and New Zealand have caused significant dislocation. Temporarily standing down a workforce invariably results in a substantial and measurable loss of GDP. More difficult to measure but equally important are other costs such as the risks to the health and well-being of vulnerable members of the community and the loss of amenity to all. It is important that the Australian economy, including business and consumers, continue to be spared this experience.

The Expert Panel recommended that the AER be asked to give explicit consideration to the risk and costs of both over and under investment.[6]

> The Panel recommends the development of an additional Rule-making criteria (and obligation on the AER in applying the Rules) that regulatory decisions give explicit consideration to:
>
> - the risks and costs of both under- and over-investment; and
> - the risks and costs of both under- and over-utilisation of existing infrastructure.

5 Australian Government Department of Resources, Energy and Tourism 2008

6 Expert Panel, *Energy Access Pricing: Report to the Ministerial Council on Energy,* April 2006, page 113

It is these considerations that should be remembered when the Review applies the following principles of section 7A of the National Electricity Law (NEL):[7]

> Regard should be had to the economic costs and risks of under and over investment.

but at the same time a central policy tenant has been that:[8]

> A regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs…

The first proposition could be read as placing equal weight on avoiding over-investment and avoiding under-investment. However, this reading would be inconsistent with the second proposition which clearly puts an emphasis on reinforcing networks' financial security to enable them to provide supply security to customers. When the risks of underinvestment are properly considered, there is a priority on ensuring that network owners have a reasonable opportunity to recover at least their efficient costs.

In 2006 CRA International prepared a report on the implications of this Revenue and Pricing Principle which also appears in the Gas Law. Following detailed theoretical work, their conclusion supported the general proposition that:[9]

> There is relatively wide acceptance amongst the economics profession that the social costs of under-investment are generally greater than the social costs of over-investment. This is because the loss of social surplus is typically much greater than the costs associated with a sub-optimal mix of capital and other inputs.

Network infrastructure owners strive to invest efficiently and not be wasteful. Over-building has significant economic costs to all users.

However, when there are significant service interruptions of the type noted above, there are far greater measurable and unmeasurable costs and these costs are high.

Australian Government policy recognises that investment in infrastructure is critical to the efficient functioning of the Australian economy. The importance of infrastructure to the Australian economy and the Government commitment to ensuring sufficient investment in infrastructure was highlighted in 2008 with the establishment of Infrastructure Australia. A key role of Infrastructure Australia is to:[10]

> …provide advice to Australian governments about infrastructure gaps and bottlenecks that hinder economic growth and prosperity.

It is important that the cost of capital is sufficient to enable investment that will prevent bottlenecks from arising.

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7 National Electricity Law, subsection 7A(6)

8 National Electricity Law, subsection 7A(2)

9 CRA International, *Pricing Principles in the exposure draft of the National Gas Law*, December 2006, page 1

10 http://www.infrastructureaustralia.gov.au/

In summary, the cost and risks of under-investment and over-investment are not symmetrical. Under-building can be a false economy. There is no question that it is in the long term interest of consumers of energy that the regulatory regime generally (and the Review in particular) must err on the side of supporting investment in capacity by ensuring incentives are in place to allow network providers to build capacity and reliability in anticipation of the demand rather than waiting to respond after crises.

The current investment record

The AER's State of the Market notes:[11]

> Real transmission investment is forecast to rise by around 80 per cent over this period.
>
> Strong investment is occurring in an environment in which the regulated revenues of network businesses are rising and network reliability is being maintained.
>
> …transmission businesses have responded to increases in summer peak demand. Further, solid investment and service standards results are being achieved with relative stability in transmission charges.[12]

The Joint Industry Associations agree that there have been important investments facilitated in recent reset decisions. There are, indeed, projections for more investments. However, it is important to note that the capital cost of the assets will continue to be recovered under several subsequent revenue caps and the projected investments are underpinned by an expectation that this Review will deliver an investment environment that continues to encourage the projected construction of assets.

Additionally, it is important not to become complacent when headline figures show significant increases in investment or large absolute investment numbers. As the AER would appreciate, there are two drivers for investment in network infrastructure: compulsory investments (such as reliability augmentations) and market driven investments. Strong headline investment figures, particularly when they are driven by reliability augmentations, can occur at the same time as significant under-investment in properly anticipating reliability issues and undertaking market driven investments.

The energy industry is entering a new era with replacement capital expenditure expected to significantly increase relative to previous years. This, combined with the continuing increases in demand for energy and investment required to meet the challenge of climate change, will mean that future investment will be significantly greater than that recently observed.

> The cost of capital is one of the key incentives for energy infrastructure investment. The Review should continue to strive for an environment that fosters the necessary investments by industry to maintain a high quality, reliable and secure system. This will be particularly challenging in the face of an uncertain outlook for financial markets, combined with expected significant calls for capacity expansion and system redesign.

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11 AER, *State of the Market* 2007, 2007, page 3

12 AER, 'Strong transmission investment continues: Fifth electricity regulatory report', http://www.aer.gov.au/content/index.phtml/itemId/721317, viewed 24 September 2008

How the Review Will Contribute to Ensuring that Investment Incentives are Correct

The work in establishing WACC parameters will necessarily be detailed and technical. The Joint Industry Associations have engaged a series of experts to assist in their contribution to that detailed work. The AER will receive other technical reports procured and submitted by other interested parties and its own advisors but in making the decision, it is important to rise above the detail and be guided by the national electricity objective and the Revenue and Pricing Principles.

Of course, the NER call for specific outcomes on each parameter and it is incumbent upon the AER, industry and users to all engage with the detail on each parameter. These parameters cannot be determined with certainty, so to promote regulatory certainty and foster investment, at this level of consideration, the MCE and AEMC have adopted what can be called the 'inertia principle'. The NER recognise the policy position that there:[13]

> …is a need for persuasive evidence before adopting a …parameter that differs from the …[parameter] previously adopted for it.

The Joint Industry Associations have procured a Gilbert + Tobin Legal Opinion (attached as Appendix A) that sets out how this requirement can be met. In essence, it would be appropriate for the previously adopted values to be maintained unless there is persuasive evidence that they are, or are likely to be, incorrect – in which event, the extent of the change should be only that which is necessary to correct the error.

The Joint Industry Associations understand that it is the AER's role to interrogate and test the material presented. However, while engaging with and testing the detail, the Review should not lose sight of the broader picture. The whole package needs to achieve a result that furthers the national electricity objective (quoted above) and meets the Revenue and Pricing Principles found in section 7A of the NEL. While all the Principles are important to energy regulation, in the context of the WACC and fostering investment there is (as the discussion in the previous section illustrates) one of these Principles that particularly stands out:[14]

> A regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs…

There are three particular implications from the broader picture. First, there are linkages between the parameters. The evidence on a particular parameter often goes hand in hand with other implications that, in some cases, call for adjustments elsewhere in the package of parameters. This is the only way to deliver a properly coordinated result that is internally consistent.

Second, the overall result should be that the network service provider will recover revenues that at *least* recover efficient costs. In practical terms, this will require the regulator to set rate of return parameters that, if anything, tend to deliver higher returns on capital.

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13 NER, version 21, 1 July 2008, clauses 6.5.4(e)(4)(ii) and 6A.6.2(j)(4)(ii)

14 National Electricity Law, subsection 7A(2)

Third, while the central focus of this review is on defining parameters for use in determining parameters for a CAPM based WACC, other methods for determining rate of return are available. The CAPM outcomes should be cross-checked against these other methods. The other key method (used in the US) is to use Dividend Growth Models. The Joint Industry Associations have provided a paper on these models. The conclusion of the paper is that the CAPM based WACC may be systematically under-rewarding investors in this industry. For all the reasons outlined in section 1 of the Overview, this is troubling and should be a firm basis to err on the side of adopting parameters within the WACC that encourage rather than discourage further investment.

The AER should not rely on isolated theoretical reviews of each individual parameter. Rather, the AER should be guided by:

- the national electricity objective which requires the AER to provide appropriate overall incentives for investment; and
- the Revenue and Pricing Principles which provide (amongst other things) that network businesses need to be provided with a reasonable opportunity to recover at least their efficient costs.

Outcomes of the Review

The Joint Industry Associations have obtained the assistance of a number of experts to assist with the assessment of each parameter, assessing how the parameters are linked and cross-checking the overall package of WACC parameters.

Overall, industry's position is:

- that the majority of the parameters should not be altered;
- based on the evidence, there should be a clear endorsement of a consistent beta of 1 (which is essentially the overwhelming position of number of companies); and
- given the relation between gamma and the MRP, a correction should be made to the gamma and/or the MRP, and to address the identified inconsistency between the market values of the parameters.

It will be clear from reading our submission and attachments that the Joint Industry Associations' position is moderate and responsible.

The details follow.

Adequacy of returns – the Joint Industry Associations expect that the Review will adequately provide for an efficient cost of capital. In arriving at its decisions on the individual parameters, the Review would give full weight to:

- the national electricity objective;
- the relationship between the parameters;
- the economic theory and empirical evidence;
- the market expectations of the return on equity; and
- the prevailing market conditions for raising debt and equity.

Consistency with previously adopted values – the Joint Industry Associations expect that the Review will use this opportunity to focus on aligning the cost of capital of electricity distribution networks and confirming the previously adopted parameters for transmission networks and correcting for the error identified in this submission relating to the MRP and gamma. Businesses that currently have a 0.9 beta should have that beta restored at their next reset to a value of 1. This recommendation is also consistent with the expert advice provided with this submission. Uncertainty surrounding measured beta data and the known limitations of the form of the CAPM commonly used by regulators demonstrate that the best estimate of equity beta for regulated entities is 1.

Regulatory stability – the Joint Industry Associations expect that the AER will demonstrate its intent to implement a sustainable regulatory regime characterised by predicable economically sensible outcomes, and provide regulatory certainty to attract and maintain investment in regulated electricity infrastructure in Australia.

Cost of capital parameters – based on the evidence presented in this submission, the Joint Industry Associations expects that the AER will arrive at the following conclusions on the individual cost of capital parameters.

	Previously Adopted Values (T)	Previously Adopted Values (D)	Proposed Values (T & D)
Headline Nominal WACC			
Equity Beta	1.0	1.0*	1.0
Market Risk Premium	6.0%	6.0%	7.0%
Debt / (Debt + Equity)	60%	60%	60%
Credit Rating	BBB+	BBB+	BBB+
Source of Nominal Risk Free Rate	10 year CGS	10 year CGS	10 year CGS**
Gamma (netted off tax liability)	0.5	0.5	0.2

* As discussed in the Gilbert + Tobin advice on the subject, although some businesses have a 0.9 beta in their last determination, 1.0 is the value that is best described as the previously adopted value.

** There is an issue as to which 10 year rate is appropriate and the Joint Industry Associations propose to explore this with the AER during the Review.

The Joint Industry Associations look forward to engaging with the AER and the other interested parties to the Review in a constructive way to ensure that capital will be attracted to the industry by providing a reasonable economic return to investors in the sector, consistent with the re-pricing of risk in the global financial markets. Ongoing investment in this critical infrastructure sector is pivotal to providing a reliable and cost-effective supply to consumers.

1 Introduction

The Energy Networks Association (ENA), Grid Australia and the Australian Pipeline Industry Association (APIA) welcomes the opportunity to respond to the Australian Energy Regulator's (AER) review of the weighted average cost of capital (WACC) parameters for electricity transmission and distribution (the Review).

Given the importance of the WACC in the regulatory framework for electricity and gas distribution, electricity transmission and gas transmission pipeline businesses, a joint submission has been developed on behalf of all industry peak associations. This submission therefore represents the views of all regulated energy network businesses in Australia.

Description of the Industry Peak Associations

ENA is the peak national body for Australia's energy networks that provide the vital link between gas and electricity producers and consumers. ENA represents gas distribution and electricity network businesses on economic, technical and safety regulation and national energy policy issues.

Energy network businesses deliver electricity and gas to over 13 million customer connections across Australia through approximately 800,000 kilometres of electricity distribution lines. There are also 76,000 kilometres of gas distribution pipelines. These distribution networks are valued at more than $40 billion and each year energy network businesses undertake investment of more than $5 billion in distribution network operation, reinforcement, expansions and greenfields extensions.

Members of ENA are: ActewAGL, Aurora Energy, CitiPower, Country Energy, ElectraNet, ENERGEX, EnergyAustralia, Envestra, Ergon Energy, ETSA Utilities, Horizon Power, Integral Energy, Jemena, Multinet Gas, NT Power & Water Corporation, Powercor, Powerlink Queensland, SP AusNet, United Energy Distribution, TransGrid, Transend Networks and Western Power.

Grid Australia represents the owners of Australia's $12 billion electricity transmission networks in the National Electricity Market (NEM), plus Western Australia. Grid Australia was launched in April 2008 and was formerly known throughout the industry as the Electricity Transmission Network Owners Forum (ETNOF). Its members are: ElectraNet Pty Ltd (South Australia), Powerlink Queensland (Queensland), SP AusNet (Victoria), Transend Networks Pty Ltd (Tasmania), TransGrid (New South Wales) and Western Power (Western Australia).

Collectively, Grid Australia members own and operate over 47,000 km of high voltage transmission lines, have network assets of more than $12 billion and invest approximately $2.2 billion in the networks each year.

APIA is the peak national body representing the interests of Australia's transmission pipeline sector. APIA's current membership is predominantly involved in the high-pressure transmission of oil and gas. However, the Association also includes membership of companies and individuals involved in the transmission via pipelines of other products, including slurry, CO_2 and water. Major gas transmission member companies include: Jemena, APA Group, Dampier Bunbury Pipeline, Epic Energy, Petronas, and SEA Gas.

Overall, there are approximately 21,000 kilometres of high pressure natural gas transmission pipelines in Australia. Of these pipelines approximately 9,000 kilometres are price regulated. It should be recognised that in some instances pipelines are not price regulated. They either directly compete with other pipelines or their market power is constrained by the countervailing power of other industry participants.

The value of the regulated pipelines, based on regulated asset bases, is approximately $3.7 billion.

Submission Approach

The approach taken in this submission has been to collect the most up-to-date information on each parameter. This includes undertaking new independent thinking on the critical issues affecting the determination of each of the parameters being reviewed by the AER. In so doing the industry associations have engaged a team of leading experts on WACC parameters to undertake new analysis and further examine methodological issues for each of the parameters.

The expert teams, and their respective reports, are as follows:

- Allen Consulting Group: equity beta, gearing;
- Value Adviser Associates (Professor Bob Officer and Dr Steven Bishop): market risk premium, nominal risk-free rate;
- Competition Economics Group: CAPM, DGM, debt and equity raising costs;
- SFG Consulting: equity beta, gamma; and
- NERA Economic Consulting and Simon Wheatley: gamma.

A copy of each report is contained in an appendix which is attached as part of this submission.

Submission Structure

The remainder of this submission answers each of the questions asked by the AER in its Issues Paper and is structured as follows:

- Chapter 2 discusses the multi-parameter considerations, including the form of the capital asset pricing model (CAPM), the definition of the benchmark efficient service provider, and ensuring consistency between information used for parameter estimation;
- Chapter 3 outlines the appropriate approach to gearing, including measurement methodologies, and the definition of debt and equity;
- Chapter 4 discusses the nominal risk-free rate;
- Chapter 5 sets out considerations on the choice of the MRP, including the relationship between the MRP and the choice of gamma;
- Chapter 6 discusses the equity beta, including estimation techniques and data considerations;
- Chapter 7 outlines methodological issues associated with the techniques commonly used to determine the benchmark credit rating, through the examination of comparator businesses;
- Chapter 8 considers questions relating to the choice of gamma;
- Chapter 9 responds to the questions relating to the choice of approach to forecasting inflation;
- Chapter 10 considers debt and equity raising costs; and
- Chapter 11 concludes.

Attachment A provides a short history of the use of the CAPM and beta in energy regulation in Australia.

Appendixes A to L provide the consulting reports that the Joint Industry Associations have commissioned in relation to issues that have been identified as part of the review.

2 Multi-Parameter Considerations

Introduction

> The WACC parameters should continue to be estimated from domestic data.
>
> The WACC parameters must be internally consistent.
>
> The sample of companies used to provide the best estimate for each cost of capital parameter value for the benchmark efficient regulated electricity transmission and benchmark electricity distribution business should be developed with regard to the parameter being considered.

The NER identifies in a brief phrase the nature of the value or methodology to be retained or revised in the review. The AER's decisions must accord with those descriptions. In undertaking the Review, the NER provides the following additional guidance:

> (1) the need for the rate of return … to be a forward looking rate of return that is commensurate with prevailing conditions in the market for funds and the risk involved in providing proscribed transmission services [or standard control services]; and
>
> (2) the need for the return on debt to reflect the current cost of borrowings for comparable debt; and
>
> (3) the need for the credit rating levels or the values attributable to, or the methods of calculating, the parameters …. to be based on a benchmark efficient Transmission Network Service Provider [or Distribution Network Service Provider]; and
>
> (4) where the credit rating levels or the values attributable to, or the method of calculating, parameters …. cannot be determined with certainty:
>
> (i) the need to achieve an outcome that is consistent with the national electricity objective; and
>
> (ii) the need for persuasive evidence before adopting a credit rating level or a value for, or a method of calculating, that parameter that differs from the credit rating level, value or the method of calculation that has previously been adopted for it.

The Issues Paper acknowledges that none of the WACC parameters can be determined with certainty. The Issue Paper goes on to state that:[15]

> the AER intends on having regard to the national electricity objective and the need for persuasive evidence before departing from a previously adopted value or method.

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[15] AER, *Review of the weighted average cost of capital (WACC) parameters for electricity transmission and distribution*: Issues Paper (the 'Issues Paper'), August 2008, page 9

Certainly, where the values and methodologies cannot be determined with certainty, the NER do afford the AER with a degree of discretion and the principles identified in the Issues Paper are relevant considerations for the AER.

However, it is important to note that section 7A of the NEL also provides further guidance in the exercise of that discretion. For reasons that become apparent in the balance of this submission, subsection 7A(2) is particularly relevant. That subsection provides that[16]:

> A regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs in:
>
> (a) providing direct control network services; and
>
> (b) complying with a regulatory obligation or requirement or making a regulatory payment.

This reflects the great importance to the whole economies of the NEM States and Territories of a robust electricity network as described in the Overview section of this submission. If certainty provided by subsection 7A were not provided as required by the NEL and expenditures on investments and proper operations and maintenance practices were not properly funded, the long term costs to the community of service interruptions or inadequate network coverage would be very high indeed. That legislative certainty is, for those reasons, also consistent with the national electricity objective to which the Issues Paper refers.

With this additional important factor also being given weight, the Joint Industry Associations support the AER's intended approach. In undertaking the Review, the AER must also develop a consistent approach that takes into account the linkages and inter-relationships between WACC parameters.

A key starting point for the review is the continuation of the current approach whereby regulators estimate the cost of capital parameters from domestic data. This approach recognises that empirical domestic data reflects the influence of domestic and international investors on capital markets in Australia. The Joint Industry Associations consider this to be the appropriate perspective to examine the 'prevailing conditions in the market for funds', as required by the NER. If a market evidence-based approach is adopted it will minimise inconsistencies that arise from potentially conflicting conceptual frameworks.

An important requirement in using a consistent approach is to recognise that a number of cost of capital parameters are inter-related. This is particularly relevant for the AER's review of:

- the MRP and gamma parameters, where there is persuasive evidence to demonstrate that the 6 per cent MRP was originally based on evidence that excluded any explicit consideration for the value of imputation credits (gamma); and

- the 'vanilla' approach of the CAPM systematically underestimates the required return where the analysis delivers a beta of less than one and the model uses government bonds to estimate the true risk-free rate.

[16] National Electricity Law, subsection 7A(2).

There is no definitive approach/method for selecting appropriate firms to be included in the sample used to estimate the benchmark efficient regulated electricity network service provider. As a result, there is no reason to presume that a unique group of firms will provide the best estimate for all cost of capital parameters. Furthermore, in some circumstances, issues with data quality or the nature of the parameter itself may suggest that a market average is an appropriate benchmark.

For the reasons set out above, the AER's individual parameter assessment and assessment of the interaction between parameters are important. Additionally, where there is uncertainty and discretion, it is notable that:

- there are alternative indicators to cross-check whether the overall package of WACC parameters is sufficient. In particular, the dividend growth model points strongly to the inadequacy of returns provided by the overall package as currently constructed;[17] and

- the requirement in subsection 7A of the NEL makes it incumbent upon the AER to exercise its discretion in the direction of increasing the returns to network providers so that they have a reasonable opportunity to recover their efficient costs. That is also necessary to meet the national priorities for the electricity industry identified in the Overview section of this submission which are, of course, consistent with the national electricity objective.

The key issues and observations are:

- the appropriateness of continuing the practice of estimating the cost of capital parameters by reference to empirical evidence derived from the domestic market;

- the need for WACC parameters to be internally consistent; and

- an approach to the development of samples of firms that best represent a benchmark electricity transmission and benchmark electricity distribution network service provider.

Each of these issues is addressed below.

[17] See CEG, *An analysis of implied market cost of equity for Australian regulated utilities* A report for the APIA, ENA and Grid Australia, September 2008

Empirical Domestic Market Evidence

The NER requires that the AER give regard to conditions prevailing in the market for funds when undertaking its review of rate of return parameters.[18] The Joint Industry Associations submit that the appropriate perspective from which to view the 'market for funds' is the domestic capital market. This recognises that the domestic capital market is influenced by both domestic and international investors.

Given this conceptual basis, Australian regulators to date have appropriately estimated the CAPM parameters by reference to domestic data. As a consequence, the CAPM assumes neither a fully segmented nor a fully integrated capital market. That is, any empirical domestic data on the risk-free rate, MRP, equity beta and gamma parameters have, and will certainly continue to be influenced by, both domestic and international investors.

Notwithstanding the integrated nature of the Australian equities market, regulators have not used an international CAPM due to the practical limitations of such a model. The ACCC (exercising jurisdiction over electricity networks prior to the establishment of the AER) noted that:[19]

> The ACCC has previously noted that the use of an international version of CAPM tends to be more complex and consequently more difficult to implement. This may explain why they are not generally used in practice, despite the accumulating evidence of greater market integration.

Further, current estimates of parameter values have largely been drawn from a period since markets have been integrated. Given this, the use of domestic data to estimate CAPM parameters provides a good approximation for the influence of foreign investors on the values of the parameters.[20]

International empirical evidence of CAPM values and other information not using the CAPM such as the dividend growth model may, in some instances, provide an appropriate cross-check on the reasonableness of individual CAPM parameters and the overall WACC.

However, these factors are only cross-checks. There are, for example, obvious limitations to the reliance on international data. For instance, foreign regulated electricity businesses operate under different regulatory regimes than those in Australia. Further, the financial and physical operating environments will also differ to that of Australia. Dividend growth model studies are limited to the short run data available.

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18 NER, version 21,1 July 2008, clauses 6.5.4(e)(1) and 6A.6.2(j)(1)

19 ACCC, *Statement of principles for the regulation of electricity transmission revenues – background paper: Decision*, 8 December 2004, page 94, footnote 40

20 Koedijk K, Kool C, Schotman P & van Dijk, M, 2002, *The cost of capital in international financial markets: local or global?*, Journal of International Money and Finance 21(6), 905-929, November

Consistency between Different Cost of Capital Parameters

An important requirement for the Review is that the parameter values are internally consistent. A number of the WACC parameters are interrelated, for example:

- the assumed value of imputation credits to investors will impact the estimated MRP;
- the market value of debt as a proportion of the market value of equity and debt has direct implications to both the assumed debt rating and the equity beta value;
- the term of the risk-free rate will affect the term that the debt margin and expected inflation will be estimated as well as the value of the MRP; and
- there is data to show that 'vanilla' beta statistics combined with using a 10 year government bond rate as the source of the risk-free rate, deliver systematically underestimated costs of capital for regulated businesses.

Setting aside a specific issue with recent downgrades of betas to less than '1' for certain distributors, the current parameter values are generally internally consistent, with one notable exception. The one exception is the parameter values currently adopted for the MRP and the value of imputation credits (gamma).

As discussed in Chapter 8 of this submission, Officer and Bishop note that the currently adopted 6 per cent MRP was originally based on evidence that excluded any explicit consideration for the value of imputation credits. Therefore, this analysis effectively gave no value to imputation credits when deriving the MRP demanded by investors. However, the Australian regulators have lowered the cash flows of electricity transmission and distribution businesses by valuing imputation credits at half their face value, ie, adopting a gamma of 0.5. This has created an inconsistency in the analysis of returns demanded by investors within the regulatory framework.

Based upon this evidence, the Joint Industry Associations submit that the AER must address this internal inconsistency as part of the Review. That is, the value adopted for gamma should be consistently applied to market data used to estimate the value of the MRP. If the AER were to continue to maintain a 0.5 value for gamma, then the Joint Industry Associations submits that the AER should also adopt the recommendation of Officer and Bishop below:[21]

> The market risk premium of 6% was originally based on evidence that excluded any explicit consideration of a component to reflect any value of imputation tax benefits in the historical MRPs. Consequently the 6% can be viewed as an estimate of the MRP when this value is zero (the term 'gamma' is usually used to reflect the value of $1 of imputation tax benefits created by a firm however we are concerned with the value of a dollar of imputation tax benefits once distributed given that we are adjusting observed market returns). The inclusion of an estimate of the imputation tax benefits in the historical estimate of market equity returns forms the basis of our recommendation that the MRP be increased from 6% to 7% as qualified below.

Also, a range of parameter specific evidence and evidence that concerns the consistency of parameter values confirms that for those businesses who have suffered a recent downgrading in their beta to below 1, the previously adopted figure of 1 must be restored.

Development of Samples of Firms

The NER requires that when setting the cost of capital parameters the AER must have regard to a benchmark efficient electricity transmission service provider and benchmark efficient electricity distribution service provider.[22] However, the Issues Paper confuses the meaning of a benchmark efficient regulated electricity network service provider and the use of market data to estimate firm specific cost of capital parameters.[23]

A benchmark efficient regulated electricity network service provider is a conceptual construction and represents an efficient stand alone business that provides prescribed transmission or distribution services. However, as a conceptual construction no actual business will perfectly reflect a benchmark efficient regulated electricity network service provider. Consequently, the use of actual market data to determine firm specific WACC parameters necessitates the judicious use of a sample of companies that to a greater or lesser extent reflect the hypothetical benchmark.

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21 Officer B & Bishop S, *Market Risk Premium; A Review Paper*: Prepared for ENA, APIA and Grid Australia, August 2008, page 39

22 NER, version 21, 1 July 2008, clauses 6.5.4(e)(1) and 6A.6.2(j)(3)

23 For clarification, firm specific cost of capital parameters include, the gearing ratio, the equity beta, debt margin and the distribution ratio component of the gamma parameter.

There is no definitive approach/method for selecting firms to be included in the sample used to estimate the benchmark efficient transmission and benchmark efficient distribution network service providers or which real life companies are appropriately representative of the benchmark company. The selection of a sample of firms requires a critical assessment of:

- the underlying quality of data and data sources, ie, if the data or its source is of uncertain quality, more firms may need to be included in the sample to improve the statistical precision of the estimated values;

- how closely the selected firms resemble the hypothetical benchmark, ie, the inclusion of firms that have features which differ from the features of the hypothetical benchmark firm are less persuasive; and

- estimates derived from a small group sample of firms are more likely to be influenced by firm specific factors.

Developing a robust sample of firms for each parameter will involve the weighing up of these factors to provide the 'best' estimate of the benchmark regulated electricity transmission business or benchmark electricity distribution network service provider. As a result, the most appropriate sample of firms used to estimate a benchmark will differ with the CAPM parameter being considered.

The Joint Industry Associations also consider that, in some circumstances issues with data quality may suggest that a market average is an appropriate benchmark. For instance, Chapter 8 of this submission notes that a firm specific sample cannot be used to determine a 'best' estimate of the distribution rate of imputation credits (due to the absence of an appropriate industry benchmark). In this instance, a market average distribution rate is the appropriate benchmark.

For these reasons, whether the sample group should include, distribution and/or transmission, electricity only or all energy network firms, all energy businesses both regulated and unregulated or all firms regardless of industry is covered in the specific chapters of this submission that address each parameter.

The Joint Industry Associations submits that the WACC parameters should continue to be estimated from domestic data. However it may on occasions be necessary to have regard to international data as a cross-check to the robustness of the estimated values.

AER Questions

Consistency between parameters in estimation – Form of the CAPM (domestic or international

2.1 Given that foreign investors are likely to influence the market data upon which the estimates of a number of WACC parameters are based, is it appropriate, feasible and practical to adopt either a fully segmented or a fully integrated version of the CAPM?

It would not be appropriate, feasible or practical for regulators to adopt a fully segmented version of the CAPM, because it would ignore the strong evidence that Australian equity markets are, to a significant degree, integrated with world equity markets.[24] To assume a fully segmented CAPM would prohibit the use of any empirical evidence as it would not be possible to observe the behaviour of domestic investors independent of international investors.

It is also not appropriate, feasible or practical for regulators to adopt a fully integrated model of the CAPM (international CAPM). The ACCC (prior to the establishment of the AER) noted that:[25]

> The ACCC has previously noted that the use of an international version of CAPM tends to be more complex and consequently more difficult to implement. This may explain why they are not generally used in practice, despite the accumulating evidence of greater market integration.

2.2 Is the AER's proposed approach to adopt a domestic form of the CAPM with foreign investors recognised appropriate from a theoretical and practical point of view? If not, what are the alternatives?

Yes, provided the correct assessment of the impact of some foreign investors in a domestic CAPM is taken.

The Joint Industry Associations submit that the appropriate perspective from which to view the 'market for funds' is the domestic capital market. This approach recognises that empirical domestic data reflects the influence of domestic and international investors on capital markets in Australia. As such, the CAPM currently applied by regulators does not presuppose either a fully segmented or a fully integrated capital market.

Further, the WACC parameters are largely drawn from a period since markets have been substantially integrated. Given this level of integration, the use of domestic data to estimate the WACC parameters is a good approximation for the influence of foreign investors on the values of the parameters.[26]

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[24] NERA, *The Value of Imputation Credits:* A report for the ENA, Grid Australia and APIA, September 2008, page 14-15

[25] ACCC, *Statement of principles for the regulation of electricity transmission revenues – background paper: Decision*, 8 December 2004, page 94, footnote 40

[26] Koedijk, Kees G. & Kool, Clemens J. M. & Schotman, Peter C. & van Dijk, Mathijs A., 2002, *The cost of capital in international financial markets: local or global?*, Journal of International Money and Finance 21(6), November. 905-929.

Consistency between parameters in estimation – definition of the benchmark efficient service provider

2.3 Is it appropriate that the businesses included in the sample to obtain a WACC parameter for a benchmark efficient service provider may vary depending on the parameter being considered? For example, is it appropriate to use an energy industry benchmark to estimate the equity beta, but to use a broader benchmark which includes non-energy businesses to estimate the gearing and credit rating levels?

The NER requires that when setting the cost of capital parameters the AER must have regard to a benchmark efficient transmission and benchmark efficient distribution network service provider.[27] However, the Issues Paper confuses the meaning of a benchmark efficient regulated electricity network service provider and the use of market data to estimate firm specific cost of capital parameters.[28]

A benchmark efficient regulated electricity network service provider is a conceptual construction and represents an efficient stand alone business that provides prescribed transmission or distribution services. However, as a conceptual construction no actual business will perfectly reflect a benchmark efficient regulated electricity network service provider. Consequently, the use of actual market data to determine firm specific cost of capital parameters necessitates the use of a sample of companies that to a greater or lesser extent reflect the hypothetical benchmark.

There is no definitive rule for the selection of firms to be included in the sample used to estimate the benchmark efficient regulated electricity network service provider for a particular parameter. The selection of a sample of firms requires the weighing up of:

- the underlying quality of data and data sources, ie, if the data or its source is of uncertain quality, more firms may need to be included in the sample to improve the statistical precision of the estimated value;
- how closely the selected firms resemble the hypothetical benchmark. Estimates derived from samples that include firms that have distinguishing features from the hypothetical benchmark are less persuasive; however
- estimates derived from a small sample group of firms are more likely to be influenced by firm specific factors.

Developing a robust sample of firms will involve weighing up of these factors to provide the 'best' estimate of the benchmark regulated electricity network service provider. Further, the most appropriate sample of firms will vary with the CAPM parameter being considered. As a result, there is no reason to presume that a unique group of firms will provide the best estimate of all cost of capital parameters.

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27 NER, version 21, 1 July 2008, clauses 6.5.4(e)(1) and 6A.6.2(j)(3)

28 For clarification, firm specific cost of capital parameters include, the gearing ratio, the equity beta, debt margin and the distribution ratio component of the gamma parameter.

Furthermore, in some circumstances issues with data quality (that is when the data from relevant regulated businesses alone is too thin) suggests that a broader market wide average is an appropriate benchmark. For instance, Chapter 8 notes that a firm specific sample cannot be used to determine a 'best' estimate of the distribution rate of imputation credits (due to absence of an appropriate industry benchmark). In this instance, a market average distribution rate is the appropriate benchmark.

For these reasons, whether the sample group should include both energy and non energy firms is covered in the specific chapters of this submission that address each parameter.

Consistency between parameters in estimation – nature of industry benchmarks: selecting businesses with similar characteristics

2.4 Which characteristics should be considered and what amount of weight to particular characteristics should be given when selecting sample businesses?

As set out in the response to question 2.3, there is no definitive rule for developing a sample of firms to use as the proxy for the benchmark efficient regulated electricity network service provider. The overriding principle is that the sample of firms must provide the 'best' estimate of the benchmark efficient transmission and benchmark efficient distribution network service provider.

Differences in the techniques used to estimate each of the WACC parameters and the underlying quality of data mean that there is no reason to presume that a unique group of firms will provide the best estimate of all cost of capital parameters. Therefore, the weights of particular characteristics within a sample used to estimate a particular WACC parameter is covered in this submission within the chapters that address each parameter.

2.5 Is it appropriate to pool electricity and gas distribution and transmission businesses in selecting the sample of businesses for some of the WACC parameters? For which parameters is it appropriate?

There are two propositions inherent in the question that should be distinguished. In identifying what are the 'previously adopted values' for each parameter, the only relevant previously adopted parameters are those from the electricity industry. However, a quite separate question arises as to whether the data from the gas industry can be informative in considering whether to depart from the previously adopted electricity parameters. Often gas businesses can contribute to a richer pool of data than the electricity industry alone can provide.

For the reasons set out the response to Question 2.3, above, whether the sample of companies should include electricity and gas distribution and transmission businesses to estimate a particular WACC parameter is addressed in this submission within the chapters that address each parameter.

In considering the issue of whether electricity and gas businesses are appropriate comparators it should be recognised that while both industries have some similarities they also have operational, market, financing and economic differences which impact on the risks faced by each industry. Thus while comparisons between gas and electricity businesses may be appropriate, they should not be viewed as perfect comparators and the distinguishing aspects of the gas industry may need to be taken into account.

2.6 Should a hierarchical approach or another approach be used to select benchmark businesses?

For the reasons set out the response to question 2.3 above, whether or not a hierarchical approach is warranted is addressed in this submission within the chapters that deal with each parameter. The overriding principle is that the sample of firms must provide the 'best' estimate of the benchmark efficient transmission and benchmark efficient distribution network service provider.

Consistency between parameters in estimation – nature of industry benchmarks: unregulated activities and mergers and acquisitions

2.7 Should businesses with significant unregulated activities be included in the sample used to obtain an industry benchmark?

The benchmark efficient regulated electricity network service provider is an efficient stand alone business that provides prescribed transmission or distribution services. Consequently, businesses with significant unregulated activities do not resemble the hypothetical benchmark as closely as firms that predominately undertake regulated activities. However, the extent that a business operates within a regulated environment is just one facet that determines whether a firm should be included in the sample.

Whether or not to include a firm with significant unregulated activities in the sample of firms should depend on whether its inclusion leads to the 'best' estimate of the benchmark efficient transmission and benchmark efficient distribution businesses. Since this is dependent on the particular WACC parameter being estimated, whether or not businesses with significant unregulated activities should be included in the sample firms is addressed in this submission within the chapters that deal with each parameter.

2.8 If businesses with significant unregulated activities are included as part of the industry benchmark, should specific observations be removed or should specific adjustments be made?

The method of estimating WACC parameters from domestic data is different for each parameter. The robustness of the estimated value and the quality of the underlying data will determine the appropriate treatment of sample outliers. Consequently, whether specific adjustments are warranted, and how those adjustments should be made, is addressed in this submission within the chapters that deal with each parameter.

Consistency between parameters in estimation – nature of industry benchmarks: foreign comparators

2.9 Which foreign businesses could be considered for the purposes of cross-checking WACC parameters estimated based on domestic data?

Cross-checks are an important tool for verifying the reasonableness of estimates that are by their very nature uncertain. In estimating the cost of capital, uncertainty can arise from a number of sources including:

- a lack of close comparator businesses; or
- low statistical precision of specific parameter estimates.

However, foreign regulated electricity businesses operate under a different regulatory regime than those in Australia. Further, the financial and physical operating environments will also differ to that of Australia. Therefore, the use of benchmarks from international data should be treated with caution and should not be directly used to estimate the value of WACC parameters.

However, international comparators may be useful as a cross-check when the domestic data is inadequate, or where the estimated value has low statistical precision. In these circumstances the more appropriate comparators for Australian electricity infrastructure businesses should be found in nations with similar markets, legal systems, regulatory systems and physical asset characteristics to Australia.

2.10 Which criteria (ie, similar markets and legal systems) should be used to pool foreign comparator businesses?

The reasonableness of using international markets as a cross-check for the estimated WACC parameter values should be assessed on a case by case basis. As a general rule more appropriate comparators for Australian electricity infrastructure businesses should be found in nations with similar markets, legal systems, regulatory systems and physical asset characteristics to Australia.

2.11 Other than the use of direct estimation and foreign comparators, is there another method that could be used to check the reasonableness of WACC parameters?

How international markets can be used as a cross-check on the estimated WACC parameter values is discussed in this submission within the chapters that address each parameter.

3 Gearing

Introduction

The benchmark gearing level should be established by examining the gearing practices of comparator companies.

An appropriate comparator group for Australian regulated electricity transmission and distribution businesses would contain APA Group, Envestra, GasNet, SP AusNet and Spark Infrastructure.

For transmission the rules require the gearing ratio to be based on market valued equity and market valued debt. For distribution the rules merely refer to debt and equity but the expert advice (and Joint Industry Associations' own view) is that the market values are the correct approach to valuing a companies gearing ratio.

For equity, market values diverge significantly from book values. However, the market value of equity can be estimated for listed companies from data drawn from stock market trading. The market value for debt is much less readily available because debt is not as extensively traded as equity. This is not generally a problem because (except in times of certain types of market volatility) book values of debt are a good indicator of market values.

The recently the market volatility associated with the 'credit crunch' has probably resulted in divergence between book and market valuations of debt. However, the appropriate period over which to take the value of market debt is 5 years and for most of that period the normal close relationship between market and book values of debt applied. Taking that 5 year perspective, the recent perturbation is not enough to displace the book value of debt as a reasonable 5 year proxy for the market value of debt.

When measuring the book value of debt, shareholder loans that are stapled to the underlying stock of a business should be treated as equity not debt.

While there is extensive variation in the gearing of the comparator businesses nominated above, they have had an average gearing ratio (Book Debt/Book Debt and Market Equity) of around 60 per cent over the last five years.

Consequently, there is no persuasive evidence that the currently adopted debt gearing ratio of 60 per cent should be departed from.

The gearing ratio determines the proportion of debt and equity financing used when formulating the regulatory WACC. Consequently, the gearing ratio is highly interrelated to the required rate of return for both debt and equity.

The key issues for consideration in establishing a gearing ratio are:

- the current adopted gearing ratio for electricity transmission and distribution service providers is 60 per cent;
- the strong interrelationships between gearing and other WACC parameters. As a result of these interrelationships, any change in the gearing ratio would in itself be persuasive evidence that the current adopted credit rating and the equity beta value would be incorrect. The Joint Industry Association submits that if the gearing ratio were to change the changes in value for both the credit rating and the equity beta should be such that the cost of capital for Australian electricity transmission and distribution businesses would remain unchanged;
- that the measure of the gearing ratio should estimate the ratio of the market value of debt to the market value of debt plus the market value of equity (ie, the market gearing ratio). The Joint Industry Associations submit that the most appropriate and practical measure of market gearing ratio is the book value of debt divided by the sum of the book value of debt plus the market value of equity. This is because, for equity, market values diverge significantly from book values and market values of equity can be readily drawn from stock market trading. The market value for debt is much less readily available because debt is not traded in the same way that equity is, however, the book value of debt is, in normal trading conditions, a good indicator of market values. The recent market volatility associated with the 'credit crunch' has probably resulted in the book values of debt overstating the market values of debt. However, the appropriate period over which to take the value of market debt is 5 years and taking that 5 year perspective, the recent perturbation is not enough to displace the book value of debt as a reasonable 5 year proxy for the market value of debt;
- that measures of gearing should consistently treat shareholder loans (ie, loan instruments stapled with shares) as equity not as debt. Consequently, the value of the loan note should not be included in the value of a businesses' debt; and
- the group of comparator businesses must provide an estimate of the gearing ratio equivalent to a benchmark efficient electricity transmission and a benchmark efficient electricity distribution network service provider. The Joint Industry Associations submit that appropriate comparator businesses are APA Group, Envestra, GasNet, SP AusNet and Spark Infrastructure.

Based upon a report commissioned from, the Allen Consulting Group (ACG),[29] the market evidence from comparable businesses is that the average gearing ratio over the last five years has been around 60 per cent. Therefore, the Joint Industry Associations submit that the currently adopted gearing of 60 per cent (ie, debt to debt plus equity) is remains appropriate and there is no persuasive evidence to adopt a different value.

Our experts have also undertaken 'cross-checks' by reviewing UK data. The UK data (which is most valuable because the regulatory arrangements are similar) confirms a 60 per cent figure as being appropriate.

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[29] ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008 which is attached to this submission as Appendix D.

The Adopted Gearing Ratio

> The debt gearing ratio (debt to debt plus equity) currently adopted for electricity transmission and distribution network service providers is 60 per cent.

The assumed gearing ratio determines the proportion of debt and equity financing used when formulating the regulatory WACC. The gearing ratio of a hypothetical regulated electricity transmission and distribution business cannot be determined with complete certainty. Consequently, the NER requires that there be persuasive evidence before adopting a different value to that previously adopted.

For electricity transmission businesses the debt gearing ratio is deemed by the NER to be 60 per cent.[30]

The same gearing ratio of 60 per cent is currently adopted for each distribution business operating within the NEM and that figure is the appropriate distribution figure to be regarded as the previously adopted value for the distribution sector. Table 3.1 sets out the values of the gearing ratio currently adopted for particular electricity distribution service providers. For NSW and the ACT the figures are specified in the transitional provisions of the NER and for the other jurisdictions the figures are specified in the most recent decision by each jurisdictional regulator.

Table 3.1: Adopted values for electricity distributors - Debt Gearing[31]

Jurisdiction	Distribution Network Service provider	Currently Adopted Debt Gearing Ratio
Australian Capital Territory	ActewAGL	60%
New South Wales	Country Energy	60%
	EnergyAustralia	60%
	Integral Energy	60%
Queensland	ENERGEX	60%
	Ergon Energy	60%
South Australia	ETSA Utilities	60%
Tasmania	Aurora Energy	60%
Victoria	AGL Electricity	60%
	CitiPower	60%
	Powercor	60%
	SP AusNet	60%
	United Energy	60%

30 NER, version 21, 1 July 2008, clause 6A.6.2(b)

31 See Gilbert + Tobin Legal Opinion attached as Appendix B

A single 'previously adopted' value for the distribution sector would conform with each of the individually adopted values and that single value would also be 60 per cent.

The gearing ratio used by regulators for regulated gas distribution and transmission (which is of interest in the consideration of the number to adopt but which is not legally a 'previously adopted' value in the meaning of the NER) is also 60 per cent.

Role of Gearing

> The Joint Industry Associations submit that there is no persuasive market evidence that the currently adopted debt gearing ratio of 60 per cent is not appropriate.
>
> However, if the gearing ratio were to be changed in this Review other variables that have been set assuming a 60 per cent gearing level would also need to be changed for consistency.
>
> A change in the gearing ratio would lead to an adjustment to the credit rating and equity beta that would likely offset any impact on the WACC. It follows that there would need to be persuasive evidence for the Review to move away from the debt margin and equity beta values that result from the change in the gearing ratio.

The gearing ratio determines the proportion of debt and equity financing used when formulating the regulatory WACC. The assumed gearing ratio will affect the required return on both debt and equity. However, in a seminal paper by Modigliani and Miller (1958) it was shown that the gearing ratio should not affect the WACC outcome.[32] This effect is demonstrated by considering the likely impact of an increase in the gearing ratio:

- a higher gearing ratio reduces the WACC by giving greater weight to the relatively cheaper cost of debt than cost of equity; but
- the higher gearing ratio also increases the WACC by increasing the debt premium and the equity beta.

The likely consequence of these two effects that they will cancels each other out. This proposition was also raised in the Issues Paper:[33]

> In theory, the cost of capital should be stable with a gearing range of 40 to 70 per cent.

A consequence of these interrelationships is that any change in the adopted gearing ratio would in itself be likely to be persuasive evidence that the current adopted credit rating and the equity beta value would be incorrect. The Joint Industry Associations submit that if the gearing ratio were to change, the adjustment in value for both the credit rating and the equity beta values should be such that the cost of capital for Australian regulated electricity transmission and distribution businesses would remain unchanged.

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[32] The Modigliani-Miller theorem states that, in the absence of taxes, bankruptcy costs, and the cost of writing and enforcing complicated debt contracts, the value of the firm in an efficient market is unaffected by how a firm is financed. See Modigliani, F.; Miller, M. (1958). 'The Cost of Capital, Corporation Finance and the Theory of Investment'. *American Economic Review* 48 (3): 261–297.

[33] AER, Issues Paper, page 20

Furthermore, the Joint Industry Associations submit if an adjustment to credit rating and equity beta is required to offset a change in the gearing ratio they should be treated as current adopted values. Therefore, if the AER were to then adopt different values in the Review there should first be persuasive evidence that these values are likely to be incorrect.[34]

Notwithstanding the above argument, as outlined in the following sections, there is no persuasive market evidence to adopt a gearing ratio different from that currently adopted. Nor is there persuasive evidence to enable the movement of other key parameters that would also have to be moved.

Methodological Issues with Market Evidence of Gearing Ratios

The Joint Industry Associations submit that the most appropriate and practical measure of gearing is the book value of debt divided by the sum of the book value of debt plus the market value of equity. This uses the best available information on both debt and equity and the book debt figure, although not in itself a market figure, is the best approximation of the market debt figure on the data that is reasonably available.

This measure will likely overstate the market gearing ratio when there is a sharp rise in interest rates as the market value of debt will likely fall below the book value of debt. However, given that the appropriate period over which to assess this parameter is 5 years, the recent perturbations in the market are not sufficient to displace the figure drawn from the book value of debt over the 5 years.

When measuring the book value of debt, shareholder loans that are stapled to the underlying stock of a business should be treated as equity not debt.

An appropriate comparator group for Australian regulated electricity transmission and distribution businesses, would contain APA Group, Envestra, GasNet, SP AusNet and Spark Infrastructure.

The Joint Industry Associations commissioned ACG to examine a number of the issues raised in relation to estimating the gearing ratio from domestic data.[35]

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34 NER, clauses 6.5.4(e)(4)(ii), 6A.6.2(j)(4)(ii) and 6A.6.4(e)(2)

35 ACG, *Review of gearing issues raised by the AER Issues Paper:* A report to ENA, Grid Australia and APIA, September 2008

ACG highlight a number of methodological issues with estimating the gearing ratio including:

- the treatment of stapled securities (ie, shareholder loans and double leverage through intra-company loans) in the calculation of the gearing ratio;
- the methods for valuing debt and equity;
- the selection of a comparable set of businesses for a benchmark efficient electricity transmission and benchmark electricity efficient distribution businesses; and
- the period over which the market evidence of the gearing ratio should be considered.

Having reviewed the current market evidence the Joint Industry Associations concur with the conclusions reached by ACG that:[36]

> Overall, we conclude that there is no persuasive evidence to cause the regulatory gearing level to be moved from the prevailing level of 60 per cent. Based on available evidence, we believe that 60 percent debt gearing is a good representation of the optimal gearing level.

Treatment of stapled securities (shareholder loans and double leverage)

Assessing the gearing ratio of comparable businesses requires a robust definition of debt and equity. ACG provides definitions of debt and equity and other forms of securities that form a part of a business' capital structure.[37] ACG's definitions are set out in this submission in the response to Question 3.5.

In reviewing the domestic data of comparable businesses AGC identified a number of issues with the common categories of the accounting values of debt and equity. ACG's primary concern related to the use of stapled securities by a number of Australian regulated businesses.

The most common stapled security arrangement involves the stapling of a shareholder loan to an underlying share. It is the stapled share and loan note which is then traded on the Australian Stock Exchange. A common feature of stapled loans is that they have no separate existence from the stapled stock. Consequently, the price of the stock will reflect both the value of the underlying share and the economic value of the shareholder loan. For these reasons ACG argues that stapled loans should be treated as equity.[38]

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36 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 28

37 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 14-15

38 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 15

However, ACG also identified that there is no consistent approach to the reporting of shareholder loans by regulated businesses, for example:[39]

- Envestra's financial accounts include stapled shareholder loans as debt in its financial reports. Consequently, when measuring the gearing ratio the outstanding balance of the loan note should be removed from the reported debt balance;

- SP AusNet's consolidated financial statements indicate that the loans between the stapled share groups are not recorded as debt, so no adjustment is necessary; and

- Spark Infrastructure's loan note[40] is stapled to the traded stock and is reported as debt in the Balance Sheet. Therefore, the outstanding value of the loan note should be removed from the reported debt balance.

The Joint Industry Associations concur with ACG that stapled loans should be treated as equity.

Methods for establishing the gearing ratio

The NER requires that the AER when assessing the gearing ratio of a benchmark transmission network service provider to review:[41]

> the ratio of the market value of debt to the market value of equity and debt

While the review terms for distribution are less prescriptive, the above clause reinforces that the most appropriate measure of gearing is the ratio of the market value of debt to the market value of debt plus the market value of equity.

ACG's report sets out the advantages and disadvantages of different approaches to valuing the proportion of debt and equity finance of a business. ACG recommend that the most appropriate and practical estimate of a business' market gearing ratio is the market value of equity and book value of debt. The Joint Industry Associations concur with ACG's conclusion on the grounds that the book value and market value of debt are generally close.[42]

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39 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 32-36

40 Spark Infrastructure's traded stock staples together units in trusts, company shares and a loan note. The loan note is subordinated debt in the asset companies (shares of which are part of the stapled stock); therefore the loan note has the characteristics equity not debt. However, for accounting purposes the loan note is treated as debt items in the Balance Sheet.

41 NER, version 21, 1 July 2008, clauses 6A.6.2(i)(v)

42 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 22

However, ACG cautioned against a direct reliance on empirical estimates of the gearing ratio as the measured book values of debt can diverge from the market value of debt in circumstances when there is a rapid increase in credit rates, which has been the recent experience.[43] As a result of the 'credit crunch', recent estimates will likely overestimate the market gearing ratio as the market value of debt is likely lower than its book value.

ACG provided the following comments on other valuation methods:[44]

- the use of book levels of debt and equity is inappropriate. While the book value of debt and market value of debt may be close, there is no necessary connection between the book value and market value of equity under normal commercial circumstances;

- the use of market values of debt and equity is impractical. The market value of equity can be ascertained from the current price of listed stock.[45] However, determining the market value of debt is not straight forward as the traded bonds of regulated Australian energy businesses is relatively illiquid; and

- applying the debt/RAB ratio of gearing is inappropriate as the enterprise value of regulated businesses exceeds RAB. In commercial practice, this measure is only used as a secondary metric indicating a business' ability to meet debt requirements.

Selection of comparable enterprises

It is important to select a set of comparator businesses that reflect the gearing ratio of a benchmark efficient electricity transmission and a benchmark efficient electricity distribution businesses. The Joint Industry Associations support the following approach advocated by ACG.

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43 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 17-19

44 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 14-23

45 The current listed price reflects future cash flows if there is sufficient liquidity in the trading of the stock. In these circumstances the value of equity can be estimated by multiplying the stock price by the number of issued shares.

Start with listed energy companies appearing on the Standard & Poor's current *Industry Report Card: Australian Utilities* and then exclude the following types of businesses: [46]

- wholly government owned business – because although they are required to operate as commercial businesses, their gearing levels may be influenced by government ownership;
- businesses with significant non-regulated activities – as the non-regulated activities are unlikely to support similar levels of debt as regulated businesses;
- businesses undergoing restructuring or rapid expansion – since these businesses may be maintaining excess borrowing capacity to provide the financial flexibility for the restructure or expansion; and
- businesses with significant international investments – because the gearing levels that are appropriate in other countries, may not be appropriate in Australia.

Using these criteria ACG concluded that a suitable group of comparators for the gearing ratio of an Australian regulated electricity transmission and distribution business would be:[47,48]

- APA Group;
- Envestra;
- GasNet;
- SP AusNet; and
- Spark Infrastructure.

Selection of the period that market data should be assessed

The final methodological issue for measuring the gearing ratio from a group of comparator businesses is the time period and frequency that market data should be assessed. ACG recommends that:[49]

> A measurement period of five years, similar to the period often applied in the measurement of equity betas, could represent a reasonable trade-off that averages the experience of a number of years, but still reflects relatively recent market conditions.

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46 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 20

47 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 27

48 While gas businesses are a reasonable comparator they should not be viewed as a perfect comparator.

49 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 24

The Joint Industry Associations support ACG's recommended five year assessment period. However, recent observations of the gearing ratio should be treated with caution as the collapse of the Sub-Prime market in the United States will likely result in overstated measures of the debt gearing ratios. ACG stressed:[50]

> A particular issue currently at hand is the continuing disturbance in credit markets. The increase in interest rates precipitated by this situation has seen a reduction in the share prices of regulated energy businesses, and the as we have seen above, these conditions have had some negative effect on the market value of debt. While the accounting gearing level is unlikely to be affected much by these events, if the market level of equity but book value of debt are combined the measure of gearing is likely to appear inflated compared with a measure of gearing that applied both the market value of equity and the market value of debt.

ACG also noted that the frequency of estimates will be limited to those dates that businesses release their financial statements. With biannual reporting it would be possible to provide 10 observations of gearing in a five year period. However, ACG limits itself to annual observations as it was not evident that the use of biannual reports improved the quality of the analysis.

[50] ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 22.

Current Market Evidence of Gearing Ratios

> Businesses that are comparable to an Australian regulated electricity transmission and distribution business have an average gearing ratio (Book Debt/Book Debt and Market Equity) of around 60 per cent over the last five years.
>
> Consequently, there is no persuasive evidence to move away from the currently adopted debt gearing ratio of 60 per cent.

The ACG report referred to above sets out various measurements of gearing for the Australian regulated electricity transmission and distribution businesses.

ACG found that:[51]

- the Standard & Poor's book gearing ratio (Total Debt/Total Capital) for all rated energy transmission and distribution businesses has an average of approximately 60 per cent between 2004 and 2008. However, this sample includes government owned businesses and subsidiaries which are not ideal comparators for a benchmark Australian regulated energy business;
- the average Debt/RAB ratio was found by Standard & Poor's to average 95 per cent for regulated energy businesses. However, ACG consider, this to be an inappropriate measure of market gearing, as the economic value of the businesses is generally greater than their RAB; and
- the group of listed comparable businesses (APA Group, Envestra, SP AusNet and Spark Infrastructure) have an average gearing ratio (Book Debt/Book Debt and Market Equity) of around 60 per cent over the last five years.

[51] ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 24

ACG also found that from mid 2007 to mid 2008 the gearing ratio of the group of listed comparable businesses rose to close to 65 per cent. This rise can be attributed to the continuing disturbance in the debt markets that was precipitated by the collapse in the Sub-Prime market in the United States. ACG concluded that these recent events are likely to overstate the true gearing ratio when:[52]

> A particular issue currently at hand is the continuing disturbance in credit markets. The increase in interest rates precipitated by this situation has seen a reduction in the share prices of regulated energy businesses, and as we have seen above, these conditions have had some negative effect on the market value of debt. While the accounting gearing level is unlikely to be affected much by these events, if the market level of equity but book value of debt are combined the measure of gearing is likely to appear inflated compared with a measure of gearing that applied both the market value of equity and the market value of debt.

The Joint Industry Associations also note the current adopted gearing ratio of 60 per cent is substantially higher than the domestic market average gearing ratio of 34 per cent.[53] This implies that 60 per cent gearing is at the upper end of a plausible range.

The gearing ratio of the identified comparator businesses has averaged 60 per cent over the last five years,. Therefore, the Joint Industry Associations submit that there is no persuasive evidence that the currently adopted debt gearing ratio of 60 per cent is not appropriate.

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52 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 21

53 The average gearing ratio of companies listed on the Australian ASX 200 is 34 per cent. See ACG, *Beta for regulated electricity transmission and distribution,* 17 September 2008, page 51

AER Questions

Data availability

3.1 What is an appropriate time period and frequency for estimating the benchmark gearing ratio from available market data?

The Joint Industry Associations submit that the gearing ratio should be measured from a group of comparator businesses over a five year assessment period as recommended by its expert ACG. ACG recommends that:[54]

> A measurement period of five years, similar to the period often applied in the measurement of equity betas, could represent a reasonable trade-off that averages the experience of a number of years, but still reflects relatively recent market conditions.

However, as discussed above reliance on recent observations of the gearing ratio should be treated with caution as the 'credit crunch' will likely result in overstated measures of the debt gearing ratios.

ACG also noted that the frequency of estimates will be limited to those dates that businesses release their financial statements.[55] With biannual reporting it would be possible to provide 10 observations of gearing in a five year period. However, ACG limits itself to annual observations as it was not evident that the use of biannual reports improved the quality of the analysis.

Measurement of gearing – valuation methodologies

3.2 Are objective market valuations for debt and equity available to estimate gearing ratios?

The correct measure of gearing is the ratio of the market value of debt to the market value of debt plus the market value of equity (ie, the market gearing ratio).

The market value of equity can be ascertained from the current price of listed stock if there is sufficient liquidity in the trading of the stock. In these circumstances the value of equity can be estimated by multiplying the stock price by the number of issued shares. However, if the stock is unlisted or if the traded share is illiquid, then direct estimation of the value of equity is difficult. The use of book levels of equity is inappropriate as there is no necessary connection between the book value and market value of equity under normal commercial circumstances.

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54 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 24

55 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 24

The market value of debt cannot be directly determined as the traded bonds of regulated Australian energy businesses is relatively illiquid.[56] ACG highlight:

> That is, there would be very few trades in this debt, and the prices are more reflective of trader valuations. This highlights the difficulty of accurately estimating changes in the market value of debt. Furthermore, one-off situations such as the problems experienced by the bond's monoline insurer in the US could not be seen as 'benchmark'. There is no doubt, however, that the market value of debt has fallen during the 'credit crunch' experienced during the last year, which has resulted in the credit spreads attaching to bonds widening considerably.

This should not be regarded as a 'show stopper' because in the ordinary course the book value of debt is a reasonable approximation of the market value. However, it is noted that this may not have been the case over the last 12 months due to the 'credit crunch'. Therefore, the Joint Industry Associations submit that the most appropriate and practical measure of a business' gearing ratio is estimated from the book value of debt divided by the sum of the market value of equity and book value of debt. This approach recognises that the book value and market value of debt are generally close.[57]

However, ACG notes that recent estimates of the gearing ratio will likely overestimate the market value of the gearing ratio as the market value of debt is likely lower than its book value. This is a consequence of the collapse of the Sub-Prime market in the United States which has resulted in a sharp rise in credit costs, and has likely lowered the market values of debt to below its book value.[58]

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56 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 18

57 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 6

58 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 17-19

When selecting a group of comparator businesses the Joint Industry Associations support the following approach advocated by ACG.

Start with listed energy companies appearing on the Standard & Poor's current *Industry Report Card: Australian Utilities* and then exclude the following types of businesses: [59]

- wholly government owned business – because although they are required to operate as commercial businesses, their gearing levels may be influenced by government ownership;
- businesses with significant non-regulated activities – as the non-regulated activities are unlikely to support similar levels of debt as regulated businesses;
- businesses undergoing restructuring or rapid expansion – since these businesses may be maintaining excess borrowing capacity to provide the financial flexibility for the restructure or expansion; and
- businesses with significant international investments – because the gearing levels that are appropriate in other countries, may not be appropriate in Australia.

Using these criteria ACG concluded that a suitable group of comparators for the gearing ratio of an Australian regulated electricity transmission and distribution business would be:[60]

- APA Group;
- Envestra;
- GasNet;
- SP AusNet; and
- Spark Infrastructure.

3.3 If an objective market valuation measure does not exist, then should the percentage of debt be measured relative to the value of the RAB be applied or book values of debt to debt and equity?

ACG in its report to the Joint Industry Associations directly considered whether it is appropriate to measure the gearing ratio by reference to ratio of debt / RAB. ACG concluded that: [61]

> Since the regulated activities of the firm give rise to an EV that is greater than RAB, it would be inappropriate to base the assessment of the regulatory gearing ratio on the observed levels of Debt/RAB.

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59 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 20

60 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 27-28

61 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page19

ACG highlights that analysts and rating agencies sometimes refer the debt/RAB ratio as a secondary metric indicating the ability of a business to meet its debt commitments.

The Joint Industry Associations also note that a reliance on debt/RAB ratios leads to unrealistically high gearing ratios (ie, 95 per cent). Gearing ratios based on debt/RAB ratios do not reflect the actual financing decisions of Australian regulated electricity transmission and distribution businesses.

The Joint Industry Associations submit that the most appropriate and practical measure of a business' gearing ratio is estimated from the book value of debt divided by the sum of the market value of equity and book value of debt.

Measurement of gearing – definition of debt and equity

3.4 What definition of debt and equity should be applied where data is available?

The Joint Industry Associations support the definitions set out by ACG of debt and equity and other forms of securities that form a part of a business' capital structure, as recommended by its experts ACG.[62]

In reviewing the domestic data of comparable business AGC identified a number of issues with the measurement of the gearing ratio. The primary concern related to the use of stapled securities by a number of Australian regulated businesses.

The most common stapled security arrangement involves the stapling of a shareholder loan to the underlying share. It is the stapled share and loan note that is traded on the Australian Stock Exchange. A common feature of stapled loans is that they cannot be traded separately from the stock to which they are stapled and there is no separate disaggregated price for the two rights. For these reasons ACG argues that stapled loans should be treated as equity.[63]

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62 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 14-15

63 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 21-22

However, ACG identified that there is no consistent approach to the reporting of shareholder loans by regulated businesses, for example:[64]

- Envestra's financial accounts included staple shareholder loans as debt in its financial reports. Consequently, when measuring the gearing ratio the outstanding balance of the loan note should be removed from the reported debt balance;

- SP AusNet's consolidated financial statements indicate that the loans between the stapled share groups are not recorded as debt; and

- Spark Infrastructure's loan note[65] is stapled to the traded stock and is reported as debt in the Balance Sheet. Therefore, the outstanding value of the loan note should be removed from the reported debt balance.

3.5 Which items should be excluded and or included when measuring an industry benchmark gearing ratio?

The Joint Industry Associations support the use of definitions recommended by its experts ACG of debt and equity and other forms of securities that form a part of a business' capital structure.[66]

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64 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 32- 36

65 Spark Infrastructure stock staples together units in trusts, company shares and a loan note. The loan note is subordinated debt in the asset companies (shares of which are part of the stapled stock); therefore the loan note has the characteristics equity not debt. However, for accounting purposes the loan note is treated as debt items in the Balance Sheet.

66 ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 14-15

ACG set out that in general, debt and equity and other forms of securities that form part of a company's capital structure can be defined as follows:[67]

- **Debt** - Debt securities oblige a company to make a specified series of fixed, floating, and/or terminal payments in the future. The form of payments can be called interest, coupons or dividends. In the case of default, debt holders rank above equity holders (and therefore do not bear residual risk). Finance lease obligations are also part of debt. Debt can be further classified into long and short-term debt (which matures within 12 months). The market value of debt can be calculated by discounting the expected future cash flows to debt holders at the discount rate (rate of interest) appropriate to the risk that is borne. If the debt is traded in a liquid market there will be a market price that can be applied to calculate the market value of debt.

- **Equity** – Equity securities are distinguished from debt by the fact that future returns are generally not specified. Equity shareholders are the residual risk bearers, who have a claim to the cash flows of the business after all other claims have been satisfied. The market value of equity can be calculated by discounting the expected future cash flows to equity holders at the discount rate (rate of return) appropriate to the risk that is borne. If the equity shares are traded in a liquid market their price can be applied to calculate the market value of equity.

Hybrid securities have a mix of debt and equity characteristics, as they may provide a fixed or floating coupon, interest payments or dividends, but may also be convertible into equity under certain circumstances. As such they may have option like characteristics:

- **Redeemable preference shares and convertible notes** – These securities should be treated as debt, since they are not long-dated (are redeemed or converted) and do not bear residual risk.

- **Shareholder loans** – These are a hybrid instrument that should be classified as equity if they are stapled to shares and therefore bear residual risk. If classified as debt in the balance sheet they should be subordinated and added to equity, as their value will be reflected in the share price in any case.

[67] ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, page 15

There are other issues that may be considered when distinguishing the debt and equity components of a firm's capital structure.

- **Operating leases** – Non-cancellable operating leases should be seen as a debt instrument since they involve a set of commitments to pay an outside entity, and are an alternative to using debt finance to purchase property plant and equipment.

- **Minority interests** – Minority interests are claims by outside shareholders over a proportion of the company's cash flows. They arise in cases where not all of the shares of another business have been acquired, or the company sells a portion of a subsidiary to another business.

- **Provisions** – To the extent that a provision for such items as workers' compensation are not separately identified and paid to another entity they become a liability of the equity holders.[68] Therefore, in market terms the value will be incorporated into the share price, and in accounting terms the value would need to be added to the equity value.

3.6 If hybrid securities and other forms of quasi debt are included in the measurement of the benchmark gearing ratio, how should specific types of hybrid securities be classified in terms of debt or equity?

For the reasons set out in the response to Question 3.4, above, where a loan note is stapled to an underlying share and has no separate existence from the stapled stock it should be treated as equity not debt. It follows that when calculating the gearing ratio the value of equity can be measured as the share price multiplied by the number of outstanding shares. However, when determining the book value of debt it is necessary to ensure that the value of the stapled share loan has not been included as debt in the financial accounts of the business.

ACG identified that:[69]

- Envestra's financial accounts include stapled shareholder loans as debt in its financial reports. Consequently, when measuring the gearing ratio the outstanding balance of the loan note should be removed from the reported debt balance;

- SP AusNet's consolidated financial statements indicate that the loans between the stapled share groups were not recorded in as debt so no adjustment is required; and

- Spark Infrastructure's loan note[70] which is stapled to the traded stock is reported as debt in the Balance Sheet. However, this loan note also has the characteristics of equity and needs to be removed from the reported debt balance.

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[68] This principle was recently put forward in a paper by R.R. Officer and S.R. Bishop (4, October, 2007), *Current and Non-Current Assets as part of the Regulatory Asset Base* (The Return to Working Capital: Australia Post).

[69] ACG, *Review of gearing issues raised by the AER Issues Paper: A report to ENA, Grid Australia and APIA*, September 2008, pages 32-36

4 Nominal Risk-free Rate

Introduction

An actively traded security with a 10 year maturity date is the appropriate proxy for the nominal risk-free rate. There is no persuasive evidence to move from a 10 year maturing proxy.

This proxy should be used for both the benchmark yield for determining the cost of debt and the cost of equity. It should also be used to estimate the MRP. Mixing maturities across these uses would introduce a bias in the cost of capital.

Averaging observed yields in the period 5 to 40 days, and commencing as close as possible to the start of the regulatory period or as nominated by the service provider, is an acceptable method of determining the regulatory rate.

The Issues Paper posits an alternative 5 year maturity date. The Joint Industry Associations have provided a wealth of business information and expert opinion to explain why such an approach is demonstrably inferior to the current approach.

The risk-free rate plays an important role in setting the cost of debt and cost of equity when determining the WACC. It is essential that the cost of capital reflect the long term rate of return required by investors in network transmission and distribution assets which are long term in nature. In addition, the risk-free rate plays an important role in estimating a MRP from historical data.

The currently adopted proxy for the nominal risk-free rate has a 10 year maturity. The arguments for change to a maturity of 5 years to match the regulatory period are examined in this submission and the attached expert reports. These demonstrate that:

- there is no persuasive evidence to move from use of a 10 year maturing proxy for the risk-free rate; and
- in fact any move to a 5 year maturity proxy would be inferior.

[70] Spark Infrastructure stock staples together a number of units in trusts, company shares and a loan note. The loan note are subordinated debt in the asset companies (shares of which are part of the stapled stock), and therefore has the characteristics equity not debt. However, for accounting purposes the Loan Notes are treated as debt items in the Balance sheet.

There are three important considerations:

- first, it is essential to consider the prudent treasury practices of capital intensive businesses generally and electricity transmission and distribution businesses in particular;
- second, is the expert evidence that reinforces why those prudent practices are appropriate and also identifies the best maturity of a proxy to adopt for regulatory setting purposes; and
- third, is the need to maintain consistency between the maturity of the risk-free rate used to add a risk premium for arriving at the cost of equity and the basis for estimating that premium. To break with consistency will introduce a statistical bias whenever the yield curve is not flat.

It is essential that the regulatory framework does not encourage electricity transmission and distribution businesses to take 5 year debt to fund their operations with that debt purchased at a time that coincides with regulatory resets. While such a proposal may appear to reduce interest rate risk and avoid 'rewarding' electricity transmission and distribution businesses with interest rate risk that they do not bear, it exposes them to unacceptable rollover risk and transactions costs. Additionally, electricity transmission and distribution businesses generally borrow on a long term basis and bear the interest cost that includes both a term structure and a credit structure component. This must be met and a regulatory process that encourages a shorter term focus potentially penalises prudent financial management. There are cogent reasons set out below why market forces left to their own devices have, over a long period, developed and adopted best practice treasury operations that are best approximated by a 10 year proxy and not a 5 year proxy.

Finally, drawing on that analysis, answers are provided to the specific questions posed in Chapter 4 of the Issues Paper.

An important backdrop to a number of the comments in this submission is a statement made in the Issues Paper:[71]

> . . . financing strategy is and should be at the discretion of the regulated entity. Provided the regulator commits to resetting interest rates (and cash flows) at the end of the regulatory period, and **the firm refinances in the specified averaging period**, the exposure to interest rate risk will be minimised to the greatest extent possible. [emphasis added]

[71] AER, Issues Paper, page 31

Officer and Bishop pass the following comment about this:[72]

> There is an acknowledgement here that the regulatory process implies or could impose a particular financing strategy for the firm and, by implication, that this is the most cost efficient (regardless of whether the firm or customers bear this cost). It requires the firm to refinance or at least hedge in the averaging period and assumes the financing or hedging facilities will be available.

As will become apparent, the Joint Industry Associations are most concerned about the apparent assumption that firms should even contemplate financing and rolling over debt for long term assets in this way. Any thought that debt maturity should continue to be matched to the regulatory period is flawed.

The Funding Practices of a Prudent Network Operator and How it Differs from the Simple 5 Year Proposal

Our primary focus in this section is on the cost of debt and good practice in establishing a debt funding profile of a network business.

Before turning specifically to the operations of network businesses, it can be observed that most capital intensive businesses in the economy carefully manage their funding requirements. This activity is generally undertaken in the businesses' Treasury Departments. These Departments are staffed by highly trained professionals with years of accumulated experience. Their task is to cost effectively manage both the aggregate cost of fund raising and to cost effectively manage risk. Generally this training and expertise leads Treasury Departments to raise capital in a structured portfolio of debt and equity.[73]

A simplified description of the considerations in structuring a portfolio include:

- due to the long economic and physical lives of the underlying assets, the overall aggregate average maturity structure will extend beyond the current regulatory period to minimise rollover risk, rollover costs and interest rate risk; and
- while being cognisant of the first point, good practice is to ensure that different debt instruments within the portfolio mature at different times. This is imperative to minimise rollover risk and to ensure that the company is not held to ransom by debt providers who could, if large quantities of debt had to be raised at once, extract significant premiums.

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[72] Officer B & Bishop S, *Term of Risk Free Rate: Commentary,* Prepared for ENA, APIA and Grid Australia, 2008, page 16. This report is attached to this submission at Appendix E.

[73] In many respects this has similarities to the task of hedge trading departments in generation and retail businesses with which the AER is familiar. Just as those businesses do not hold a single hedge of finite duration, there is a structured portfolio whose characteristics match the characteristics of their businesses' costs and exposures.

Network businesses are capital intensive businesses and their approach to financing is consistent with the approach observable in capital intensive businesses in the economy generally. These practices are summarised when addressing Question 4.3 below. They show that, as further discussed in the next section, the 10 year rate is the single best proxy for the typical debt portfolio which has an average maturity of approximately 10 years.

Electricity transmission and distribution businesses own and operate assets with long economic and physical lives (longer than 50 years). As noted above, the basic tenet in funding such assets is that funding should reflect the asset life as much as it is practicable,[74] with a spread of maturity dates of these debt arrangements. This minimises the risk of not being able to raise funds when capital markets are stressed (as is currently the case). This also minimises the risk of 'unreasonable' interest and debt costs arising from a potentially weakened position of a network seeking substantial funding at a point in time. There are many examples of businesses that have been exposed to these risks with huge value losses to shareholders as a result. Centro Properties and Babcock and Brown are two recent examples of firms that have experienced debt rollover challenges with strong downward revision in the value of equity. In times of compressed access to capital markets, the price signal is observable in the higher than usual credit spreads.

Long term debt generally has a higher interest cost that short term debt. This arises from a typical upward sloping yield curve and an upward sloping credit spread curve. The prudent cost of this debt financing should be recoverable under the regulatory regime.

Regulated businesses can and do enter into hedging arrangements to align as close as possible to the cost of debt determined for regulatory pricing. This minimises interest rate risk over the course of the regulatory period. However, this does not mean the business' long term funding arrangements become short term. The long term credit spreads must still be covered.

It is against these guidelines of prudent financial management and good practice in funding that the Joint Industry Associations are concerned with the AER's comments from the Issues Paper:[75]

> . . . financing strategy is and should be at the discretion of the regulated entity. Provided the regulator commits to resetting interest rates (and cash flows) at the end of the regulatory period, and the **firm refinances in the specified averaging period,** the exposure to interest rate risk will be minimised to the greatest extent possible. [emphasis added]

[74] For example see NECG, *Determining the risk free rate for regulated companies*, November 2002.

[75] AER, Issues Paper, page 31

The businesses fully agree with the initial statement that '… financing strategy is and should be at the discretion of the regulated entity.' However, a regulatory regime that assumes, or implies, refinancing all or a substantial component of physical debt during the specified averaging period presupposes many aspects of financing. It presupposes the risk profile and treasury management policies of electricity transmission and distribution businesses in their management of financial risk, for example around managing the balance between refinancing risk and interest rate risk management. In addition, the financing and liquidity profile of a particular electricity transmission or distribution business sends signals to capital providers which can affect debt pricing (eg, through credit ratings) and terms of credit spreads.

In setting the cost of debt, the AER must ensure that the cost reflects that which would be incurred by a prudent transmission or distribution operator. The cost of debt must include the costs of establishing long term debt facilities typically negotiated by these businesses. Assuming an upward sloping yield curve, the prudent cost of establishing long term debt facilities are likely to exceed the cost of establishing 5 year debt facilities.

The key problem with the proposal to move to a 5 year proxy (or any shorter rate) that encourages or assumes a 5 year rollover of debt is that it exposes the business (and/or its customers) to significant unpriced risks and, even likely higher costs. Exposure to debt rollover challenges of the type experienced by Centro Properties, for example, is unacceptable.[76] The prospect of all electricity transmission and distribution businesses employing only 5 year maturity debt, let alone all businesses going to the debt market within the same narrow window is also unacceptable. To do so is to adopt a very sizable risk that all debt would have to be taken on at a moment when interest rates are high. Even worse, forcing a very sizable quantity of debt to be taken on at once with no corresponding increase in the supply of debt at that time could substantially increase the clearing price of the market for debt defeating or more than defeating any cost reduction from artificially shifting debt raising to the short end of the yield curve.

As noted earlier, a view that recognises that hedging of long term debt for 5 years can occur within a long term debt regime. However, this approach does not allow the full recovery of the long term debt costs (term and credit structure) and so will disadvantage regulated businesses.

[76] Centro Properties was unable to rollover debt leading to a substantive decline in its share price because of the anticipated effects of having to sell assets and deal with 'bankruptcy' costs.

The Expert Evidence and Regulatory Precedent

Most Appropriate Maturity for the Risk-free Proxy

A 10 year maturity is the most appropriate term for the proxy for the risk-free rate as an input to assessing the cost of debt and the cost of equity when estimating a regulated WACC.

Of considerable importance to the choice of the appropriate term of the risk-free rate proxy is the application of a consistency of position ('Consistency Position') approach. As a 10 year bond has been used by the AER and generally adopted by regulators to estimate the MRP for the CAPM it must also be used as the proxy for the risk-free rate. This is necessary to ensure consistency between the risk-free rate used as the benchmark, to which a risk premium is added to estimate both the cost of debt and the cost of equity, and the risk-free rate used to estimate the risk premium itself. To vary from this Consistency Position across these two applications will introduce a bias into any derived cost of capital whenever the yield curve is not flat.

There is no evidence to demonstrate that a change to a risk-free proxy with a maturity that matches the regulatory period[77] (ie, a change to a 5 year maturity instrument) leads to a more efficient outcome than the current 10 year term bond and that a 'better' estimate of the MRP can be derived from such a change.

In determining the most appropriate term of the risk-free rate, key issues for consideration include:

- that the previously adopted MRP is based on 10 year Commonwealth bonds as a proxy for the risk-free rate;
- that there is a paucity of research using a 5 year horizon;
- that the prior adoption of the yield on the 10 year Commonwealth bond as the risk-free benchmark for determining the cost of debt and the cost of equity is a precedent;
- the yield on a 5 year maturing bond is more volatile than that of a 10 year maturing bond thereby potentially leading to more volatile revenue requirements if adopted; and
- the average shape of the yield curve between 5 year and 10 year bonds is relatively flat. Costs arising from hedging, rollover or refinancing risk and transaction costs when funding shorter term debt will, most likely, more than offset any average premium in the longer maturing bonds. Persuasive evidence is required to show that there is an advantage arising from using 5 year over 10 year maturing bonds and this has not been presented.

[77] It should be noted that some regulated electricity assets, such as Murraylink and Directlink, have a ten year regulatory period in any event.

Officer and Bishop[78] were commissioned by the Joint Industry Associations to provide an independent assessment of the appropriate maturity of a nominal risk-free bond to proxy for the risk-free rate in regulatory WACC assessments (see Appendix E). Officer and Bishop advise that the 10 year horizon should be used as the best proxy for this purpose and that consistency should be maintained between the bond used as a proxy for the risk-free rate and that used to estimate the MRP.

Officer and Bishop conclude that while, in theory, a 5 year horizon could be used as a proxy for the risk rate: [79]

> . . . it would be necessary to be of the view that:
>
> - There is an active and deep market for five year Commonwealth Bonds;
> - The financing transactions costs that may be imposed on regulated firms are not higher than under current arrangements (ceteris paribus);
> - The rollover risk is not higher as a result of 'going to market' more frequently or at a common point in time than other arrangements under a ten year financing regime;
> - The term structure is, on average, upward sloping from five to ten year maturities and passing on the financing risk and transactions cost to consumers does not dampen demand arising from this;
> - The market risk premium is estimated using observed historical market returns and the observed yield on a five year Commonwealth Bond.
>
> We have not seen any evidence presented by those advocating a change from the ten year maturity to the five year rate that shows that application would lead to a better regulated price such that the present value principle would yield a closer to zero answer under a five year regime than a ten year regime, all costs and benefits appropriately considered.
>
> Consequently, in our opinion, a case has not been presented that warrants a change from current practice.

[78] Officer B & Bishop S, *Term of Risk Free Rate: Commentary* - Prepared for ENA, APIA and Grid Australia, 2008

[79] Officer B & Bishop S, *Term of Risk Free Rate: Commentary* - Prepared for ENA, APIA and Grid Australia, 2008, page 20

The following sections discuss each of the five key points above, followed by responses to the specific questions posed in the Issues Paper.

The Market Risk Premium used in the CAPM has been estimated using yields on 10 year maturing Commonwealth Bonds

The MRP currently adopted by all regulators in Australia[80] was derived from historical data using the yield on the 10 year Commonwealth bond as the proxy for the risk-free rate. If a 5 year maturing bond was to be used as the risk-free rate to which a risk premium is added then consistency requires that the MRP be re-estimated using 5 year bonds. To the Joint Industry Associations' knowledge, a MRP has not been estimated this way. Officer and Bishop show the impact of such an inconsistency by referring to an MRP derived from 10 year bonds and an MRP derived from 90-day bills.[81]

> Mixing the risk free rate used to estimate the MRP and that used as the first term in the CAPM can lead to a clear bias. To illustrate, Table 1 below shows the required rate of return under the CAPM for five different levels of beta – from 0.5 to 1.5 but it mixes the risk free rates. It uses estimates of the MRP over the period 1959 to 2005 from Brailsford et al. The MRP estimated using Bonds is 6.3% and 6.8% for Bills. We hasten to point out the illustration considers short term bills versus ten year bonds, not five year bonds versus ten year bonds. This is because an historical MRP is not available based on five year bonds.
>
> The example uses 6% as the measure of the 'current' risk free rate (maturity undisclosed at this point). To this has been added a risk premium equal to beta times an MRP of 6.3% based on ten year Commonwealth Bonds in one case and beta times an MRP of 6.8% for Treasury bills in the other case. These estimates of the MRP are taken from Brailsford et al (2008) based on the period 1958 – 2005 and exclude any adjustment for imputation tax benefits. The last column identifies the difference between a cost of capital derived from the Bond MRP versus the Bills MRP given the risk free rate proxy and beta.
>
> If the 6% current risk free rate used as an input was a **short term** Bill rate then the best estimate of the cost of capital under different betas will be the 'Bills' Column. It is best because there is consistency in the use of the risk free rate proxy. In this case, use of a ten year Bond based MRP of 6.8% would be inappropriate and understate the cost of capital by the column headed 'Difference.' Investors would not be compensated for the risk being borne.
>
> If, on the other hand, the 6% was a **long term** Bond rate then the ten year Bonds column would be the best estimate of the cost of capital. Inappropriately using the Bill based MRP of 6.8% would overstate the cost of capital by the column headed 'Difference'.

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80 See AER, Issues Paper, Table 5.1, page 39

81 Officer R and S Bishop, *Term of Risk Free Rate: Commentary* - Prepared for ENA, APIA and Grid Australia, 2008, pages 10-11

Table 4.1: Estimates of cost of capital using CAPM but with a different r_f as risk-free rate and used in estimating MRP

Beta	CAPM required return relative to:		
	10 Yr Bonds	Bills	Difference*
0.50	9.2%	9.4%	0.3%
0.75	10.7%	11.1%	0.4%
1.00	12.3%	12.8%	0.5%
1.25	13.9%	14.5%	0.6%
1.50	15.5%	16.2%	0.8%

* Columns may not add due to rounding

Mixing the short term rate as the proxy for the risk free rate with a MRP estimated from historical data using the yield on a ten year maturity bond will, on average, understate the required cost of capital.

There is a paucity of research using a 5 year horizon

To the Joint Industry Associations' knowledge there has not been any research that estimates a MRP using a 5 year Commonwealth bond or any other risk-free proxy with a 5 year maturity. This means that, at this time, there is no basis for assessing a MRP that retains the consistency position between the two uses of the risk-free proxy in the CAPM relationship if a risk-free rate proxy with a five year maturity was used. Officer and Bishop provide indicative evidence that the market for 10 year Commonwealth Bonds is the deepest and most liquid of the Commonwealth Bonds. Section 3.1 of their paper supports this proposition and suggests a potential lack of depth in the market for 5 year maturing Commonwealth bonds:[82]

> Since August 1996 there have been 111 occasions when Treasury Bonds of any maturity have been issued. Table 4 shows the maturity structure of bonds issued on each occasion. Of the 111 occasions in which Tenders have been called (and successful) 79 have been over ten years with 21 over 3 years and up to five years. This says the primary market for treasury bonds is deepest at the long end. There were 90 occasions when 3 – five year bonds were not issued thereby making it challenging to buy bonds of this maturity in the primary market. They become available in the secondary market when the passage of time makes longer term bonds of shorter maturity but we have not accessed any statistics on the amount of trading in five year to maturity bonds and therefore cannot comment on the availability of these for acquisition by firms.

[82] Officer B & Bishop S, *Term of Risk Free Rate: Commentary* - Prepared for ENA, APIA and Grid Australia, 2008, pages 10-14

Current regulatory practice is to use a 10 year maturing proxy for the risk-free rate

The yield on the 10 year maturing Commonwealth bonds has been used as the risk-free benchmark for determining the cost of debt, the cost of equity and expected inflation in regulatory determinations in Australia. Reference is made to Table 4.1 (page 28) in the Issues Paper reproduced, in part below. It is evident from this table that regulatory precedent is to use a Commonwealth bond with a 10 year maturity as the proxy for the risk-free rate. To change from this precedent requires persuasive evidence and, as we describe below, the Joint Industry Associations do not consider that a conclusive case for change has been established.

Table 4.2: Electricity and gas distribution determinations – risk-free rate[83]

Regulator (year)	Energy	Risk-free rate (proxy)
ESC (2008)	Gas	10 year nominal CGS
OTTER (2007)	Electricity	10 year nominal CGS
ESCOSA (2006)	Gas	10 year nominal CGS
QCA (2006)	Gas	10 year nominal CGS
ESC (2006)	Electricity	10 year index-linked CGS*
QCA (2005)	Electricity	10 year nominal CGS
ESCOSA (2005)	Electricity	10 year nominal CGS
IPART (2005)	Gas	10 year nominal CGS
ICRC (2004)	Gas	10 year nominal CGS
IPART (2004)	Electricity	10 year nominal CGS
ICRC (2004)	Electricity	10 year nominal CGS

Source: AER, Issues Paper, page 28, table 4.1

* The Essential Services Commission (ESC) adopted a real framework in its 2006 decision.

The yield on a 5 year maturing bond is more volatile than the yield on a 10 year maturing bond thereby leading to a more volatile revenue requirement

The table reproduced below shows the average yield and volatility (standard deviation) for 5 and 10 year maturing Commonwealth bonds from January 1972 to July 2008 taken from Officer and Bishop.

[83] See Gilbert + Tobin Legal Opinion attached as Appendix B

Table 4.3: Average yield and volatility of Commonwealth Bonds

	Yield on Commonwealth Bonds	
	5 Year Maturing	**10 Year Maturing**
Average	9.10%	9.28%
Standard Deviation	3.31%	3.20%
Return per unit risk	2.75%	2.90%

Source: Reserve Bank of Australia, Bulletin Statistical Tables, Capital Market Yields – Government Bonds (Table F02)

There is a yield difference of 18 basis points between the averages. On average, there has also been a slightly upward sloping yield curve over this period.

The volatility of the 5 year maturing bond is higher than the 10 year bond. This says that if the 5 year bond was selected as the risk-free rate that there would be a consequent increase in the volatility of the revenue requirement relative to 10 year maturing bonds. The Joint Industry Associations see this as undesirable. Further, there will be uncertain demand effects potentially arising from this additional volatility that customers would face.

Table 4.3, also shows that the return per unit of risk (average yield divided by the standard deviation) is lower for the 5 year bond than the 10 year bond. This suggests that any move to a 5 year bond can increase the risk to shareholders with a lower reward in terms of yield.

These facts make any potential move to 5 year bonds disadvantageous to customers and shareholders.

Persuasive evidence is required to show that there is an advantage arising from using 5 year over 10 year maturing bonds

Officer and Bishop examined the difference in historical yield between 5 and 10 year Commonwealth bonds. They found that the average difference was 18 basis points which suggests that the average shape of the yield curve between 5 year and 10 year bonds is relatively flat. Costs arising from hedging, rollover risk and transaction costs when funding shorter term debt will, most likely, more than offset any average premium in longer maturing bonds. For the AER to adopt a methodology that differs to the currently adopted 10 year rate, there must be persuasive evidence to change. The Joint Industry Associations consider that the Davis and Lally position to use a maturity term for the risk-free rate that matches the regulatory period, does not explicitly identified or consider all the costs of such a change.

Officer and Bishop estimate that the impact on the cost of equity of moving to a 5 year maturing bond as a proxy for the risk-free rate is small. The example extracted from their paper below used MRP data taken directly from Brailsford et al. This was because the research does have an MRP derived from the historical difference between market returns and the 10 year Commonwealth bond rate on one hand and between market returns and short term Commonwealth bills on the other hand. [84]

> Indicative data on Government bond yields from January 1972 to July 2008 does show an average yield difference between ten year and five year bonds of 18 basis points with there being more positive than negative differences. This suggests that the MRP relative to a five year bond will be slightly higher than for a ten year bond.
>
> Using this indicative data, Table 3 estimates the difference in the cost of capital for different betas under a ten year bond regime and a five year bond regime. The assumptions here are:

Current yield on 10 year maturing Commonwealth Bonds		6.0%
Current yield on 5 year maturing Commonwealth Bonds		.5.8% (a difference of 18 bp rounded to 20)
MRP relative to 10 year Bonds	6.3%	
MRP relative to 5 year Bonds		6.5% (20bp difference)

[84] Officer B & Bishop S, *Term of Risk Free Rate: Commentary* - Prepared for ENA, APIA and Grid Australia, 2008, page 11

Table 3: Cost of capital for different betas under a ten year risk-free rate regime compared with a five year risk-free rate regime and being consistent between the risk-free rate used and the estimation of MRP

Beta	CAPM cost of capital relative to:		
	10 Yr Bonds	5 Yr Bonds	Difference
0.50	9.2%	9.1%	0.1%
0.75	10.7%	10.7%	0.0%
1.00	12.3%	12.3%	0.0%
1.25	13.9%	13.9%	-0.1%
1.50	15.5%	15.6%	-0.1%

As is to be expected, there should be no difference in the cost of capital for a business with a beta of 1 under either regime. Being consistent in the estimation of the MRP and the definition of the risk free rate ensures this.

However Table 3 shows no difference at a beta of 0.75 (although the ten year regime gives a higher cost of capital of 5 basis points that doesn't show up due to rounding) and a lower rate under the ten year regime with a beta of 1.5.

These two examples, using notional data, demonstrate that there is likely to be minimal difference in the cost of equity estimated with use of either a five or a ten year bond as a proxy for a risk free rate provided there is consistency in its use in the MRP, however mixing rates can lead to a larger difference.

The example illustrates that there may be a small impact on the cost of equity and therefore the WACC of moving to a 5 year maturing risk-free proxy. A prior example in Officer and Bishop shows that being inconsistent in using a 5 year maturing risk-free proxy will understate the cost of equity by a larger amount. When this is combined with the potential impact of passing transactions costs to customers, the implied increase in rollover risk and the expectation that businesses would even consider rolling over debt every 5 years is considered to be substantive. The Joint Industry Associations would require a careful analysis of the costs and benefits of moving away from the current use of a 10 year risk-free proxy.

Overall, the Joint Industry Associations consider that there is no persuasive evidence to move from the current regulatory practice of using a 10 year maturing bond as a proxy for the risk-free rate.

AER Questions

4.1 Are there viable alternatives to Commonwealth Government Securities (excluding using Credit Default Swaps) as an appropriate proxy for the nominal risk-free asset in the context of a domestic Australian CAPM?

a) nominal CGS yields are "generally considered to be the best proxy for the nominal risk-free rate in Australia";

b) that this general acceptance is due to the fact "these bonds are essentially default risk free (government guaranteed returns), are highly liquid assets, and have yields that are transparent and published";

c) the "RBA and Australian Treasury did not consider there to be an absolute bias in nominal CGS yields, and considered that CGS remain the best proxy for the nominal risk free asset"; and

d) "recent experience in the US associated with the 'sub prime crisis' has demonstrated that [credit default swaps (CDS)] issuers are not themselves free from the risk of default" and "significant concerns arise over using this alternative methodology to determine a proxy for the risk free rate".

The Joint Industry Associations understand that an Issues Paper is just that, a paper that raises issues to stimulate discussion and consultation. It is not appropriate to take the paper as the AER's final decision on the matters expressed in it and the Joint Industry Associations do not take the paper in that light.

This is an important point because the issues raised in Question 4.1 are complex and more in-depth consideration is required before certain statements in the Issues Paper can be taken as final views. The Joint Industry Associations have retained Dr Tom Hird of CEG to:

- more fully flesh out the agenda necessary for an effective consultation; and
- assist the AER's consideration by contributing research and analysis of the issues identified.

The CEG paper is attached in Appendix F.

First, the CEG paper identifies the statements in the Issues Paper that need to be considered in more depth. These statements are:

These statements also lead to the proposition included in Question 4.1 that CDS cannot be considered as an appropriate source of the relevant proxy.

A full and fair consideration leading to a sound final decision requires the above statements to be considered as questions: Is each statement supportable and correct? Having investigated and answered that question, what is the most appropriate proxy for the risk-free rate? Is there persuasive evidence to depart from the existing methodology of using CGS without an adjustment?

Without repeating the full details of the CEG Paper, it suggests that each of the above propositions found in the Issues Paper has passed over important details and they are not, in fact, fully supportable as final views. The key observations in the CEG Paper and the recommendations that flow from them are:

- the Reserve Bank considers that the market in CGS is functioning well (and the Joint Industry Associations have no reason to 'second guess' that view and based on the information available, accept it);

- the finance literature recognises the existence of a convenience yield for government bonds. The existence of a convenience yield is attributed to the special non-risk characteristics of national government bonds such as high liquidity, high levels of transparency, simplicity and certainty of returns;

- it is estimated that the convenience yield on Australian 10 year nominal CGS has historically been 39 basis points and is currently 100 basis points;

- an implication of the convenience yield is that yields on CGS are below the benchmark risk-free rate that should be used in the CAPM to price corporate assets;

- general observations about the market for CGS functioning well, regardless of who makes them, cannot properly be taken to contradict the proposition that the CGS is flawed as an unadjusted proxy for the risk-free rate; and

- the CEG Paper expresses the view that there is a superior source of the proxy. The 10 year swap rate less the historical average difference between 10 year CGS yields and 10 year swaps (ie, using historical data, the subtraction would be 39 basis points) (the '**Recommendation**').

The core issues raised in the CEG paper were presented to the ESC in its recent gas decision and CEG's previous work on the topic was considered by ACG who was retained by the ESC. Neither ACG nor the ESC rejected the correctness of CEG's conclusions. The Joint Industry Associations are not aware of a regulator who has rejected the correctness of the conclusions. ACG did, however, identify further work that it considered should be undertaken prior to accepting the conclusions for regulatory purposes. The ESC's decision was to the effect that until the work identified by ACG was undertaken, the ESC could not be 'satisfied' (as per the language of the Gas Code) that the analysis should be taken as the source of the risk-free rate proxy. Whether that was a correct approach for the ESC to adopt under the Gas Code is a tangential matter currently under consideration in another forum.

However, under the NER, the issue cannot be left as an issue that may, subject to certain additional checks being performed, be the correct answer. It is incumbent upon the AER to 'get to the bottom' of this issue and do the remaining work (if any) that is needed before a view on the merits can be reached. Having got to the bottom of the issue, the AER will then need to accept the Recommendation or identify a substantive evidence-based reason to take a different course.

CEG has now considered what additional work it considers necessary in light of ACG's advice to the ESC and confirms that the conclusions in its current paper are fully and properly supported. A key factor is whether the overall WACC package to be adopted by the AER delivers a reasonable opportunity for each business to recover its efficient costs. It would be unacceptable if the combined effect of the individual parameter decisions was to deny a business a reasonable opportunity to recover its efficient costs. CEG conclude that using CGS as the proxy for the risk-free rate today, other things being equal, would under-estimate the required cost of equity by 61 basis points. This is very significant and therefore cannot be ignored by the AER. The Joint Industry Associations maintain an open mind on this important issue and look forward to participating further in the consultations with the AER.

4.2 What is the typical term over which a regulated network business in Australia refinances its debt? How relevant is this term in a regulatory setting?

Table 4 below provides evidence of the debt profile of network businesses. The data has been sourced from Bloomberg and shows the maturity profile and debt financing patterns of the companies listed.[85]

Two clear messages emerge from Table 4. The first is that these firms borrow long term, not short term. The weighted average term is 11.4 years. This means the interest rates charged to the businesses will include any term structure and term based credit premium. Since long term borrowing arrangements include term structure costs, the use of the 10 year risk-free rate does not reward these regulated companies for costs or risks they are not bearing as argued by Lally and Davis.

The second message is that these firms stagger their financing over time. This is undertaken to minimise refinancing risk and the potential to face higher interest rates arising from high demand relative to supply when each goes to the market to raise funds.

The implication of this is that if all such businesses went to the market at the one time, there is a high chance that debt costs would increase from the substantive demand pressures. The Joint Industry Associations consider that it would be wrong for the regulatory process to encourage such a practice by way of the signals the AER and other regulators send about refinancing, eg, that it should be 5 year maturity and should be refinanced in the averaging period for the risk-free rate assessment.

[85] Bloomberg reports data for certain debt instruments and not all, for example band debt. However, Bloomberg is a publicly available source of data while other data are generally not publicly available in aggregated form.

Table 4: Debt Structure of Listed[86] Network Companies

Issuer	Amount	Start date	Maturity	Original Term (Years)
Powercor	350	14 May 01	07 Jun 11	10.1
Powercor	200	15 Nov 05	15 Nov 15	10.0
Powercor	300	15 Aug 07	15 Aug 21	14.0
Powercor	650	15 Aug 07	15 Jan 22	14.4
CitiPower	175	28 Feb 03	28 Feb 10	7.0
CitiPower	300	28 Feb 03	28 Feb 13	10.0
CitiPower	575	12 Jan 07	15 Jul 17	10.5
ETSA Utilities	750	12 Apr 00	12 Apr 10	10.0
ETSA Utilities	300	15 Jul 05	15 Jul 15	10.0
ETSA Utilities	265	15 Nov 04	15 Oct 16	11.9
ETSA Utilities	350	11 Apr 07	12 Apr 18	11.0
ETSA Utilities	269	15 Nov 04	15 Oct 19	14.9
ETSA Utilities	300	30 Apr 07	15 Oct 19	12.5
Envestra	175	21 Nov 02	21 Nov 09	7.0
Envestra	150	26 Jul 01	20 May 11	9.8
Envestra	100	26 Jul 01	20 May 11	9.8
Envestra	55	26 Aug 97	27 Aug 12	15.0
Envestra	45	21 Feb 03	14 Oct 15	12.7
Envestra	300	31 Mar 05	01 Jul 24	19.3
Envestra	220	10 Feb 06	20 Aug 25	19.5
Envestra	300	31 Mar 05	01 Jul 26	21.3
Jemena	275	01 Aug 02	15 Sep 09	7.1
Jemena	150	25 Sep 03	25 Sep 15	12.0
Jemena	150	14 Apr 98	15 Apr 18	20.0
SPI Elect & Gas	600	22 Oct 03	22 Oct 08	5.0
SPI Elect & Gas	1,000	22 Oct 03	22 Oct 13	10.0
SPI Elect & Gas	300	10 Dec 03	15 Nov 13	9.9
SPI Elect & Gas	100	03 Dec 96	01 Dec 16	20.0
SPI Elect & Gas	60	08 Sep 00	01 Dec 16	16.2
United Energy	260	19 Nov 03	15 Apr 11	7.4
United Energy	200	19 Nov 03	15 Apr 16	12.4
GasNet	200	20 Mar 02	20 Mar 09	7.0
GasNet	100	20 Mar 02	20 Mar 09	7.0
Weighted Average				**11.4**

Source: *Bloomberg*

[86] GasNet was delisted following a takeover in 2006 but its debt was taken on by the acquiring company.

In the lead up to preparing comments on the Issue Paper, industry members have had a range of informal discussions with their industry associations which provide a richer and more detailed picture of their funding strategies, activities and profiles. These communications provide information that is consistent with the interpretation of the Bloomberg data presented above.[87] The businesses have confirmed that the comments below are a fair summary of the communications.

The majority of members (particularly the privately owned businesses) use debt with a range of maturities, with terms varying both shorter and longer than the 10 year benchmark. However, consistent with Bloomberg's numbers above, the 10 year period is more representative.

In general, beneath the 'headline' average long term maturity, these businesses tend to spread their debt-raising over time to manage and minimise refinancing risk. That is, to ensure they are not going to market for all or a significant part of their debt at one time. While the overall portfolio has an average not dissimilar from 10 years, the portfolio is comprised of instruments with maturities both longer and shorter than the 10 years. These businesses also consider that prudent best practices will continue to dictate this approach regardless of changes in the regulatory process because this approach is needed to minimise refinancing risk.

Some businesses (a minority) are in a process of change. Most of these businesses are government owned businesses that have previously applied debt funding practices as a result of the incentives of the regulatory framework and the rigours of commercialisation. Particularly accelerated as a response to recent events in the capital markets, these members are more likely to move toward a more typically commercial approach to debt financing. This includes actively managing and mitigating avoidable clearance spreads that accompany large transactions to roll over existing debt and to provide for additional future capital expenditure programs. Where businesses have had shorter debt maturities in the past, the trend is to move toward adopting a range of debt maturities, commensurate with the other, predominantly privately owned businesses.

[87] It was noted that the Bloomberg data does not have bank debt but its inclusion is not expected to materially affect the results on the grounds that it is not a preferred source of funding long term assets.

4.3 What is the true extent of interest rate and refinancing risk faced by regulated network businesses as a result of the regulatory regime? Can regulated network businesses manage their refinancing risk via swaps and other financial instruments?

Electricity transmission and distribution businesses are not immune from refinancing risk irrespective of ownership. Prudent financial management requires spreading refinancing over time given debt maturities are not available to match the long term asset lives. This exposes the business to interest rate risk and financing risk if debt matures and is refinanced in between regulatory reviews and hedging this risk is not available.

The Joint Industry Associations' members identified that the current state of the market means that longer term Australian capital markets are closed to corporate issues. The US private placement market is too expensive given the state of the markets. As a result, bank debt has to be used, which comes at considerably higher margins and shorter terms. This highlights the importance of managing refinancing risk and not being in a position whereby all or a majority of debt is refinanced at the same point in time.

While there is a range of financing instruments available to minimise interest rate risk, these are not costless. Many members hedge in an attempt to align the cost of debt with the rate set in their respective regulatory determinations and thereby minimise interest rate risk over this period. To date, some government owned enterprises (GOEs) have financed debt over shorter maturities. However, this practice is changing and refinancing strategies commensurate with privately owned entities are being adopted as debt portfolios increase and refinancing constraints apply to GOEs. The GOEs are not exposed to the same degree of refinancing risk as privately owned businesses, albeit they incur a cost to clear the funds. In capital markets faced with the current funding 'crisis', the cost of any form of financing or risk management rises.

There are no instruments for hedging refinancing risk. Businesses generally manage refinancing risk by spreading refinancing over time and ensuring that not all debt is refinanced in one large raising but rather by raising in smaller parcels over time. The regulatory regime should not in any way be based around, or encourage, a view that all debt will be refinanced in the averaging period.

In the section entitled *The Expert Evidence and Regulatory Precedent* of this submission, cogent current examples have been given of two companies that simply cannot refinance at a particular time even though their assets are quality assets. There is a risk (albeit small) for network operators that this could happen to them and hedging cannot remove this risk.

The current regulatory practice is to permit a regulated electricity transmission and distribution business to nominate the averaging period (between 5 and 40 days). This at least creates an opportunity for partial issuance but more importantly provides for a period to transact financial instruments to manage interest rate risk and to smooth out price spikes during the reset period. It is important that the averaging period is not released to the market to potentially increase the negotiating power of debt funding bodies.

4.4 As the nominal risk free rate is reset at the commencement of each regulatory period, should the term of the nominal risk free proxy (all else equal) be the same as the term of the regulatory period?

No. The term of the risk-free rate should not be equal to the term of the regulatory period unless it can be established that by doing so there is a more efficient outcome for all parties, ie, consumers, producers and financial intermediaries. The current term is 10 years, so introducing change will add regulatory risk for an unclear benefit.

The proposition that these horizons should be equal appears to be based on the following arguments:

- regulated businesses can either refinance or hedge costlessly at each regulatory reset, can do so in the averaging period and achieve this at lower cost than the current alternatives;
- that there is an upward sloping yield curve between 5 and 10 year Commonwealth government securities that is not explained by the rational expectations theory. This means that if the 10 year bond rate is used as the risk-free rate then regulated businesses will be compensated by this premium for risks they do not bear; and
- that the potential over-compensation is greater than the additional costs and risks arising from re-financing every five years.

Further, the argument for change also be relies on it still being reasonable to use the MRP derived from historical 10 year yields as a basis for a forward looking MRP when assessing the cost of equity. This reliance largely arises from there not being any research providing an estimate of the MRP based on a 5 year maturing risk-free proxy. The lack of research[88] appears to arise from there being a thin market for 5 year bonds. Therefore there being an unreliable historical series of yields on 5 year maturing bonds from which to derive a MRP that is consistent with a 5 year maturing risk-free proxy,. In other words, it is unlikely that the same process that has been used to estimate the MRP for 10 year bonds can be repeated for 5 year bonds.

Substantive evidence has not been presented to support these propositions. Consequently the argument for change has not been established except under special and unrealistic assumptions. The Joint Industry Associations comment on each point in turn after presenting a point of view from the Issues Paper.

[88] See Officer B & Bishop S, *Term of Risk Free Rate: Commentary* - Prepared for ENA, APIA and Grid Australia, 2008, section 3.1

As stated earlier, the Issues Paper states that:[89]

> . . . financing strategy is and should be at the discretion of the regulated entity. Provided the regulator commits to resetting interest rates (and cash flows) at the end of the regulatory period, and the firm refinances in the specified averaging period, the exposure to interest rate risk will be minimised to the greatest extent possible.

Officer and Bishop comment on this as follows:[90]

> There is an acknowledgement here that the regulatory process implies or could impose a particular financing strategy for the firm and, by implication, that this is the most cost efficient (regardless of whether the firm or customers bear this cost). It requires the firm to refinance or at least hedge in the averaging period and assumes the financing or hedging facilities will be available. It also requires that firms know in advance what this period will be, that the funds are available and that there are no price effects due to all regulated firms refinancing in a short period of time. Anecdotally we point to the experience of Centro Properties and Babcock and Brown as examples of two firms that could not refinance when required, despite the underlying assets being of good quality.[91] We are also advised that Corporates have been unable to issue debt instruments in recent months, again largely as a fall out from the sub prime crisis. Being unable to refinance dramatically increases the probability of experiencing what finance theory calls bankruptcy costs (witness the re-rating of the equity in these firms).

Returning to comment specifically on the three bullet points above. Firstly, the Joint Industry Associations internal discussion of funding strategy and associated challenges highlighted difficulties in identifying in advance what the averaging period will be that determined the risk-free rate used in estimating the cost of capital. Officer and Bishop point to the large cost that can be associated with refinancing in adverse markets (like the current market in wake of the sub prime crisis) – see the reference below to Centro Properties and Babcock and Brown.

Regulated electricity transmission and distribution businesses do not wish to have all debt maturing at one point in time or be competing for hedging instruments at the same time. There is a preference to spread the debt funds such that they have different refinancing dates.

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89 AER, Issues Paper, page 31

90 Officer B & Bishop S, *Term of Risk Free Rate: Commentary* - Prepared for ENA, APIA and Grid Australia, 2008, page 16

91 See, for example, the article entitled 'Centro growth stays solid in all sectors', Australian Financial Review, 21 May 2008 p 62, where the opening paragraph says: 'Rental and sales growth appear to have remained solid across Centro Properties Group's portfolio in the face of the US economic trouble and doubts over the company's future.'

The arguments attributed to Davis (2003)[92] and Lally (2002)[93] rely on there being an upward sloping yield curve between the 5 and 10 year horizon that is not explained by rational expectations theory but by some risk premium, eg, liquidity. They argue that under these circumstances, and with a regulatory reset every 5 years, regulated businesses will be rewarded for risk they do not bear if a 10 year maturity risk-free proxy is used. At this stage, there has been no evidence[94] identified that has shed light on the shape of the yield curve and the extent of any potential additional reward. Nor has there been any assessment of the transaction costs that might arise from such a change. It is clear from the financing behaviour of the members as presented in Table 4 and the discussion beneath it, that financing is long term. Therefore the interest costs implicit in a rising yield curve are being borne by regulated businesses. Hedging imposes additional costs. There is no free ride.

The third bullet point above - that the potential overcompensation is greater than the additional costs and risks arising from refinancing every five years – has not been established. There has been no empirical analysis that incorporates all benefits and costs to the Joint Industry Associations knowledge to support a substantive case for change.

4.5 What is the significance of consistency between the risk free rate proxy and the MRP from both a theoretical and a practical point of view?

Consistency between the risk-free rate proxy and the MRP is paramount from both a theoretical and practical point of view. The arguments for breaking this fundamental principle are weak and can lead to the introduction of bias.

The risk-free rate appears twice in the CAPM relationship and it is the same rate. At the theoretical level there is no debate that it is a risk-free rate and that it should be the same in both parts of the equation.

No convincing argument has been presented at the practical level for not adhering to consistency.

The apparent debate appears to arise from two arguments. The first relates to the alleged short term nature of the CAPM as presented in the Issues Paper. The second relates to an apparent argument that because historical based estimates of the MRP based on 10 year bonds is an imperfect estimate of the forward looking MRP then it is acceptable to break with consistency and use a 5 year risk-free rate along with an MRP based on a 10 year rate.

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92 Davis, *Report on risk free interest rate and equity and debt beta determination in the WACC*, Prepared for the ACCC, August 2003

93 Lally M, *Determining the risk free rate for regulated companies*, Prepared for ACCC, August 2002

94 Other than that provided in Officer and Bishop (2008) that showed an average of 18 basis points difference over the period 1972 to 2008

Neither argument is acceptable.

With respect to the first argument, the Issues Paper makes the following point:[95]

> It remains open to question whether estimating the MRP using historical excess market returns over short-term government bond rates is required for consistency, even for a CAPM that assumes a short-term investor horizon. This is because the use of historical excess returns is only a proxy for the forward looking MRP.

The CAPM makes no statement about the investment horizon of investors nor about the length of the single period it is based upon. Consequently there cannot be an open question about whether estimating the MRP using historical excess market returns over short term government bond rates is required for consistency.

Officer and Bishop reference general guidance for the period of practical application of the CAPM arguing that estimating the MRP should be, and is, undertaken using a long term maturity as a proxy for the risk-free rate:[96]

> Given the CAPM is a one period pricing model then conceptually the appropriate period is the price setter's horizon that would define the period. However typically there is often an implicit assumption of some match between the asset life and investor's planning horizon. Ideally, the maturity of the CAPM should be the maturity of the planning period for which the CAPM is to be used to estimate an expected or required return. This means that if the planning horizon is a long term investment then a long term government bond is the appropriate maturity to use. That is, the rate of return we are attempting to estimate for regulated network assets is that appropriate for long term investments.

Officer and Bishop also illustrate the size of a potential bias in not being consistent. This is presented in section entitled *Persuasive evidence is required to show that there is an advantage arising from using 5 year over 10 year maturing bonds*, above.

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95 AER, Issues Paper, page 35

96 Officer B & Bishop S, *Term of Risk Free Rate: Commentary,* Prepared for ENA, APIA and Grid Australia, September 2008, page 12

4.6 How does the objective of maintaining consistency with the MRP interact with the 'present value principle' in determining an appropriate term for the risk free rate in the CAPM?

Officer and Bishop illustrate how the inconsistent use of the risk-free rate can under-estimate the cost of equity capital. A detailed example is included in the prelude to answering the AER questions, which demonstrates that:[97]

> Mixing the short term rate as the proxy for the risk free rate with a MRP estimated from historical data using the yield on a ten year maturity bond will, on average, understate the required cost of capital.

Under these circumstances the present value of expected future cash flows will be less than the initial investment because the determined revenue requirement will not meet the opportunity cost of capital.

4.7 Does the current regulatory practice of effectively accepting any averaging period to calculate the nominal risk free rate of between 5 and 40 days in length (and commencing as close as possible to the start of the regulatory period) require re-consideration?

The businesses are of the view that the current regulatory practice of averaging contained in the NER is acceptable. The averaging period achieves three main objectives:

1. it smooths out spikes in the nominal risk-free rate across the reset period;

2. it allows a regulated electricity transmission or distribution business the ability to manage interest rate risk by entering into financial products to match a portion of its total interest rate exposure during this period; and

3. it allows a regulated electricity transmission or distribution business the ability to manage interest rate risk by refinancing a portion of its total debt portfolio during this period.

The businesses are of the view that due to differing risk appetites and financing practices a range between 5 and 40 days is required to allow each business to achieve the most efficient outcome.

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[97] Officer B & Bishop S, *Term of Risk Free Rate: Commentary* - Prepared for ENA, APIA and Grid Australia, September 2008, page 11

Further, continuing the current practice:

- provides consistency with regulatory precedent thereby minimising regulatory risk;
- provides consistency with existing practices arising from this in tapping and accessing debt and equity markets;
- provides regulated electricity transmission and distribution businesses' with an opportunity, but not an obligation, to raise a portion of their debt during the averaging period; and
- allows regulated electricity transmission and distribution business' to build a debt profile of multiple maturity debt financing to minimise refinancing risk.

4.8 In determining an appropriate averaging period, are there certain times of the year (eg, the Christmas period) that should be excluded?

This is a matter that should be dealt with as part of an individual business' revenue proposal and there is no clear basis for specifying particular exclusions. In particular it is noted that:

- a shift from the current practice would presuppose a framework that would actively discourage opportunistic issuance to minimise total fund raising costs; and
- does not allow for the possibility of drift in an issuance program that may infringe a deemed exclusion period inadvertently through a multiplicity of root causes many of which the relevant regulated electricity transmission and distribution business cannot control.

4.9 In calculating the nominal risk free rate over the agreed averaging period, are there any alternative methodologies (other than linear interpolation) that should be considered?

No. The businesses consider the current averaging process to be acceptable. The process is partially based on a view that the observed spot rate is equal to some underlying 'true' rate plus noise. If the noise is random with an expected value of zero then simple averaging should even out the noise. Clearly a challenge arises if some significant economic event occurs during the averaging period, eg, something that causes interest rates to move. In this case an average over the entire period would not be reflective of current rates. However, this is circumstantial and has to be weighed up against the impact on the Treasury Department attempting to hedge interest rates over the period.

5 Market Risk Premium

Introduction

> A value of 6 per cent has been used historically as the MRP. This has been predicated on imputation credits having no value to investors (ie, a zero gamma). The Joint Industry Associations support the continued use of this value under this gamma assumption.
>
> However, if imputation credits have a positive value there is convincing and persuasive evidence to increase the expected MRP from 6 to 7 per cent.

An important parameter in the estimation of the required return on equity is the MRP. In the standard CAPM the MRP is normally expressed as a positive premium over a risk-free rate of return that is required (expected) by the market to bear the risk of investing in a broad based market portfolio.

The key issues for consideration are:

- the previously adopted MRP value for both electricity transmission and distribution service providers is 6 per cent;
- the adoption of a 6 per cent MRP, assuming no value is attributable to imputation credits, is supported by an array of secondary estimation sources including:
  - historical average MRP estimated over a variety of periods;
  - surveys of financial professionals, including Chief Financial Officers, Independent Expert Reports and other users of financial data;
  - forward looking estimates of the MRP; and
  - comparisons with the measured historical MRP of other open economies;
- the best source of a forward looking MRP is a long term average of historical MRPs. Over the period 1958 to 2007 the historical arithmetic average of the MRP was 6.7 per cent, if there is no value placed on a return to investors for imputation tax benefits;
- if the currently adopted value of gamma (ie, 0.5) was included in the post 1987 historical MRP the best estimate of the MRP rises to 7 per cent.

Officer and Bishop have been commissioned by the Joint Industry Associations to provide an independent assessment of the appropriate value of MRP. Officer and Bishop have also been asked to advise whether there is persuasive evidence to move from the currently 'adopted value' of 6 per cent for electricity transmission and distribution businesses.

Officer and Bishop have provided comprehensive advice that is attached at Appendix G and their position is clear:[98]

> The market risk premium of 6% was originally based on evidence that excluded any explicit consideration of a component to reflect any value of imputation tax benefits in the historical MRPs. Consequently the 6% can be viewed as an estimate of the MRP when this value is zero (the term 'gamma' is usually used to reflect the value of $1 of imputation tax benefits created by a firm however we are concerned with the value of a dollar of imputation tax benefits once distributed given that we are adjusting observed market returns). The inclusion of an estimate of the imputation tax benefits in the historical estimate of market equity returns forms the basis of our recommendation that the MRP be increased from 6% to 7% as qualified below.

There is no persuasive evidence to support a reduction in the currently adopted MRP value of 6 per cent. However, a 6 per cent MRP is predicated on imputation credits having no value to investors. If imputation credits have a value of 0.5 at the time of creation (consistent with past regulatory practice) there is convincing and persuasive evidence that a 6 per cent MRP is not appropriate. Instead the expected return on a broad based market portfolio would be 7 per cent.

The following sections discuss each of these key points, followed by responses to the specific questions posed in the Issues Paper.

The Adopted MRP Values

> The 'adopted value' of the MRP for electricity transmission and distribution is 6 per cent.

The NER requires that there be persuasive evidence before adopting a different value other than that previously adopted.

For electricity transmission businesses the value is deemed by the NER to be 6 per cent. The value of the MRP for distribution is not explicitly set out in the NER. However, a MRP of 6 per cent is the currently adopted for all distribution businesses operating within the NEM. Table 5.1 sets out the values of the MRP currently adopted for electricity distribution service providers.

[98] Officer B & Bishop S, *Market Risk Premium: A Review Paper - Prepared for* ENA, APIA and Grid Australia, August 2008, page 39

Table 5.1: Adopted values for electricity distributors - Market Risk Premium[99]

Jurisdiction	Distribution Network Service provider	*Previously Adopted market risk premium*
Australian Capital Territory	ActewAGL	*6%*
New South Wales	Country Energy	*6%*
	EnergyAustralia	*6%*
	Integral Energy	*6%*
Queensland	ENERGEX	*6%*
	Ergon Energy	*6%*
South Australia	ETSA Utilities	*6%*
Tasmania	Aurora Energy	*6%*
Victoria	AGL Electricity	*6%*
	CitiPower	*6%*
	Powercor	*6%*
	SP AusNet	*6%*
	United Energy	*6%*

[99] See Gilbert + Tobin Legal Opinion attached as Appendix B

Estimates of the MRP

> The best estimate of a forward looking MRP is based on a long term average historical MRP which is estimated as 6.7 per cent over the period 1958-2007, based on the assumption that investors do not value imputation credits.

Officer and Bishop have advised that, given the challenges in determining a forward looking MRP, the best source of the estimate is one that relies heavily on historical data.[100] The argument for relying on historical data is a combination of there not being a useful model of deriving an expected market return and that the future expectations of investors will be influenced by past experiences. Since historical data is on the whole objective, it is not surprising that most empirical research of the Australian MRP examines the historical behaviour of stock returns relative to government securities returns (such as Treasury bonds or bills). This is a common method of assessing the MRP.[101]

Historical measures of the MRP are tabulated in Table 5.2 below.

Table 5.2: Arithmetic average of historical MRP

				95% Confidence Intervals		
Period	**Number of Years**	**Average (%)**	**Standard Error**	**Low**	**High**	**Range**
1958-2007	50	6.7	3.1	0.6	12.9	12.3
1968-2007	40	6.0	3.7	-1.2	13.2	14.4
1978-2007	30	7.9	4.0	0.1	15.7	15.6
1988-2007	20	5.8	3.4	-0.9	12.5	13.4
1998-2007	10	8.4	3.4	1.7	15.1	13.5
1883-1957	75	8.0	1.4	5.2	10.2	5.5
1958-1987	30	7.4	4.8	-2.0	16.7	18.7
1883-2007	125	7.5	1.5	4.5	10.4	5.9
1888-2007	120	7.4	1.6	4.3	10.5	6.1
1898-2007	110	7.5	1.7	4.3	10.8	6.6
1908-2007	100	7.4	1.8	3.8	11.0	7.2
1918-2007	90	7.5	2.0	3.6	11.5	7.9
1928-2007	80	7.0	2.2	2.6	11.4	8.8
1938-2007	70	6.8	2.4	2.0	11.6	9.6
1948-2007	60	7.0	2.8	1.5	12.4	10.9

Source: Appendix G, Officer and Bishop, Table 6.

[100] Officer B & Bishop S, *Market Risk Premium; A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008

[101] See, for example, Dimson E, Marsh, P & Staunton, M, '*Risk and Return in the 20th and 21st Centuries*', Business Strategy Review Vol 11, No. 2 Summer 2000

Table 5.2 highlights a number of key issues with the historical data on excess returns, including:

- that at almost all the sample lengths the historical MRP is above the adopted rate of 6 per cent – indeed there is only one of the 15 sample periods that is below 6 per cent and even that study would give a value of 6 per cent if rounded to the nearest whole integer as the expert evidence suggests;

- there is no discernable 'trend' supporting a fall in the MRP in recent years; and

- the statistical precision, as seen by the range of MRPs that fall within the 95 per cent confidence level, is low. However, the statistical precision improves with the length of the sample period.

As the statistical precision of historical estimates increases with the length of the sample period they are better surrogates for current expectations. However, Brailsford et al (2008)[102] identified a number of measurement errors such that in their view the pre-1958 data cannot be relied on. Their paper examined the MRP up to 2005. However, this has been updated to 2007 by Officer and Bishop. Consequently, the longest period of data that is not subject to Brailsford et al's concerns is from 1958 – 2007, where the MRP has an arithmetic average[103] of 6.7 per cent, if an imputation tax benefit adjustment is excluded.

Some commentators have argued that a shorter sample period is appropriate as the current data is likely to be more relevant for today's circumstances. Specifically, that recent empirical studies have found evidence of structural breaks in the MRP suggesting that in recent years the MRP has trended down. However, when these studies are updated to include recent data (as done by Officer and Bishop) , the apparent recent decline in the MRP has reversed. [104]

Officer and Bishop consider annual market returns using 2007 as their most recent data source.[105] Given the 2008 performance of the Australian stock market to date, it would be reasonable to expect a moderation of the recent upswing in the historical MRP. On the other hand, the recent increase in market volatility and uncertainty as a result of events like the sub prime crisis would suggest the forward looking MRP has increased. This highlights the instability in the estimates of the MRP that are based on a short term view or on short term samples of the historical MRP data. It also reinforces the necessity to rely on long term historical estimates. While MRP may vary over time, the Joint Industry Associations do not advocate a change in the MRP at each regulatory hearing, as it would be impossible to gain agreement on what the change should be. Instead the Joint Industry Associations recognise that infrastructure is a long term investment and we argue that a long term view should be taken of the cost of capital.

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[102] Brailsford T, Handley J, Maheswaran K, *Re-examination of the historical equity risk premium in Australia*, Accounting and Finance, 48, (2008) pp 73-97, quoted in Issues Paper, page 42

[103] Note that the issue of the appropriateness of using arithmetic rather than a geometric average is specifically addressed in our response to question 5.6.

[104] Officer B & Bishop S, *Market Risk Premium; A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, pages 33-37

[105] Officer B & Bishop S, *Market Risk Premium; A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 19

Other methods for estimating the MRP may provide a useful cross-check on the historical long term estimates Officer and Bishop highlight a number of approaches that could be used as a cross-check to the estimated MRP, including:

- historical data from different time periods. As can be seen from Table 6.2 over the longest period that data is available (ie, 1883 to 2007) the MRP (excluding imputation credits) has an arithmetic average of 7.5 per cent (or 6.2 per cent according to Brailsford et al (2008)). While over the shortest period (ie, 1998 to 2007) the MRP has averaged 8.4 per cent. The MRP estimated over different time periods provides no support for a reduction in the 6 per cent MRP currently adopted for regulated electricity transmission and distribution businesses. In fact, the historical data on excess returns supports the adoption of a 7 per cent MRP;

- comparisons of the MRP with other open economies can also provide a useful cross-check to the estimated MRP. It would be expected that the MRP of open economies would be broadly similar as investors would invest in countries that give the highest return per unit of risk.

  Officer and Bishop[106] found that the long term Australian MRP of 7.6 per cent (based on Officer data) was at the higher end of the 16 countries reviewed by Dimson et al but the revised estimate by Braislford et al would be in line with the average. The Australian MRP was not dissimilar to the MRP found in the US and falls within the range of results for the developed countries examined taken as a whole.[107] Further, adopting a MRP of 6 per cent is in line with the world wide historical view of the average MRP;

- forward cash flow based measures of the MRP are also generally in line with long term historical estimates of the MRP;[108] and

- surveys of financial professionals have found that the MRP commonly used falls in the range of 6 to 8 per cent. [109] For example, KPMG (2005)[110] found that none of the Independent Expert Reports that applied the CAPM used a MRP of less than 6 per cent. KPMG also found that 24 per cent used a MRP of greater than 6 per cent.

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106 Officer B & Bishop S, *Market Risk Premium; A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 13

107 Dimson E, March P & Statunton M, 'Global evidence on the equity risk premium', Journal of Applied Corporate Finance , Vol 15, 4 (2003) pages 8-19, quoted in Officer and Bishop, *Market Risk Premium; A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 13

108 This is discussed in greater detail in our response to questions 5.17 and 5.18.

109 This is discussed in greater detail in our response to questions 5.15 and 5.16.

110 KPMG, *Cost of Capital – Market practice in relation to imputation credits; Victorian Electricity Distribution Price Review* 2006-10 2005 quoted in Officer and Bishop, *Market Risk Premium; A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 18

Impact of Gamma

> The currently 'adopted value' of 6 per cent for MRP was developed without consideration of any value for imputation credits.
>
> The inclusion of a positive value for imputation credits necessitates that the MRP be increased from 6 to 7 per cent.

Officer and Bishop advised that the 'adopted value' for MRP of 6 per cent does not recognise or reflect any value for imputation credits.[111]

The imputation tax regime was introduced in Australia from 1 July 1987. Under this regime companies can attach franking credits to dividends. Initially shareholders were able to use these to offset Australian tax liabilities. However, investors are now able to be to receive a rebate for the value of credits that were previously unused.

As Officer and Bishop demonstrate, the 6 per cent MRP was originally based on evidence that excluded any explicit consideration of the value of imputation credits.[112] This is clearly inconsistent with previous regulatory decisions which adopted a positive value for gamma. To correct this inconsistency when calculating MRP, it is necessary to recognise the value of the imputation credits.

Table 5.3 tabulates the Officer and Bishop estimates of the increase in the historical MRP if the market value of franking credits distributed is 0.5 or 1.0.

[111] AER, Issues Paper, page 38

[112] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 39

Table 5.3: Average historical MRP: Adjusted for Imputation Credits

Period		Market Risk Premium				
		φ = 0	φ = 0.5		φ = 1	
	Years		Adj.	With Imp	Adj.	With Imp
1998-2007	10	8.4	0.9	9.3	1.7	10.1
1988-2007	20	5.8	0.9	6.7	1.7	7.5
1978-2007	30	7.9	0.6	8.5	1.1	9.1
1968-2007	40	6.0	0.4	6.5	0.9	6.9
1958-2007	50	6.7	0.3	7.1	0.7	7.4
1948-2007	60	7.0	0.3	7.2	0.6	7.5
1938-2007	70	6.8	0.2	7.1	0.5	7.3
1928-2007	80	7.0	0.2	7.2	0.4	7.4
1918-2007	90	7.5	0.2	7.7	0.4	7.9
1908-2007	100	7.4	0.2	7.6	0.3	7.7
1898-2007	110	7.5	0.2	7.7	0.3	7.9
1888-2007	120	7.4	0.1	7.6	0.3	7.7
1883-2007	125	7.5	0.1	7.6	0.3	7.8

Source: Appendix G, Officer and Bishop, Table 7

The impact of including a value for imputation credits is that it increases the long term historical MRP for the 1958 to 2007 period to over 7 per cent.

If the AER were to continue to maintain a 0.5 value for gamma then it is necessary to adopt the conclusion of Officer and Bishop, as stated below:[113]

> The market risk premium of 6% was originally based on evidence that excluded any explicit consideration of a component to reflect any value of imputation tax benefits in the historical MRPs. Consequently the 6% can be viewed as an estimate of the MRP when this value is zero (the term 'gamma' is usually used to reflect the value of $1 of imputation tax benefits created by a firm however we are concerned with the value of a dollar of imputation tax benefits once distributed given that we are adjusting observed market returns). The inclusion of an estimate of the imputation tax benefits in the historical estimate of market equity returns forms the basis of our recommendation that the MRP be increased from 6% to 7% as qualified below.

[113] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 39

AER Questions

Historical measures – selection of the appropriate proxy for the market portfolio

5.1 Is the data source for Australian historical market returns an issue of contention? Are there certain data sources that should be preferred over others?

While theoretically the MRP should represent all risky assets it is not practical to incorporate all types of assets into the value of MRP. In practice, the market return used to measure the MRP generally relies on a broad stock market index. Historical Australian market returns use either the All Ordinaries Accumulation index or AGSM market returns. Both of these sources present no particular issues of contention. However, a number of data quality issues have been raised with respect to market returns prior to 1958.[114]

5.2 Should foreign stock market data be used as a 'cross-check' on the use of Australian excess market returns as a proxy for the domestic MRP? Are there particular foreign studies that should be considered? What characteristics should be considered in selecting foreign countries as a cross-check?

Officer and Bishop[115] found that the long term Australian MRP of 7.6 per cent was at the higher end of the 16 countries reviewed by Dimson, Marsh and Staunton (2003). The Brailsford et al (2008) revision of the pre 1958 series means the long term Australian MRP is in line with the average of overseas countries. The Australian MRP was not dissimilar to the MRP found in the US and falls within the range of results for the developed countries examined when taken as a whole.[116] Further, adopting a MRP of 6 per cent (ignoring the value of imputation credits) is in line with the world wide historical view of the average MRP.

It would be a concern if there were substantive differences across open economies as it would be expected that equity would be directed to those countries that give higher returns per unit of risk. This comparison should only be an in passing check. Cross-checks are important to the extent they shed any light on the reasonableness of the MRP.

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[114] Brailsford T, Handley J, Maheswaran K, 'Re-examination of the historical equity risk premium in Australia', *Accounting and Finance,* No. 48, 2008 pages 73-97, quoted in Issues Paper, page 42

[115] Officer R and S Bishop, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 13

[116] Dimson E, P Marsh and M Staunton, 'Global evidence on the Equity Risk Premium' Journal of Applied Corporate Finance, Vol 15, 4 (2003) pp 8-19 as quoted in Officer and Bishop op .cit. *page 13*

Historical measures – length of estimation period

5.3 What factors should be considered in determining the length of the estimation period?

There are a range of factors that should be considered when determining the length of time that excess market returns are assessed. The principal factors include:

- the underlying quality of the data and data source;
- the stability and robustness of the estimated MRP. If the sampling length results in a volatile estimate of the MRP it is unlikely to be a useful surrogate for current expectations. This principle suggests that the use of a longer sampling period is appropriate; and
- due to the previous point, no exclusions of periods or restarts to the series of reliable data should be made unless there is strong evidence of a structural break or a trend away from the long term average MRP possibly due to overall less risk or more diversification opportunities. This would support the use of a shorter time period. However, there is a challenge in dealing with the increased confidence interval arising from the smaller number of observations.

5.4 Should a shorter term or longer term data series be considered?

A longer term data set provides stable and robust estimates of the MRP. However, if there is evidence of a structural break or a trend away from the long term average MRP then a shorter term might be appropriate. Whether or not a structural break or a trend away from the long term average MRP has occurred is an empirical and challenging question.

In the attached report from Officer and Bishop, they examine whether there was any empirical evidence to suggest a structural break or trend away from the long term average MRP as argued by Hancock (2005). Officer and Bishop conclude that when previous studies were updated to include data up to the end of 2007, there was no evidence of a structural break or downward trend.

A further problem with using short term historical estimates of the MRP is that it can result in nonsensical conclusions. For example, there are periods when using a 10 year moving average MRP, which would result in a negative forward looking MRP.[117] This is clearly not a plausible outcome given that risk averse investors will demand a premium over the risk-free rate to invest in the market portfolio.

In the absence of any evidence that a structural break or a trend away from the long term average MRP has occurred a long term average historical MRP should be adopted as the primary estimate of the forward looking MRP.

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[117] See Officer and Bishop, *Market Risk Premium: A Review Paper* -Prepared for ENA, APIA and Grid Australia, August 2008, page 29, Figure 5

5.5 What start and end dates should be considered?

As a long term average is preferable to a short term average the only constraint on the start date is data quality issues. Brailsford et al (2008)[118] are of the view that the pre 1958 data has some measurement errors and cannot be relied upon. This suggests that greater weight should be placed on historical estimates derived from post 1958 data. However, the pre 1958 data provides a useful cross-check to the estimated MRP. That cross-check is consistent with a 6 per cent MRP (assuming a zero gamma).

The end date should incorporate up-to-date data. Given that conventional practice is to use annual rates of return, the most recent year that data is available is 2007.

Consequently, the best period to sample the historical MRP is the 1958 – 2007 period.

Historical measures – method of averaging returns over multiple periods (arithmetic or geometric)

5.6 Is an arithmetic or geometric average of historical excess returns more appropriate as an estimate of a forward looking MRP?

Officer and Bishop and Cooper (1996)[119] are clear that the arithmetic average is the appropriate measure for deriving a forward looking MRP.[120]

The CAPM is used to estimate the annual rate of return required by equity owners. As a component of the CAPM, the MRP estimates the expected return, on an annual basis of the market portfolio ($E(r_m)$) over and above the risk-free rate (r_f). Whether investors' expectations of the annual return of the market portfolio are determined by the arithmetic or geometric average of historical returns depends on the extent that investors believe that historical observations of market returns are independent.

The arithmetic average MRP is the generally accepted approach and assumes that investors treat all historical observations as independent. That is the MRP in a given year is not influenced by the MRP in a prior year.

In some circumstances, a geometric mean is computed. The geometric mean represents the actual investment returns over a defined period and is appropriate when estimating the aggregated return achieved from a buy and hold strategy. However, this is not the purpose here, which is trying to find the best representation of how expectations are formed on past historical returns.

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[118] Brailsford T, Handley J, Maheswaran K, 'Re-examination of the historical equity risk premium in Australia', Accounting and Finance, 48, (2008) pages 73-97, quoted in Officer and Bishop, *Market Risk Premium: A Review Paper - Prepared for* ENA, APIA and Grid Australia, August 2008, page 39

[119] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 14, and Cooper (1996): Cooper Ian, '*Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting',* European Financial Management, Vol 2, 2 (1996) pages 157-167

[120] Officer B., and Bishop S., *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 6

The historical data provides many observations on what the market returned relative to the risk-free rate over a series of one year periods. To the extent that each of these should be given equivalent weight in framing expectations, a simple arithmetic average is appropriate.

Historical measures – interaction between MRP and term of the risk free rate

5.7 Could the MRP be estimated for different terms? For example, could a distinct forward-looking MRP for 1, 5, and 10 year terms be determined? Or do the various estimation difficulties limit the precision of estimates to a 'current' MRP?

The forward looking MRP for any term should be estimated on the basis of long term historical data using a long term view of the risk-free rate.

5.8 Should the term of the risk free rate proxy used in estimating the historical excess returns must be consistent with the term of the 'first' risk free rate? What other considerations are relevant in determining the risk free rate proxy used in estimating historical excess returns?

The appropriate risk-free rate has a term of ten years which is consistent with the risk-free rate used elsewhere in the CAPM and WACC.

The use of short dated government securities as the risk-free rate surrogate is inappropriate. The reasons for retaining a 10 year risk-free period are discussed in greater detail in response to Chapter 4 of the Issues Paper. To summarise, the principal argument for the retention of the 10 year risk-free period is that the term of the CAPM should, as far as practically possible, reflect the planning horizon of the regulated firm.

The planning horizon of the regulated firm will primarily depend on the effective life of the assets used to provide the regulated service. This has been acknowledged by the Australian Competition Tribunal in the GasNet decision:[121]

> The timescales are dictated by the relevant underlying facts in each case and for present purposes those include the life of the assets and the term of the investment.

In the case of electricity transmission and distribution businesses the effective life of an overwhelming majority of regulated assets is greater than 10 years. Therefore, it would be inappropriate to use short dated government securities as the risk-free rate surrogate.

The Issues Paper does raise for consideration a shorter timeframe. However, as discussed more fully in chapter 4 of this submission, it is not possible or desirable for the regulatory framework to seek to run counter to the fundamentals of the business described above, by aligning the time horizon of the WACC parameters with the reset timetable without creating significant distortions.

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[121] Australian Competition Tribunal , *Application by GasNet Australia (Operations) Pty Ltd*, 2003 ACompT6, Addendum, paragraph 47

Adjusted historical measures – treatment of unexpected returns or one-off events in historical data: arguments against adjustments to historical estimates

5.9 Should adjustments be made to historical excess returns to account for significant unexpected or one-off events?

This is answered jointly with Question 5.10 below.

5.10 If yes, are the adjustments proposed by Hathaway and by Hancock appropriate? If no, why? Are there any other relevant adjustments?

As discussed in section entitled *Estimates of the MRP*, above the best estimate of the forward looking MRP is the long term historical average difference between the return on a broad market portfolio over and above the risk-free rate.

Officer and Bishop make the point that the challenge with making adjustments of the type recommended by Hancock and Hathaway is that there is no real guiding theory or model that informs us as to what drives the determination of a MRP.[122] Consequently, there is no real way of assessing what is an event that might lead to a bias and this leaves an open question of how to assess what is a one off event and what is not.

For example, Hathaway estimated that over the 1980 to 1990 period the price earnings ratio increased from about 9 times to 17 times. This shift in the PE ratio therefore added 145 basis points to the 1965 to 2005 historical MRP. However, recent movements in the All Ordinaries PER has all but removed the increase in the PER.[123] This highlights the difficulty in identifying an 'event' that requires an adjustment or whether the observed phenomenon is simply the product of the volatility in market returns. There is always the possibility that the PER could move in the opposite direction.

The second issue with adjusting for one off events is that it leads to a loss of objectivity in the measures of the historical MRP. Note that Hancock and Hathaway each identify what they regard as upward bias in the MRP but provide no discussion of possible events that could bias the MRP downwards (save for the measurement problem arising from franking tax credits identified by Hathaway). There may well be many events that could be identified as 'once off' having either an upward or downward impact on the MRP. For example, one could argue that the 1987 crash or the introduction of capital gains tax are both 'once off' events that require an adjustment to remove the downward bias in the MRP.

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122 Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 14

123 According to CommSec the All Ordinaries PER is 10.96 as at the 22 August 2008.

Officer and Bishop state:[124]

> As noted by Gray and Officer, the MRP arises because there are unexpected economic events. The MRP is a 'reward' for bearing unexpected market wide risks. To exclude market wide events from the data set is to potentially exclude the events that give rise to it in the first place.

With no formal way to identify which events should be excluded the adjustments are by their very nature ad hoc and by themselves represent a source of potential bias. In addition, the use of a long sample period of 50 years, ie, 1958 to 2007 to estimate the MRP, means that a large number of positive and negative events have been considered.

Adjusted historical measures – evidence of a declining MRP

5.11 Is the MRP declining? What quantitative data or qualitative factors suggest that the MRP is, or is not, declining?

This is answered jointly with Question 5.12 below.

5.12 How should any decline affect the MRP the AER adopts?

The Joint Industry Associations summarise here the material that demonstrates that there has not been any decline, or if there has, it is temporary and is already well advanced in the process of reversal. The issue of how a decline would affect the MRP adopted only arises if there is a decline. The material referred to in the Issues Paper, upon a fuller examination, does not support the proposition that there has been a decline and so there should be no effect on the MRP adopted on the basis of that material.

From a review of the historical data it is readily apparent that the statistical precision of the estimates of the MRP is low given the high variability in returns on the market portfolio. As a consequence, historical estimates should use the longest possible period that reliable data is available. However, this comes at a cost in that a long term average may mask changes in expected returns.

Officer and Bishop illustrate that recent empirical data is not consistent with the AER's proposition on page 47 of the Issues Paper that the MRP has declined in recent years.

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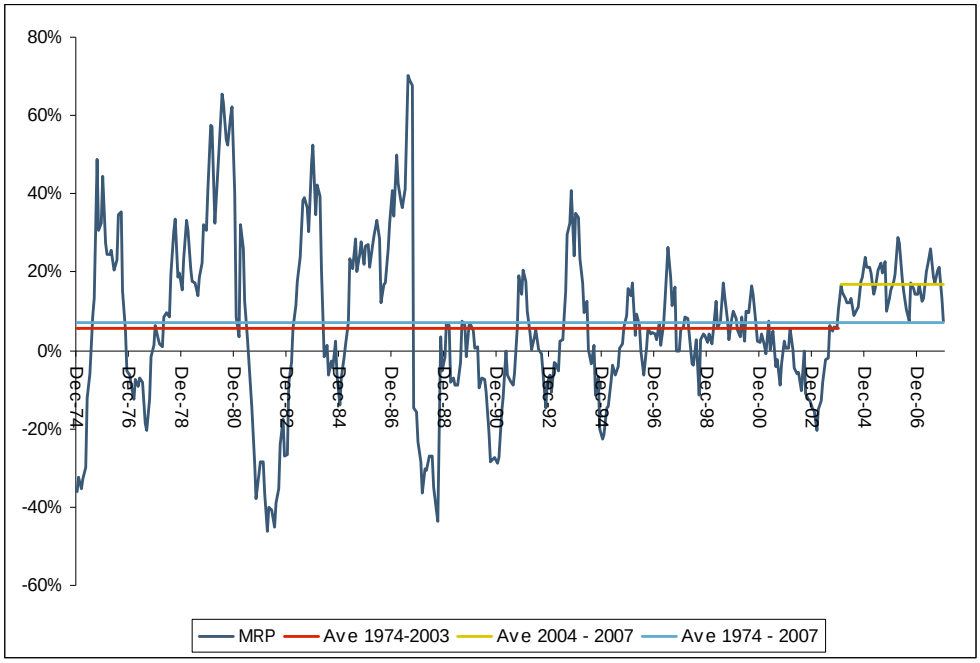
[124] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 39

Figure: Historical Market Risk Premia Post 1974, overlapping data



Source: Attachment F, Officer and Bishop, Figure 10.

One source cited by the AER to support the proposition that the MRP has fallen in recent years was a study by Hancock (2005). Hancock concluded that the use of a Hodrick-Prescott filter produced trend estimates that are strongly suggestive of a downward move in historical excess returns since the late 1950's.

However, Officer and Bishop have updated this analysis to include market returns in 2004 to 2007. They conclude that:[125]

> It is apparent from this update that the 'smoothed' MRP does continue the apparent decline in the data to 2003. The trend has moved back to a higher level as was predicted from recent MRP observations. The apparent downward trend in Figure 12 has been substantially reversed. Clearly this has been influenced by the strong performance of the stock market in recent years and the figure highlights the challenge in selecting an appropriate time series.

The AER also cite AMP Capital Investors who note that there are several qualitative factors suggesting the MRP may have fallen over time. This includes the reduction in business cycle volatility and improved regulatory control and legal protection for investors. The premise of these qualitative factors is that over time there has been a reduction in risk in the Australian market which in turn lowers the MRP. However, these are simply assertions and are not supported by empirical evidence.

[125] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 36

Officer and Bishop examined the issue of whether there has been a recent reduction in volatility in the Australian stock market. They concluded that over the long term there has been no demonstrable decrease in volatility and that on a 90 day based measure, it has increased recently.[126] Despite the recent increase they advocate a long term view on these measures.

Adjusted historical measures – interaction between MRP and gamma

5.13 How should historical excess returns be adjusted, if at all, to reflect the value of imputation credits, if using historical excess returns as a proxy for the MRP?

This is answered jointly with Question 5.14 below.

5.14 Is there an inconsistency between the values of gamma, MRP and the assumed tax rate of 0.50, 6.0 per cent and 30.0 per cent, respectively? If yes, how should this inconsistency be addressed?

The current practice of Australian regulators is to assume that shareholders of Australian regulated businesses have a positive value for imputation credits but to then assign a zero value for imputation credits in the estimation of the MRP. This is clearly inconsistent. A positive value for franking credits to the shareholders of regulated businesses should also be reflected in the value placed on franking credits distributed to the market as a whole.

When calculating a historical MRP the dividends paid to the market should be grossed-up to account for the value of imputation credits.

Officer and Bishop calculated the increase in the historical MRP by undertaking the following steps:[127]

1) An estimate of the dividend yield (di) component of the total or cumulative yield (ri) made of the capital yield (pi) plus the dividend yield for the period (i). The implicit company tax paid on this dividend is estimated ie, the dividend yield is grossed up (divided by 1.0 less the company tax rate ie, (1- Tc)) and then the tax component is estimated by multiplying the grossed up dividend by the effective company tax rate;

2) Since not all dividends are franked dividends, the proportion of franked dividends (fi) has to be estimated. Multiplying this by the implicit company tax paid on the dividend gives the 'effective tax' implied on the dividend;

3) Finally, since not all investors value imputation tax benefits once distributed at their 'face value', an estimate of the value – see Hathaway and Officer (2004) an estimate of the value (φ) implied by the market of a unit or $1 of franking credits must be estimated.

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[126] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, pages 31-32

[127] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 10

Table 5.4 tabulates their results showing the increase in the historical MRP if the market value of franking credits distributed is 0.5 or 1.0.

Table 5.4: Average historical MRP: Adjusted for Imputation Credits

Period		Market Risk Premium				
		φ = 0	φ = 0.5		φ = 1	
	Years		Adj.	With Imp	Adj.	With Imp
1998-2007	10	8.4	0.9	9.3	1.7	10.1
1988-2007	20	5.8	0.9	6.7	1.7	7.5
1978-2007	30	7.9	0.6	8.5	1.1	9.1
1968-2007	40	6.0	0.4	6.5	0.9	6.9
1958-2007	50	6.7	0.3	7.1	0.7	7.4
1948-2007	60	7.0	0.3	7.2	0.6	7.5
1938-2007	70	6.8	0.2	7.1	0.5	7.3
1928-2007	80	7.0	0.2	7.2	0.4	7.4
1918-2007	90	7.5	0.2	7.7	0.4	7.9
1908-2007	100	7.4	0.2	7.6	0.3	7.7
1898-2007	110	7.5	0.2	7.7	0.3	7.9
1888-2007	120	7.4	0.1	7.6	0.3	7.7
1883-2007	125	7.5	0.1	7.6	0.3	7.8

Source: Appendix G, Officer and Bishop, Table 7

Including imputation credits increases the long term historical MRP for the 1958 to 2007 period to over 7 per cent.

In chapter 8, the empirical evidence confirms that the value of gamma is low, and that correct interpretation of the data indicates a gamma value that is not materially different from zero. If the AER determines a zero value for gamma then the requirement to increase the MRP is removed.

However, if a 0.5 value for gamma is maintained, Officer and Bishop conclude that the MRP should be increased from 6 to 7 per cent:[128]

> The market risk premium of 6% was originally based on evidence that excluded any explicit consideration of a component to reflect any value of imputation tax benefits in the historical MRPs. Consequently the 6% can be viewed as an estimate of the MRP when this value is zero (the term 'gamma' is usually used to reflect the value of $1 of imputation tax benefits created by a firm however we are concerned with the value of a dollar of imputation tax benefits once distributed given that we are adjusting observed market returns). The inclusion of an estimate of the imputation tax benefits in the historical estimate of market equity returns forms the basis of our recommendation that the MRP be increased from 6% to 7% as qualified below.

The same proposition would apply if any material positive value were adopted for gamma.

[128] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, page 39

Survey measures

5.15 What weight should be given to surveys in estimating the MRP?

This is answered jointly with Question 5.16 below.

5.16 Are there particular surveys that should be considered? How should the AER determine which surveys to place greater weight on?

The low statistical precision of the historical MRP estimates mean that it is important to check the reasonableness of the resulting MRP estimate. Surveys can be a useful cross-check on the reasonableness of the estimated MRP.

Officer and Bishop reviewed a number of surveys and found that the MRP commonly falls in the range of 6 to 8 per cent.[129] Surveys reviewed included:

- Truong, Partington and Peat (2005);
- KPMG (2005) - review of independent expert reports; and
- Jardine Fleming Capital Partners Ltd (2001).

Officer and Bishop also recommend that Jardine Fleming Capital Partners Ltd (2001) data on the expected equity premium should be omitted because participants were asked the wrong question.

There is also an argument to place less weight on Independent Expert Reports as these are subject to potential litigation. Valuers' work is mindful that people who rely on valuations will often sue if the value is too high but are exceedingly unlikely to sue if the valuation is too low. Valuations that investors rely on are on occasion subject to litigation, consequently valuers naturally tend towards the lower end of the possible range of valuations. Because their valuations must be consistent, this affect applies to all valuations even where litigation is less likely. Even more than usual, in circumstances where there is high uncertainty, valuers tend to be conservative. Therefore their responses to any regulatory survey are likely to suffer a downward bias and be unsuitable for use in regulatory decision making.

Cash flow based measures

5.17 What weight should be given to cash flow based measures in estimating the MRP?

This is answered jointly with Question 5.18 below.

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[129] Officer B & Bishop S, *Market Risk Premium: A Review Paper* - Prepared for ENA, APIA and Grid Australia, August 2008, pages 16-18

5.18 Are there particular studies that should be considered? How should the AER determine which studies to place greater weight on?

Cash flow based measures of the MRP are generally based on dividend growth models (DGM). These models equate MRP as the expected market dividend yield plus expected growth in dividends less the risk-free rate.

A draw back of this approach is that the use of the expected market dividend yield means that the estimated MRP is subject to the volatility of the market. That is, if the market index falls all other things being equal, it implies an increase in the dividend yield in the market and the estimated forward MRP.

Officer and Bishop have provided information (see below) from Bloomberg with respect to forward based estimates of MRP. It is understood that Bloomberg is the only source of current forward looking estimates of the MRP in Australia. The Allen Consulting Group captured output from this service over time and this, along with a recent update, is reproduced below. Officer and Bishop have advised that there is no explicit consideration of imputation tax in these estimates.

Table 1: Bloomberg forward based estimates of MRP

Country	Market Risk Premium			
	2004	2006	2008	July 2008
Australia	4.5	4.9	7.9	8.6
Canada	6.6	6.6	7.8	6.8
United Kingdom	5.0	5.2	6.3	6.7
USA	5.1	4.5	6.8	6.9

Source: Attachment F Officer and Bishop, Table 1 which cites Allen Consulting Group and Bloomberg

The depth of long term forward information from financial analysts in Australia is substantially less available than that in other markets especially the United States where forward looking analysis is more common. The Joint Industry Associations understand that the single source of forward looking estimates means that the derived estimates are not consensus forecasts and are therefore less persuasive as a representation of the 'market' risk premium.

The high variability of forward looking estimates derived from discounted cash flow analysis, combined with the relative lack of depth in the market of analysts providing forward looking estimates, limits this method to that of a useful cross-check on the reasonableness of the estimated MRP.

Weighting different measures

5.19 What weight should be placed on each measure of the MRP raised in this paper? Should some measures be used as 'primary estimates' with other measures used as 'cross-checks'?

This is answered jointly with Question 5.20 below.

5.20 Are there any other ex post or ex ante measures of the MRP that should be considered?

The best and most objective estimate of a forward looking MRP relies heavily on historical data. Further, the variability in the historical market returns strongly supports the use of long term historical series. However, while data on the MRP is available from 1883 greater emphasis should be placed on the period from 1958 to 2007 because of the data issues identified by Brailsford et al.

Other estimates of the MRP, such as varying historical periods, surveys of market practitioners, forward looking estimates, or international comparisons are useful cross-checks on the estimated MRP given the low statistical precision of historical data.

6 Equity Beta

Introduction

Previously Adopted Equity Beta Values

The previously adopted value for beta for both transmission and distribution over the years that economic regulation has been performed is overwhelmingly 1.0. It is also unequivocally the previously adopted value in the NER for transmission, the transitional Rules for distribution in NSW and the ACT and for certain regulatory decisions for distribution.

It is noted in the latest regulatory reviews for a minority of distribution members, in a minority of jurisdictions, the regulator (or appeals body) has adopted a 0.9 for beta. Those 'outlier' decisions should not be regarded as 'previously adopted values' for the purposes of this Review.

However, *even if* 0.9 were the previously adopted values for those businesses (and the Joint Industry Associations do not agree with such an approach), the expert evidence provided with this submission demonstrates that a beta of less than one is a particularly uncertain statistic.

There is a significant risk that it does not provide those members with a reasonable opportunity to recover at least their efficient costs as required by section 7A of the NEL. Within the context of that entitlement, this expert evidence and the considerations arising from them amount to persuasive evidence that the betas to be applied to those businesses at their next reset need to be restored to the long run industry wide value of 1.0.

Also, inconsistencies between the betas applied to different electricity businesses may introduce distortions in the investment incentives within the national network or distortions in the market for investment funds. That would run counter to the need identified in the Overview to foster an environment that is conducive to critical electricity infrastructure investment. All members recognise the importance of the AER adopting a single consistent beta of 1.0. Therefore, 1.0 is the beta value that should be regarded as the previously adopted value for this review.

Equity Beta

Estimates of equity beta for Australian electricity transmission and distribution businesses, based on the best available data are subject to a very high degree of uncertainty. A key reason for the uncertainty is that there is only a very small sample of comparators and even these are imperfect comparators. Estimates can and do vary substantially from one measurement period to the next, underscoring the high level of imprecision in the estimates. To date, the extent of this problem and how to compensate for it has only been partially recognised.

A substantial amount of expert advice was obtained in the course of preparing this Joint Industry Associations submission:

- in light of the uncertain and sparse beta data, ACG has concluded that there is 'no convincing or persuasive evidence that the equity beta for a regulated electricity transmission or distribution business is different from 1.' This Joint Industry Associations submission concurs with ACG's conclusion.
- other experts have examined the limitations of the Sharpe-Lintner CAPM (the model mandated in the NER), and demonstrated that it underestimates the true cost of equity. To make a sound estimate of the return on equity in accordance with the requirements of the NER, the deficiencies of the Sharpe-Lintner CAPM must be recognised. This analysis lends further weight to the conclusion that in light of the uncertainty of the available data and the known limitations of the Sharpe-Lintner CAPM the best estimate of equity beta is 1.

In summary, there is no persuasive evidence to adopt an equity beta value other than 1.0 if the equity beta to be adopted is to comply with the requirements of the NER and the NEL. In fact 1.0 remains the best estimate for the equity beta for regulated Australian electricity transmission and distribution businesses given the limitations of the data and estimation methodology, and the deficiencies of the Sharpe-Lintner CAPM.

The NER requires that the equity beta chosen must result in a forward looking rate of return that is commensurate with the prevailing conditions in the market for funds and the risks in providing prescribed services. Moreover, the NER requires that there be persuasive evidence before adopting a value that differs from that previously adopted. However, the forward looking equity beta is not a value that can be determined with any great certainty.

The key issues for consideration in establishing a value for beta are:

1. The previously adopted equity beta for electricity transmission is 1.0. This is also unequivocally the previously adopted value under the NSW and ACT transitional arrangements and the last Victorian decision. Recent 'outlier' decisions, in which 0.9 was applied to a minority of distribution members, is still not a basis for the beta to be regarded as anything other than the 1.0 that has applied over a long period. An equity beta of 1.0 has also been the norm for regulated electricity distribution businesses since around 2000. There are no sound reasons to adopt different beta values for different Australian jurisdictions, or for electricity transmission and distribution.

2. Empirical analysis should, ideally, be used to derive an estimate of the equity beta. However, such an estimate should be based on a sound understanding of the issues associated with beta measurement, and should not be based on a mechanical application of statistical techniques. Furthermore, limitations of the data must be understood and informed judgement must be applied to derive a valid and fit-for-purpose estimate of the equity beta, in accordance with the requirements of the NER. This requires a sound understanding of both financial economics and statistics.

3. When the data is uncertain and inconclusive, cross-checks of the results of empirical analysis of the equity beta should be undertaken to ensure:

    - the decision is consistent with furthering the National Electricity Objective; and

    - the purpose of the Revenue and Pricing Principles and the Review are achieved. In particular, the latter including that all network businesses should be provided with a reasonable opportunity to recover at least their efficient costs.

4. An understanding of the theoretical underpinning of the CAPM is essential to ensure that the decision about the equity beta meets the requirements of the NEL and NER. In particular this requires an understanding of the limitations of the version of the CAPM in the NER (ie, the Sharpe-Lintner CAPM) and how to address these limitations in the context of the NER.

5. If empirical evidence is not sufficiently robust then other factors should also be considered. These other factors relate principally to the desirability of maintaining a stable and predictable regulatory regime which provides incentives for adequate on-going investment in long-lived infrastructure assets. The provision of such a regime is consistent with the national electricity objective, the revenue and pricing principles in the NEL. The provision is also consistent with the more detailed principles espoused by the Expert Panel on Energy Access Pricing in its December 2005 report, and by the AEMC in its 16 November 2006 Rule Determination in relation to the specification of certain WACC parameter values.

Based upon the advice of its experts, namely, the Allen Consulting Group (ACG), SFG Consulting and the Competition Economics Group (CEG), the Joint Industry Associations submit that there is a lack of empirical evidence to provide anything other than a low level of positive certainty as to the appropriate value of an equity beta for Australian electricity infrastructure. Moreover, the equity beta which is to be determined by the AER must meet the requirements of the NEL and NER, so any estimate derived from empirical evidence must take into account the limitations of the Sharpe-Lintner CAPM.

Although there is a low level of positive certainty as to the appropriateness of a particular equity beta, there is no persuasive evidence that a beta of less than 1.0 is appropriate. The expert evidence explains that there is an acute risk associated with 'sub-1' betas as the business concerned will not have a reasonable opportunity to recover at least its reasonable costs.

The analysis summarised below and set out in the accompanying reports demonstrates that the best estimate of the equity beta value for regulated electricity transmission and distribution businesses is 1.0. There is no persuasive evidence to change from the current value of 1.0.

The Concept of the Equity Beta

The equity beta is a major parameter in the estimation of the required return on equity under the Sharpe-Lintner CAPM. In the Sharpe-Lintner CAPM the equity beta is expressed as a positive value that quantifies the risk of a stock relative to the market. That is, it measures the degree to which a stock's returns move with the rest of the market. The equity beta of the market as a whole is 1.0.

In considering the market beta it should be recognised that the equity beta of the market is 1.0 at a gearing of approximately 30 to 35 per cent. If the assumed gearing of a regulated business was set to the market average of 30 to 35 per cent debt, the equity beta of the regulated business is estimated to be approximately 0.6.[130] That is, at the level of gearing consistent with the market beta the electricity transmission and distribution networks already have a low equity beta.[131]

Thus in considering equity beta it needs to be recognised that there are two considerations. First asset risk, which is relatively low compared to the market, and second, financial risk which is relatively high compared to the market, due to gearing. Any consideration of an equity beta outcome in the context of the market should take into account both the asset risk and the financial risk. In particular it should explicitly be recognised that any adjustment of the equity beta is implying a change in the asset risk or a change in the financial risk.

More formally, the equity beta is one of three parameters using the Sharpe-Lintner CAPM for determining the cost of equity. The Sharpe-Lintner CAPM is the original and most widely recognised version of the CAPM and is the version of the CAPM required to be applied under the NER. It is set out as follows:

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

Where:

r_f = the nominal risk-free rate of return;

β_e = the equity beta; and

MRP = the expected market risk premium.

The role of the CAPM is to estimate the 'forward looking rate of return that is commensurate with the prevailing conditions in the market for funds and the risks in providing prescribed …… services'[132] in respect of returns on equity. This means that the equity beta determined by the AER must be one that - together with the MRP and risk-free rate - provides a correct estimate of the market's required return on equity at the present time and into the future.

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130 This is based on an internal Joint Industry Associations estimate using the Monkhouse delevering approach.

131 An alternative way of viewing this is if a firm which had the market gearing and the market equity beta was re-geared to be 60% debt funded this firm's equity beta would be 1.6.

132 NER, version 21, 1 July 2008, clauses 6.5.4(e)(1) and 6A.6.2(j)(1)

The Previously Adopted Equity Beta Values

The NER requires that there be persuasive evidence before adopting a different value to the previously adopted value.

For electricity transmission businesses the equity beta value is deemed by the NER to be 1.0.[133]

The value of equity beta for distribution is not explicitly set out in the NER. However, an equity beta of 1.0 has been accepted as the 'norm' for electricity distribution businesses since about 2000. As ACG note:[134]

> A beta of 1 has been the 'norm' for the equity beta for a regulated electricity transmission or distribution business over the period since about 2000, and since that time the majority of regulatory decisions for electricity transmission and distribution businesses have adopted an equity beta of 1.

Table 6.1 sets out the values for equity beta currently adopted for electricity distribution network service providers.

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133 NER, version 21, 1 July 2008, clause 6A.6.4 (a)

134 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, page 2, attached to this submission as Appendix H.

Table 6.1: Adopted values for electricity distributors – Equity Beta[135]

Jurisdiction	Distribution Network Service provider	Previously Adopted Beta
Australian Capital Territory	ActewAGL	1.0
New South Wales	Country Energy	1.0
	EnergyAustralia	1.0
	Integral Energy	1.0
Queensland	ENERGEX	0.9
	Ergon Energy	0.9
South Australia	ETSA Utilities	0.9
Tasmania	Aurora Energy	0.9
Victoria	AGL Electricity	1.0
	CitiPower	1.0
	Powercor	1.0
	SP AusNet	1.0
	United Energy	1.0

It should be noted that the Issues Paper (Table 4.1[136] page 54) indicates that ETSA Utilities has an equity beta of 0.8. On appeal this equity beta was increased to 0.9 and there is no basis for the 0.8 number which was overturned, to have any relevance in this review.

It is also noted that the Issues Paper lists WACC parameters adopted in decisions relating to gas networks,[137] however, these are not previously adopted parameter values for the purpose of the AER's review.

In the case of electricity distribution, three jurisdictional regulators have most recently adopted an equity beta of 1.0 in their decisions.

In the latest regulatory reviews for a minority of distribution members, in a minority of jurisdictions, the regulator (or appeals body) has adopted a 0.9 for beta. Those 'outlier' decisions should not be regarded as 'previously adopted values' for the purposes of this Review because (as set out in the above discussion in this Chapter) the only true 'previously adopted value' for the distribution sector is 1.0.

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135 See Gilbert + Tobin Legal Opinion attached as Appendix B

136 The Issues Paper contains two tables labeled 'Table 4.1'. This reference refers to the latter of these tables, on page 54.

137 While the Joint Industry Associations consider gas businesses are a reasonable comparator in some circumstances, they should not be viewed as a perfect comparator. For example many gas pipelines are not price or revenue regulated and / or serve end use markets with distinctive characteristics such as power generation or mining sites.

However, *even if* 0.9 were the previously adopted values for those businesses (and we do not agree with such an approach), the expert evidence provided with this submission demonstrates that a beta of less than one is a particularly uncertain statistic.

SFG Consulting has also turned his mind to the specific issues facing these businesses and has concluded:[138]

> …I also demonstrate that the further an equity beta estimate is below 1, the more likely it is to have been negatively affected by estimation error. This occurs even if the estimation error is completely random and symmetric.[139] Moreover, the further the equity beta estimate is below 1, the more likely it is to be negatively biased. Consequently, if an equity beta estimate below 1 is used to determine the regulatory return, there is a greater than 50% chance that the regulatory return will be insufficient for network service providers to recover at least the efficient cost of capital employed.

In other words, there is a significant risk that it does not provide those members with a reasonable opportunity to recover at least their efficient costs as required by section 7A of the NEL.

Within the context of the section 7A entitlement to a reasonable opportunity to recover efficient costs, this expert evidence and the considerations arising from them amount to persuasive evidence that the betas to be applied to those businesses at their next reset need to be restored to the long run industry wide value of '1'.

A further problem arises if some firms have a 0.9 which is that consistency is undermined and distortions could arise in investment incentives in different parts of the national network or there could be distortions in the market for investments funds. Both these issues would run counter to the need discussed in the Overview for fostering an appropriate environment for critical infrastructure investment.

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138 SFG Consulting, *The reliability of empirical beta estimates*, September 2008, page 5, attached to this submission as Appendix I.

139 A symmetric estimation error is one that is equally likely to cause the estimate to be above or below the true value.

Background and Context to Estimation of Betas in Australian Energy Infrastructure Regulation

> Estimation of equity betas for the purpose of energy infrastructure regulation in Australia has been problematic due to the small sample sizes of comparator firms and the relatively short timeframes these comparator firms have been listed. To date, the extent of the problem and how to compensate for it has only been partially recognised.

Before turning to the specifics of the energy industry, it is worth noting two broader, market wide statistics that put the energy discussion in context:

- the market as a whole has an average beta of exactly 1.0 by definition; and
- if a notional representative firm which had the current average market gearing and the market equity beta of 1.0 was re-geared to be 60% debt funded this firm's equity beta would be 1.6. This demonstrates the impact benchmark gearing has on risk.

It may be that electricity network businesses have been regarded as low risk and this explains why regulatory precedent has been so very much lower than the market equivalent for the relevant assumed gearing level. In the discussion below, it is important to remember that the lower historical risk of electricity companies is already taken into account in adopting a level of 1.0 rather than 1.6.

We now turn to the specific history of that regulatory precedent.

In making a decision as to the correct value for the equity beta in the context of the AER's current review it is essential to gain a perspective on the history of the estimation of equity betas in Australian energy infrastructure regulation, which has led to the current regulated values. A more detailed outline of the previous use of CAPM and estimation of equity betas in Australian energy infrastructure regulation is contained in Attachment A.

The WACC and CAPM were first used in the mid-1990s by the Victorian Office of the Regulator-General (ORG) and the Independent Pricing and Regulatory Tribunal (IPART). However, the first high profile debate on these issues occurred in 1998 at the time of the first access arrangement reviews of the Victorian gas distribution networks and the Victorian gas transmission system, by the ORG and the ACCC respectively.[140]

[140] The outcomes of the debate may be found at ACCC Final Decision Access Arrangement by Transmission Pipelines Australia Pty Ltd and Transmission Pipelines Australia (Assets) Pty Ltd for the Principal Transmission System 6 October 1998 pp 46-59

These two reviews and the reviews that followed up until 2001 relied solely on international benchmarks of asset betas. It should be noted that in using those benchmarks the ACCC determined an asset beta of 0.55 and a 60% geared equity beta of 1.2. This use of international benchmarks was because of the dearth of Australian benchmarks. At that time AGL was the only equity that could be considered.

The ORG did seek to apply Australian comparables in the 2001 Electricity Distribution Price Review, but was left with only three - two of these provided no more than three years of data. The ORG determined an equity beta for the distribution electricity businesses of 1.0 and recognised the issue of reliability of the Australian equity beta estimates.

Following this was a report by ACG for the ACCC in 2002. By this time there were four Australian comparables and again the data series was very short for the majority of the comparables. Notably the data for the new comparables was from the period of the now well recognised 'technology bubble'. ACG's opinion was that Australian market evidence implied an equity beta of 0.7.[141] However ACG recognised the issue of reliability of Australian data and recommended the ACCC adopt an equity beta of 1.0. ACG also forecast improving reliability of the market data, on the assumption that a larger time series and more comparables would be available. In more recent work ACG has indicated that these expectations for improvements in data have not been realised.[142]

The next report undertaken by ACG was in 2004 when ACG undertook similar analysis to the 2002 report but had increased the number of comparables, and also gave consideration to the 'technology bubble'. Similar to its 2002 report ACG indicated that equity betas were measured at approximately 0.7, but ACG again identified that the uncertainties in the data led it to conclude that the best estimate was 1.0.[143]

These reports were a key reference point for the ACCC in the development of its Statement of Regulatory Principles for electricity transmission.

During the 2005 Victorian Electricity Distribution Price Review a report by Gray et al[144] provided a comprehensive discussion on techniques to improve the reliability of estimates. Gray et al demonstrated that datasets should be at least 7 to 10 years long, and that the best approach was to adopt an assumption of an equity beta of 1.0 unless the Blume adjustment was applied. Gray et al demonstrated very clearly that beta estimation is subject to considerable uncertainty even when using a pooled industry technique.

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141 ACG, *Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities*, 2002, page 42

142 ACG's reflects on how their expectations have not been realised in their most recent report 'Beta for regulated electricity transmission and distribution' September 2008, page 6

143 ACG, *Queensland Distribution Network Service Providers Cost of Capital Study*, December 2004, page 52

144 S. Gray, Hall, Bowman, Brailsford, Faff, Officer, *The performance of alternative techniques for estimating equity betas of Australian firms*, May 2005, pages 23-25

For the most recent regulatory review ACG only provided an analysis of equity beta estimates for use by the ESC. ACG[145] recognised that they were engaged to provide analysis and had not been asked to advise on the most appropriate equity beta. As such the results are perhaps best characterised as a summary of outcomes, rather than as a recommendation. In undertaking this analysis ACG[146] used most of the techniques proposed by Gray et al which demonstrated some of the uncertainties around equity beta estimates.

Following this ACG report SFG Consulting[147] provided a report that investigated the issues with the data that provided a foundation for understanding the uncertainty and unreliability of the equity beta estimates. It showed that in spite of the 95 per cent confidence intervals calculated by ACG, proper recognition needed to be made of the unreliability of the results and associated uncertainty.

The Joint Industry Associations are concerned that despite the work of Gray et al, and the report by SFG Consulting for the Victorian Gas distributors[148] which highlights the statistical uncertainties surrounding the beta estimates there continues to be little recognition that deriving an accurate estimate of equity beta from Australian and international data is a problematic exercise. The focus of many, especially regulators, to find the 'right' answer has tended to cause a loss of perspective about the quality of the available information and what may be meaningfully deduced from it.

As a result, the Joint Industry Associations consider it is important that the Review of WACC parameters be used to adopt a fresh perspective in assessing how the data and analyses can be meaningfully and correctly interpreted.

Current Estimates of Beta

> Estimates of the equity beta for Australian electricity transmission and distribution businesses, based on the best available data - which consists of a small sample of imperfect comparators - are subject to a very high degree of uncertainty. Estimates may vary substantially from one measurement period to the next, underscoring the high level of imprecision in the estimates.
>
> Given its soundly-based concerns about data reliability, and the observed increase in its most recent beta estimates, ACG concludes that there is no convincing or persuasive evidence that the equity beta for a regulated electricity transmission or distribution business is different from 1.

In the Sharpe-Lintner CAPM the beta parameter compensates an investor for the non-diversifiable risk of an investment.

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145 ACG, *Empirical evidence on proxy beta values for regulated gas distribution activities*, June 2007 page 25

146 ACG, *Empirical evidence on proxy beta values for regulated gas distribution activities*, June 2007 pages 6-8

147 SFG Consulting, Equity beta estimates for Victorian gas distribution businesses: A report for Envestra, Multinet and SP AusNet, October 2007.

148 SFG Consulting, *Equity beta estimates for Victorian gas distribution businesses*, October 2007

The Overview to this submission explains that going forward there are unprecedented risks facing the electricity industry arising from the new challenges of climate change and the likely reconfigurations that will be required. Risks of this magnitude have probably never been faced by the electricity network industry before. Nevertheless, at this stage the Joint Industry Associations continue to support the derivation of a beta based on a cautious evaluation of past data.

The Joint Industry Associations consider, though, that the approach should be to err on the side of a higher rather than a lower beta when the data does not deliver a certain result.

Broadly then, beta is estimated by examining how the return of an asset, such as a share, has varied in the past, relative to the variations in the returns for the market for assets. This broad approach assumes that in deriving a forward looking beta, the past is an appropriate indicator of the future.

More technically, the beta is the expected covariance of the return on an asset with the return on the market portfolio of assets, divided by the expected variance of the market portfolio of assets.

It is not always understood that measuring beta is a process with a number of statistical and conceptual difficulties.

Despite the difficulties associated with estimating an equity beta the Joint Industry Associations recognise that for the AER to perform its role in determining the value of equity beta in accordance with the NER it is necessary that the market data be analysed as thoroughly as possible to derive estimates of equity beta within the limitations of the data. In light of this requirement the Joint Industry Associations requested ACG[149] to provide estimates of the equity beta for an Australian regulated electricity utility which is assumed to be geared with 60 per cent debt for the purposes of this Review.

ACG concludes that the statistical range for a 60 per cent levered equity beta for an Australian regulated electricity utility cannot be demonstrated persuasively to be different to 1.0.[150] This conclusion recognises the considerable uncertainty about the 'true' or 'best' value of the equity beta. In particular ACG notes:[151]

> … In the time that we have been advising on equity betas for regulatory purposes, the reliability and stability of the beta estimates in Australia has remained depressingly poor, notwithstanding our predictions that the situation would improve.

149 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008

150 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, pages 57

151 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, page 6

A key part of ACG's conclusion is:[152]

> There is a great deal of uncertainty about the equity beta for regulated electricity transmission or distribution business that is currently expected by the market, which makes it difficult to form a strong view about what is the best estimate of the equity beta. The estimation of beta for the Australian energy sector has been hampered by a paucity of data over a longer period, but the material rise in the estimates of beta observed for the Australian portfolio data since our last report in 2007 due to the addition of 16 months of extra data gives even greater cause for concern about the reliability of the estimates that previously existed.

It is reasonable to place some weight on betas from other comparable nations such as the US while recognising there are problems in comparing betas from one nation to another. ACG identify several potential issues with applying US data to draw conclusions about Australian betas and[153] attempt to address these by adjusting for different weights of market sectors and different gearing levels and testing if differences in regulatory approaches will impact on outcomes.

While using US comparators ACG's[154, 155] analysis is largely based on the limited number of available Australian comparables, each of which suffers from problems to differing degrees. These problems include:[156]

- being a gas transmission and/or distribution business;
- having a short listing period;
- being subject to an acquisition or undertaking an acquisition or acquisitions;
- including non-Australian businesses; and
- including non-regulated or non-infrastructure businesses such as electricity generation and energy retailing.

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152 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, page 57

153 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, pages 16-17, pages 37 -40

154 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, pages 20-21

155 The gas businesses represented in this submission support the use of their data as a source of insights into energy company risk profiles in the manner undertaken by ACG. However, it is also important to note that there are particular gas pipeline investments which can deviate significantly from the benchmark to be adopted for electricity where the particular circumstances of the pipelines warrant it.

156 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, pages 20-21

ACG reviews the major methodological (including most of the issues raised in Gray et al's report) issues in estimating betas covering:

- the techniques to estimate beta which deal with the problems of outliers;
- the period of data;
- the adjustment for leverage;
- the response to unusual events. Consistent with its previous reports ACG has identified the 'technology bubble' period from approximately 1998 to 2001 – as significantly distorting estimates of the equity beta during this period;
- the use of adjustments to improve the precision of estimates; and
- the tests/adjustments for comparability of US and Australian data.

In deriving estimates for a forward looking equity beta for Australian electricity infrastructure businesses ACG derived estimates for historical equity betas for nine Australian and twenty one US firms at an assumed 60 per cent gearing.

ACG also estimated 95 per cent confidence intervals for individual businesses using an accepted technique for combining confidence intervals for the pooled estimates. 95 per cent confidence intervals describe the range within which an estimate has 95 per cent probability of being a correct estimate. Outside this range there is a 5 per cent or less probability that an estimate could be correct. However, this is based on the assumption that the normal distribution estimated from the data is an accurate reflection of the actual distribution that represents the true equity beta. Where data is sparse and unreliable this assumption is unlikely to be correct. As a consequence the confidence intervals are less likely to be representative.

In addition SFG Consulting has identified that confidence intervals generally understate the true uncertainty surrounding beta estimates as they do not account for uncertainty surrounding relevering, gearing and whether the firms are appropriate comparators.[157] (Confidence intervals effectively assume that these items are known with certainty). As such confidence intervals would need to be widened to take account of such uncertainties.

[157] SFG Consulting, *The reliability of empirical beta estimates*, September 2008, page 27

ACG's summary of the estimate results is set out in the table below:[158]

Data source	Current estimates to May 2008	No of firms with a 95% confidence level >= 1.0	Estimates to Jan 2007	No of firms with a 95% confidence level >= 1.0
Australian Firms (longest period)	0.7 – 0.9	4	0.6 – 0.7	1
Australian Firms (recent period)	0.65	n/a	0.2 – 0.4	0
US Firms (longest period)	0.5 – 0.7	0	0.4 – 0.6	0
US firms (recent period)	0.7 – 1.1	All	0.5 – 0.8	2

These results show that using Australian firm data over the longest term available gives an estimate of an equity beta in the range of 0.7 - 0.9,. If one wanted 95 per cent confidence that a value of 1.0 was not a reasonable estimate, in four cases out of nine this would not be possible. An equity beta of 1.0 would therefore have to be included as a possible estimate.

If we use just the most recent five years, (which includes the commodities boom), the estimate is 0.65 with the 95 per cent confidence intervals exceeding 0.9 to 1.0. This appears to imply that equity betas over the period of the commodities boom are lower than historically measured.

In comparison US equity beta estimates over the longer period are in the range 0.5 – 0.7 and 95 per cent confidence intervals do not include an equity beta value of 1.0. However, US equity betas for the most recent 5 years (where the US market has not experienced a commodities boom) are higher at between 0.7 – 1.1 and all confidence intervals include 1.0.

ACG compare the results from their 2008 analysis to their 2007 analysis and note the marked change in the results. This leads ACG to conclude;[159]

> the fact that the estimates of betas for similar or the same firms can change so materially in such a short period underscores the high degree of imprecision of estimates of beta. It also underscores the inadequacy of traditional measures of statistical precision to account fully for the uncertainty in beta estimation.

Overall ACG note that an equity beta of 1 is within the 95 per cent confidence interval in a significant proportion of the equity beta estimates. Given the level of uncertainty about the equity beta, the paucity of data over a long period and the material rise in the beta estimates since 2007, ACG conclude that there is no convincing evidence the equity beta is different to 1.0.[160]

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158 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, pages 55-57

159 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, page 56

160 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, page 57

The Joint Industry Associations agree with ACG's conclusions. Indeed, this concern has been present for quite some time. ACG's analysis demonstrates the paucity of data available in the Australian equities market for strongly comparable businesses with a sufficient trading history to allow the analysis of the comparators to be reliable and robust.

Reliability of Beta Estimates

Examination of the statistical methods used in relation to estimating equity betas shows that:

- there is a strong likelihood of a downward bias in equity beta estimates derived from the available data; and
- confidence intervals cannot be applied mechanically to correctly assess the level of uncertainty of an equity beta estimate, and in fact they must be widened.

Given these considerations, it would be misleading, if not dangerous, to rely on beta estimates derived from the available data without taking into account the analysis of SFG Consulting, which demonstrates clearly that:

- central estimates of equity beta have to be adjusted upwards; and
- confidence intervals must be widened.

SFG Consulting's analysis confirms that having regard to the high level of uncertainty of beta measurement, a beta estimate of 1.0 is a reasonable best estimate.

The issue of the reliability of beta estimates for Australian energy infrastructure companies, and in particular the meaningfulness of confidence limits is identified in the ACG report.[161] The ACG report makes some important observations in relation to this matter, as follows:

- there is a difference between *expected* and historically *measured* equity betas. As a result current equity betas may be a poor representation of future equity betas. This is particularly important in the context of the current review as the cost of capital derived in the current review will be applied in a forward looking approach; and
- variations in levels of market volatility may affect actual equity betas or may reflect a broader market condition such as the commodities boom, which has the effect of biasing betas for utility investments downwards.

[161] ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, pages 56-57

On this issue ACG concludes:[162]

> In our view, a proper assessment of the true level of uncertainty in beta estimates needs to take account of the potential for the change in the mix of macroeconomic events between periods to have a material effect on beta, which implies the true level of uncertainty would be materially higher than what is implied by statistical confidence intervals.

In order to reach a better understanding of the reliability of the beta estimate and the meaningfulness of calculated confidence intervals the Joint Industry Associations sought advice from Stephen Gray of SFG Consulting – financial economist and econometrician. In particular, the Joint Industry Associations sought an explanation about the usefulness and interpretation of calculated confidence intervals, particularly where r-squared statistics are low. The SFG Consulting report provides considerable insight into the issue of the reliability of the equity beta that has been an ongoing concern in the derivation of reliable equity beta estimates for regulated Australian energy infrastructure since the late 1990s.

Firstly the SFG Consulting report provides an explanation of the relationship between the r-squared statistic and the reliability of equity beta estimates.[163] What SFG Consulting demonstrates is that r-squared statistics provide a measure of the 'signal-to-noise ratio' in a set of data. That is, in relation to beta data, it is a measure of how much of the variation in the returns on the specific equity can be explained by changes in market returns. The lower the value of r-squared the less the 'signal' can be clearly heard through the 'noise', and the less the regression estimate (ie, the estimate of the b) provides a reliable reflection of the true correlation (or actual beta).

Not only does a low r-squared statistic indicate an unreliable estimate of beta, but it also indicates that the beta estimate is likely to be downwardly biased. This is demonstrated very powerfully through a simulation. The simulation process shows a significant downward bias when the r-squared statistic is low (10 per cent or less).

SFG Consulting also demonstrates this point using a very clear example of this bias with a correlation of the r-squared statistic with beta estimates using AGL's long data series.

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[162] ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, page 57

[163] SFG Consulting, *The reliability of empirical beta estimates*, September 2008, pages 9-19

In addition, SFG Consulting shows that there is another source of inherent biases in beta estimates.[164] That is, where actual betas differ significantly from the market average (ie, an equity beta of 1.0), the error in beta estimates is magnified. For example, when ranked on the basis of equity beta estimates:[165]

- the group of stocks with the lowest beta estimates had a mean beta estimate of -0.66 whereas the mean actual beta for this group was 0.53; and
- the group of stocks with a mean beta estimate of 0.64 had a mean actual beta of 0.90.

As a consequence where the equity beta estimates differ materially from 1.0 the probability of bias from the true beta increases the further away it is from 1.0. The numbers in the example show that even for a beta estimate as high as 0.64 the true beta is in fact likely to be 0.90. This becomes very marked as the actual beta moves from 1.0 such that low and even negative beta estimates of -0.66 would imply a true beta of 0.53.

Importantly, SFG Consulting provides insight into the appropriate use of confidence intervals.[166] Firstly, in using confidence intervals, an understanding of the quality of the data is required. In the case of the data available for Australian energy infrastructure businesses SFG Consulting highlights the issues associated with:

- the non-ideal nature of many of the comparators;
- uncertainties about relevering procedures; and
- uncertainty about the correspondence between benchmark credit rating assumptions and benchmark gearing assumptions.

As identified in SFG Consulting's analysis in the report in respect of bias, confidence intervals do not overcome or take into account statistical bias or periods of non-representative data. In particular, SFG Consulting illustrates how much confidence intervals can shift for the same business, so that they do not overlap even though significant portions of the data overlap.

Confidence intervals can only reflect the data used to estimate them. To the extent that there is a small data set (ie, a small number of observations) the estimated confidence intervals are less likely to reflect the true range of confidence for an estimate. Consequently, with the sparse data available for Australian beta estimates the calculated confidence limits provide an inaccurate guide as to the true confidence limits for the beta estimates.

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164 SFG Consulting, *The reliability of empirical beta estimates*, September 2008, pages 20 - 26

165 SFG Consulting, *The reliability of empirical beta estimates*, September 2008, table 3 page 22

166 SFG Consulting, *The reliability of empirical beta estimates*, September 2008, pages 25 - 27

In summary, confidence intervals cannot be applied mechanically to correctly inform the level of uncertainty of a beta estimate.

Overall SFG Consulting concludes that the calculated confidence intervals (and therefore the central equity beta estimates) should not be applied to the CAPM directly, but they must be adjusted.

In the absence of defined techniques to provide the adjustment, Gray makes the following conclusions about use of calculated confidence intervals for Australian beta estimates. SFG Consulting concludes equity beta confidence intervals must be:[167]

- widened to take account of:
  - uncertainties related to the input data; and
  - the representativeness of data periods;
- shifted upwards to account for statistical bias that results from both 'noise' and symmetric estimation error where estimates are less than 1.0; and
- afforded little weight if:
  - r-squared statistics are low;
  - beta estimates vary widely across firms;
  - beta estimates vary widely across time; or
  - the final estimate of the cost of equity is economically unreasonable.

The analyses described in each section of SFG Consulting's report provide guidance about the level of adjustment that may be required.

Together, ACG's report on beta estimates and SFG Consulting's report on the reliability of beta estimates provide significant insights into the estimates of beta that can be made from Australian data. The reports confirm that, prima facie, measurements indicate a range for central estimates of beta of 0.7 – 0.9, with confidence intervals between 0.4 and 1.2. However, it would be misleading to rely on these figures. Better indications which take into account the issues raised by SFG Consulting would see the central estimates higher and the confidence intervals increased. Given the statistical issues described in this section it is clear that an adjusted estimate must be made. Moreover, there is by no means persuasive evidence that the currently adopted value of 1.0 is incorrect let alone sufficient evidence to support a value less than 1.0. The adjustment proposed by SFG Consulting to remove the symmetric estimation error and statistical bias provides additional support to an equity beta estimate of 1.0.

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[167] SFG Consulting, *The reliability of empirical beta estimates*, September 2008, page 33

Alternative Methods for Estimating the Return on Equity

> In mid 2008 the cost of equity based on current NER parameters (including a beta of 1.0) was lower than investors' cost of equity as shown by dividend growth expectations. This supports the view that the market expectations for cost of equity for regulated energy businesses are higher than the regulatory cost of equity as derived from Sharpe Lintner CAPM.
>
> In particular at an MRP of 6 per cent an equity beta of above 1.2 is implied, or alternatively at an equity beta of 1.0 a MRP of above 7 per cent is implied.

There is mounting evidence, that applying an equity beta of less than 1.0 results in a return on equity that is materially less than that required by the market.[168] This empirical evidence about required returns on equity is supported by a strong theoretical and empirical understanding of the inadequacies of the Sharpe-Lintner CAPM.

When regulators adopted equity beta values of 1.0, the inadequacies of the Sharpe-Lintner CAPM did not emerge. It is only when regulators adopted equity betas materially less than 1.0 that the inadequacy of the Sharpe-Lintner CAPM has become evident and the need to better understand its shortcomings has become particularly relevant.

A key piece of evidence in relation to required rates of return for energy infrastructure businesses is analysis using the dividend growth model (DGM) by the Competition Economics Group (CEG) in its attached report.[169] The DGM analysis demonstrates that current expectations of returns on equity are 12.7 to 17.3 per cent. This is higher than the return on equity of 12.5 per cent predicted by the CAPM using an equity beta of 1.0 and a MRP of 6 per cent.[170]

The lower end of this range of return on equity expectations, being 12.7 per cent, is based on a scenario where dividends are expected to fall by 2 per cent per annum post 2012. This implies that either:

- in order to make the observed price of equity consistent with the assumed cost of equity (using current NER parameter values) dividends should fall by more than 2 per cent per annum post 2012; or
- the cost of equity (using current NER parameter values) was, during the sampling period in mid 2008, below the market discount rate.

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[168] Examples include:

- CEG, *Estimating relative risk in the market for funds*, October 2007;
- NERA, *Equity Beta for Gas Distribution*, October 2007; and
- CEG, *An analysis of implied market cots of equity for Australian regulated utilities*, September 2008.

[169] CEG, *An analysis of implied market cost of equity for Australian regulated utilities,* A report for the APIA, ENA and Grid Australia, September 2008, which is attached to this submission as Appendix J

[170] See CEG, *An analysis of implied market cost of equity for Australian regulated utilities* A report for the APIA, ENA and Grid Australia, September 2008, page 5, Table 2

Another way of considering this issue is to:

1. estimate the equity beta needed to meet market return on equity expectations (assuming all other NER CAPM parameters were held constant at their current levels).

   In this case the CEG analysis shows that the equity beta needed is in the range 1.05 to 1.81, where the lower end of this range is based on a scenario where dividends are expected to fall by 2 per cent per annum post 2012.

   A scenario of zero per cent dividend growth implies an equity beta of 1.24.

2. estimate the MRP needed to meet market return on equity expectations (assuming all other NER CAPM parameters were held constant at their current levels).

   In this case the CEG analysis shows that the MRP needed is in the range 6.3 to 10.8 per cent. The lower end of this range is based on a scenario where dividends are expected to fall by 2 per cent per annum post 2012.

   A scenario of zero per cent dividend growth implies a MRP of 7.4 per cent.

These results are tabulated below in Table 6.2.

Table 6.2: Results of CEG's Analysis of Domestic Dividend Growth Models

	Growth Scenarios					
Parameter Scenarios	**NER Parameters**	**GDP (5.5%)**	**Inflation (2.5%)**	**Zero (0.0%)**	**Negative 1%**	**Negative 2%**
Implied cost of equity with assumed nominal dividends growth rate post 2012	12.5%	17.3%	15.4%	13.9%	13.3%	12.7%
Implied equity beta with assumed nominal dividends growth rate post 2012 – where all other parameters are set at NER values	1.0	1.81	1.49	1.24	1.14	1.05
Implied MRP with assumed nominal dividends growth rate post 2012 – where all other parameters are set at NER values	6%	10.8%	8.9%	7.4%	6.8%	6.3%

Table 6.2 demonstrates that even in a zero dividend growth expectation scenario the implied cost of equity in dividend expectations is higher than the NER cost of equity. This in turn implies an equity beta of 1.24 with an MRP of 6 per cent or an MRP of 7.4 per cent with an equity beta of 1.0.

A comparative analysis of US energy businesses based on data to 2007 demonstrates a similar gap between the return on equity predicted by the CAPM and those determined by US regulators using DGM analysis. This analysis clearly shows that over the period 1996 to 2007 the implied equity betas from the decisions where DGM was used was above 1.0. That is, US regulators using DGM analysis produced implied equity betas as follows:

- for electricity utilities, implied equity betas were in a range 0.91 to 1.43, with an average of 1.15 (these results are adjusted to allow for an assumption of 60 per cent gearing); and
- for gas utilities, implied equity betas were in a range 0.94 to 1.45, with an average of 1.17 (these results are adjusted to allow for an assumption of 60 per cent gearing).

Thus CEG conclude:[171]

> US regulators commonly use the DGM model to establish the regulated cost of equity. This has resulted in estimates of the equity risk premium for regulated businesses roughly double the equity risk premium that would be derived if one simply 'plugged in' observed equity betas for US firms (as estimated by ACG) into the Sharpe CAPM formula with a market risk premium of 6%.

Another way of looking at this is that the estimated US equity beta based on 2007 data falls within a range of 0.5 to 0.8[172] while the equity beta implied by back-calculating from the measured return on equity using DGM is 0.9 to 1.4.[173] The conclusions being established by considering both the Australian measurements of beta and the required return on equity for Australian energy utilities (as measured by DGM) is that there is a gap between the estimate of the equity beta and the estimate of the required returns on equity. This is supported by the US measurements of beta and the required return on equity for US energy utilities (as measured by DGM).

One explanation for this phenomenon could be that the measured betas are backward-looking while the DGM estimates a forward-looking return on equity. The problem with this explanation is that, at least in the case of the US, the CAPM (ie, the Sharpe-Lintner CAPM) is consistently below the DGM over the period. It is more likely that this version of CAPM falls short of estimating the return on equity for the market.

In summary, the DGM analysis for Australia demonstrates that, given other parameters are held constant, an equity beta less than 1.0 is highly likely to underestimate the return on equity required by the market. In addition, the US and Australian DGM analysis is consistent with the existence of a gap between the estimate of the return on equity using the Sharpe-Lintner CAPM and estimates of the return on equity for regulated electricity infrastructure businesses measured directly from the market.

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171 CEG, *An analysis of implied market cost of equity for Australian regulated utilities* A report for the APIA, ENA and Grid Australia, September 2008, page 7

172 ACG, *Beta for Regulated Electricity Transmission and Distribution Businesses*, September 2008, page 56

173 These figures are based on the figures contained in tables 11 and 12 of CEG, *An analysis of implied market cost of equity for Australian regulated utilities* A report for the APIA, ENA and Grid Australia September 2008, pages 22-23

The Sharpe-CAPM Does Not Adequately Explain Return on Equity

Flaws in the assumptions underpinning the Sharpe-Lintner CAPM result in it underestimating the true cost of equity. Use of the Sharpe-Lintner CAPM is presently mandated in the NER. However, the NER also requires the adoption of parameter values that will produce an estimate of the cost of equity which is a forward looking rate of return that is commensurate with the prevailing conditions in the market for funds and the risks in providing prescribed services. To make a sound estimate of the return on equity in accordance with the requirements of the NER, the deficiencies of the Sharpe-Lintner CAPM must be recognised. This analysis lends further weight to the conclusion that in light of the uncertainty of beta measurement data and the known limitations of the Sharpe-Lintner CAPM the best estimate of equity beta is 1.

While the Sharpe-Lintner version of the CAPM is the version of CAPM the majority of finance practitioners are familiar with, it has been demonstrated to be a flawed model since the early 1970s. This fact and the broader problems of the Sharpe-Lintner CAPM were set out for the ESC in a report prepared by CEG for the Victorian gas distributors in response to the Draft Decision on their Access Arrangements in October 2007.[174]

The Joint Industry Associations have commissioned a report from CEG to further explain and extend this work on flaws in the CAPM to include empirical analysis of the Australian equities market. The key finding of this report is that equity betas less than 1.0 applied in the Sharpe-Lintner CAPM will underestimate the required return on equity. This is because the Sharpe-Lintner model assumes that the return required of a zero equity beta stock (ie, one that does not have any co-variance with the market) is only required to provide a return equal to the risk-free rate. Put another way the investor is neutral between investing in a government bond or a zero equity beta stock. Or in the alternative the model assumes that an investor can borrow at the government bond rate to invest in equities. Clearly this is not a viable assumption.

The CEG analysis verifies that the research undertaken by Black, Jensen and Scholes (Black et al) and others is applicable to the Australian market. Black et al found that the security market line actually measured had a lower gradient than would be consistent with the Sharpe CAPM. A zero beta equity has a required a rate of return which is approximately 4.4 per cent greater than the government bond rate.[175] This meant that where the equity beta was less than 1.0 the return on equity would be underestimated. Others including Fama and MacBeth as well as Fama and French have replicated Black's findings.

CEG's paper goes beyond consideration of research by Black et al to review the history of research around the CAPM from Sharpe in 1964 to the present day, including a paper presented at the ACCC Regulatory Conference in July 2008 by Ravi Jagannathan.[176]

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174 CEG, *Estimating relative risk in the market for funds, October 2007*

175 CEG *Estimation of, and correction for, biases inherent in the Sharpe CAPM formula September* 2008 page 17, which is attached to this submission as Appendix C.

176 Jagannathan R, *CAPM & the Cost of Capital* – presentation to the ACCC 2008 Regulatory Conference, July 2008

CEG's paper sets out significant developments in the CAPM over the period from 1964 onwards, including both theoretical and empirical developments. The most significant developments have been:

- the theoretical work of Merton in 1973 that overcomes the fact that the Sharpe-Lintner CAPM is a single period model of indefinite period. In effect the Merton Intertemporal CAPM recognises that there are two forms of systematic risk:

  - covariance of returns with the market; and

  - risk of reinvestment opportunities.

  This second form of risk is not recognised by the Sharpe-Lintner CAPM. While covariance risk can be measured (although this measurement is difficult for Australian regulated energy infrastructure) the measurement of reinvestment risk is problematic; and

- CEG's paper summarises research contained in a number of papers by Fama and French who have developed a three-factor CAPM model, which has acted as a reasonable proxy for the Merton Intertemporal CAPM.

In summary, CEG's report demonstrates that even if an equity beta less than 1.0 were the actual measured equity beta of a regulated electricity infrastructure business, employing it in the Sharpe-Lintner CAPM will underestimate the true cost of equity. The NER requires the use of the Sharpe-Lintner CAPM. However, it also requires that the parameters chosen will produce an estimate of the cost of equity which is a 'forward looking rate of return that is commensurate with the prevailing conditions in the market for funds and the risks in providing prescribed …… services'.[177] CEG's analysis suggests that the most appropriate way in which both requirements of the NER can be met is by adopting an estimate of the equity beta that recognises the limitations and deficiencies of the Sharpe-Lintner CAPM. One way in which the impact of these deficiencies can be taken into account is by adjusting the equity beta so that it will deliver the rate of return outcome required by the NER. CEG has proposed a possible adjustment based on the Black et al CAPM.

[177] NER, version 21, 1 July 2008, clauses 6.5.4(e)(1) and 6A.6.2(j)(1)

CEG proposes the following formula to adjust the measured beta:

$$\beta_e^{equation(i)} = \frac{\alpha}{R_m - R_f} + \beta_e^{observed} \times \left(1 - \frac{\alpha}{R_m - R_f}\right)$$

The effect of this formula will be to adjust beta as follows depending on the value of the estimated beta - assuming α = 5 per cent (as recommended by CEG) and MRP = 6 per cent:

Table 6.3: CEG Adjusted betas

Estimated Beta	Adjusted Beta
0.5	0.92
0.6	0.93
0.7	0.95
0.8	0.97
0.9	0.98

The analysis set out above demonstrates that even if an estimated equity beta of 0.7 was to be used to estimate the true return on equity it would have to be adjusted to 0.95 in order for the Sharpe-Lintner CAPM to provide a reasonable estimate of equity investors' expected returns in accordance with the requirements of the NER.

It should be recognised that there is a need to adjust the equity beta to allow for the inadequacies of the Sharpe-Lintner CAPM. In order to adequately estimate the return on equity using raw measured equity betas of 0.7 to 0.9 and adjusting them as outlined above. This would give equity beta in a range 0.95 to 0.98. Given the imprecision of the measurements of beta there is clearly no persuasive basis to change from an equity beta of 1.0.

Conclusions

> Given the limitations of the data and estimation methodology there is clearly no persuasive evidence that the equity beta should be changed from its current value of 1.0.

It is clear that an equity beta for regulated Australian electricity infrastructure businesses cannot be estimated with any reasonable degree of confidence. It is also clear that conventional confidence intervals do not capture the full uncertainty with respect to beta estimates. Moreover there is strong evidence that both the estimates of central tendency and the confidence intervals derived from the available beta data are biased downwardly.

A substantial amount of expert advice was obtained in the course of preparing this Joint Industry Associations submission:

- in light of the uncertain and sparse beta data, ACG has concluded that there is 'no convincing or persuasive evidence that the equity beta for a regulated electricity transmission or distribution business is different from 1.' The Joint Industry Associations concur with ACG's conclusion;

- SFG Consulting's examination of statistical methods used in estimating equity betas shows that there is a strong likelihood of a downward bias in equity beta estimates and that confidence intervals cannot be mechanically applied and must be widened;

- SFG Consulting's analysis confirms that having regard to the high level of uncertainty of beta measurement, a beta of estimate of 1.0 is a reasonable best estimate; and

- CEG and other experts have examined the limitations of the Sharpe-Lintner CAPM, and demonstrated that it underestimates the true cost of equity. To make a sound estimate of the return on equity in accordance with the requirements of the NER, the deficiencies of the Sharpe-Lintner CAPM must be recognised. This analysis lends further weight to the conclusion that in light of the uncertainty of the available data and the known limitations of the Sharpe-Lintner CAPM the best estimate of the equity beta is 1.

In the Joint Industry Associations' view, supported by a range of significant expert evidence, equity beta estimates of 0.7 – 0.9 and confidence intervals of 0.4 – 1.2, which are based on inadequate data, cannot be taken at face value, but must be adjusted. The adjustment must be upwards for both the central estimates and the confidence intervals and the confidence intervals must be widened.

In addition, and perhaps more importantly, even if a beta materially less than 1.0 could be justified it would not meet the NER requirement that it be used within the Sharpe-Lintner CAPM to estimate a return on equity which accurately reflects the forward looking rate of return on equity. This equity beta would have to be adjusted. Such an adjustment would result in an equity beta so close to 1.0 that the difference would be insignificant.

There is clearly no persuasive evidence that the equity beta should be changed from its current value of 1.0.

AER Questions

Conceptual issues

6.1 What influence does the regulatory regime have on a DNSP's or TNSP's sensitivity to non-diversifiable risk? Has this been increasing or decreasing over time?

Transmission and distribution businesses are regulated and this regulation creates risks which are non-diversifiable.

The existence of regulation creates regulatory risk. The type of regulation is likely to be a second order consideration as to the level of risk.

There is little quantifiable basis for determining whether the regulatory regime, or type of regulatory regime, has had, or is having, any influence on electricity transmission and distribution businesses' sensitivity to non-diversifiable risk. It is likely that perceptions of the impact of Australia's regulatory regime have changed since the regime was introduced in the late 1990s. Perceptions of risk are likely to have increased due to the departure of US businesses as owners of Australian regulated energy infrastructure and due to concerns on the part of owners about regulatory decision-making that is regarded by investors as increasingly aggressive.

Any attempt to quantify a change in non-diversifiable risk due to the regulatory regime or a change in the regulatory regime will be lost in estimation error and noise in the data.

The regulatory regime is constantly changing for different assets in different ways. If quantification was possible, any comparisons over time would be comparing multiple regulatory factors and as such the impact of any one regulatory factor would be difficult to isolate and quantify.

Overall regulation of price and revenues creates non-diversifiable risks, but it is difficult to ascertain whether the type of regulation has an impact and it is difficult to quantify the impact of this regulatory risk.

6.2 What influence, if at all, does the form of control have on a DNSP's or TNSP's sensitivity to non-diversifiable risk?

Given the paucity of data for regulated Australian regulate electricity transmission and distribution businesses, the data available only allows a broad and uncertain estimate of beta for this group. It is not possible to distinguish any influence on the impact of non-diversifiable risk from any particular form of control. Measurements of non-diversifiable risk are far too imprecise. Any attempt to quantify or measure a change in non-diversifiable risk due to the regulatory regime or a change in the regulatory regime will be lost in estimation error and noise in the data.

The analysis by ACG of the effect of the form of regulation in the US provided estimates for incentive regulation and rate of return regulation that were practically indistinguishable.[178] Given the nature of revenue caps versus price caps this would support the proposition that at this stage it is not possible to discern empirically that the form of regulation has an impact on non-diversifiable risk that would be sufficient to justify the application of different betas to network companies regulated under different price control forms.

6.3 Excluding the effects of financial leverage, on a conceptual basis would a DNSP's or TNSP's sensitivity to non-diversifiable risk be expected to be less than that of the market, equal to that of the market, or greater than that of the market? That is, would the asset beta of a DNSP or TNSP be expected to be less than, equal to, or more than the asset beta of the overall market?

This question involves speculation on levels of non-diversifiable risk in the market. However, it would be reasonable to assume that a utility business is likely to have less non-diversifiable risk than the market, because of the more stable nature of energy demand in relation to the rest of the economy.

Reference to asset betas can be misleading because calculation of asset betas is complicated by the method of delevering. There are many methods that can be applied, none of which has been shown to be correct. It is more informative to compare non-diversifiable risk at the same level of gearing and use a consistent delevering and relevering formula. Generally this process is insensitive to the formula used, unlike the relevering of asset betas.

Financial leverage is an integral component of the equity beta and should be considered in any assessment of risk. Since the Australian stock market is geared at 34 per cent[179] and utilities are generally geared at around 60 per cent the previously adopted equity beta of 1.0 explicitly acknowledges that utilities exhibit substantially lower levels of non-diversifiable risk than the market. (Indeed, the application of a 34 per cent geared ratio to electricity networks implies a 0.6 beta which indicates a lower asset beta).[180]

It should be recognised that measurement of non-diversifiable risk is very imprecise.

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178 ACG, *Beta for regulated electricity transmission and distribution*, September 2008, page 53

179 ACG, *Beta for regulated electricity transmission and distribution businesses*, September 2008, page 51

180 This is based on an internal Joint Industry Associations estimate using the Monkhouse delevering approach.

Empirical issues – frequency and number of observations

6.4 What frequency of observations (daily, weekly or monthly) is appropriate to estimate a benchmark beta? Why is this appropriate?

The generally accepted frequency of observations is monthly for a majority of commercial services. This is because this frequency balances out the need for sufficient measurements to provide estimates that are meaningful (typically at least 48 data points) and the need to eliminate noise. Very frequent measurements tend to increase the noise level in estimates unless a long data series is employed.

The goal of the regression process is to filter out the extent to which a stock's returns move with the market. This is more readily seen with lower frequency measurements, which are more likely to register underlying movements of share prices than short term market volatility.

It has also been suggested that higher frequencies will allow earlier registration of changes in betas. To the extent that this is true the Joint Industry Associations take the position that this expectation is not likely to be of great value. This is because while betas may vary over time it is likely that such variation is a result of structural change in the equities market. Structural change of any significance is likely to occur over periods of many years and even decades reflecting changes in the national and global economy. The Joint Industry Associations' view is that the use of monthly observations as adopted by a majority of data services continues to strike the best balance.

Weekly data may be useful as a cross-check. However, larger numbers of observations will be needed. The Joint Industry Associations do not have the analytical tools and expert advice that would be required to determine this. However the Joint Industry Associations note that the sort of analysis undertaken by Gray et al suggests that the number of observations required is likely to be similar to that recommended for monthly observations 84 – 120, based on 7 – 10 years of monthly data.

Having said all of the above, the Joint Industry Associations note the key conclusions of the expert advice are that:

- estimates of equity beta for Australian electricity transmission and distribution businesses, based on the best available data - which consists of a small sample of imperfect comparators - are subject to a very high degree of uncertainty;
- estimates may vary substantially from one measurement period to the next, underscoring the high level of imprecision in the estimates. To date, the extent of this problem and how to compensate for it has only been partially recognised;
- in light of the uncertain and sparse beta data, there is no convincing or persuasive evidence that the equity beta for a regulated electricity transmission or distribution business is different from 1; and
- to make a sound estimate of the return on equity in accordance with the requirements of the NER, the deficiencies of the Sharpe-Lintner CAPM must be recognised.

It would be incorrect for the AER to infer or expect that changing the frequency and number of observations would address any of the fundamental issues with the data and estimation methodology, and the deficiencies of the Sharpe-Lintner CAPM.

6.5 Is the 'technology bubble' still relevant going forward? If yes, what are the start and end dates of the technology bubble?

The 'technology bubble' is relevant to the extent that a single term CAPM (ie, Sharpe Lintner or Black CAPM) continues to be applied. Thus the 'technology bubble' is still relevant as the Joint Industry Associations understand that the Sharpe Lintner CAPM will continue to be applied.

If an Intertemporal CAPM were to be applied this would not be necessary. That is, data from this period should be excluded from beta estimates.

It is a matter for judgement as to when the 'bubble' started and finished. Based on advice from ACG the period would be approximately July 1998 to December 2001.[181]

6.6 Are there other 'unrepresentative events' that may have biased the estimation of beta? Such events could include mergers and acquisition activity, terrorist acts and natural disasters. How should this issue be addressed (ie, use weekly data over a shorter period, select years prior to the event, or compare both approaches)?

The main 'unrepresentative event' is the 'technology bubble'.

There are some potential 'unrepresentative events' in addition to the 'technology bubble'.

The main potential 'unrepresentative event' is the commodity boom combined with a period of low volatility which has essentially followed the 'technology bubble'. The market has, until the beginning of 2008, been characterised by 'bull conditions' with low volatility. This period of low volatility is now over.

As explained in SFG Consulting's paper (which was prepared in the context of the 2007 Access Arrangement Review for the Victorian gas network businesses) the period of low volatility since 2002 has had a marked impact on beta estimates for energy infrastructure businesses.[182]

SFG Consulting identifies the commodity boom as similar in character and effect to the 'technology boom' and suggests that the period of the boom should be considered for exclusion from the data set for beta estimates.[183]

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181 ACG, *Beta for regulated electricity transmission and distribution*, September 2008, page 55

182 SFG Consulting, *Equity beta estimates for Victorian gas distribution businesses*, October 2007, pages 32-51

183 SFG Consulting, *The reliability of empirical beta estimates*, September 2008

SFG Consulting has also shown in his paper that this low volatility alone has created two downward measurement biases.[184] ACG also note this low volatility period and its likely impact on beta estimates.[185]

The Joint Industry Associations recognise the fact that the 'commodity boom' is continuing although the period of low volatility has ceased, and as such, it is difficult to identify whether it is a structural change or an 'unrepresentative event'. Given the lack of clarity on this issue the joint industry association is not suggesting an adjustment be made for this potential 'unrepresentative event' at this time.

Until there is clarity there should be caution in adjusting beta away from 1.0.

6.7 What length (in years) is appropriate to estimate a benchmark beta?

Gray et al provide a very clear rationale for the use of periods of between 7 and 10 years as being optimal.[186] Where periods of this length are not available the problems with unreliability of the results must be recognised. It then remains an issue of determining the extent to which such data can be relied on if at all.

Empirical issues – estimation techniques and outliers

6.8 Should the OLS approach be used as a first step when estimating a benchmark beta?

Ordinary Least Squares (OLS) is recognised within both econometric, finance and statistics as the standard technique for regressing one variable against another. It is also the technique employed by a majority of commercial data services. Both ACG and SFG Consulting have applied this technique in their reports as the foundation of regression analysis. The Joint Industry Associations consider this is therefore the correct starting point for estimating betas.

The caveats noted in the answer to question 6.4 above apply here also.

6.9 Which estimation methods should be used and which should not be used to ensure that the benchmark beta is robust and statically reliable?

Based on the reports by Gray et al, SFG Consulting and ACG the beta should be estimated using standard OLS regression techniques. However, they have illustrated the importance of improving the precision of beta estimates using methods that remove outliers. Removal of outliers, re-weighted OLS and Least Absolute Variation (LAV) all have their place in refining raw OLS estimates. What is required is to be able to discern the meaning of different results from each method.

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184 SFG Consulting, *The reliability of empirical beta estimates*, September 2008, pages 16-17

185 ACG, *Beta for regulated electricity and distribution infrastructure*, September 2008, pages 56-57

186 S. Gray, Hall, Bowman, Brailsford, Faff, Officer, *The performance of alternative techniques for estimating equity betas of Australian firms*, May 2005, pages 23-25

However, as demonstrated by Gray et al the Blume adjustment is applicable and improves beta estimates, particularly where there is uncertainty about the quality of data and wide calculated confidence intervals.

The Joint Industry Associations note that ACG object to the use of the Blume adjustment for regulated businesses because ACG considers that mean reversion should not apply. However, mean reversion is not the only rationale for the Blume adjustment. Like the Vasicek adjustment it also deals with problems of statistical uncertainty as demonstrated by Gray et al.

The Vasicek adjustment should also be applied because the concept of prior assumption is useful. The problem in the current review is that application of a prior assumption is problematic unless it is accepted that the appropriate prior value is 1.0. However, it must be recognised that a difficulty associated with the Vasicek adjustment is the precision of the prior belief[187] and different prior values would give rise to different Vasicek adjusted results.

Overall the Vasicek adjustment is a useful tool but consideration needs to be given to the weighting to current data versus the prior assumed values. Further consideration also needs to be given to the extent that prior assumed values are similar to current values then it is reasonable to expect little change due to the adjustment.

Even with these adjustments it should be recognised that biases may occur in estimates as a result of biases that result from low r-squared statistics usually resulting from low market volatility and low estimates of beta. Unless these matters are properly recognised it is highly likely that beta estimates will be biased below their true value. The methods for adjusting or compensating for these biases may have to be qualitative or it may be possible to employ some analytical techniques to do this. Which ever method is employed it is essential that it be done for any beta estimate to conform to the requirements of the NEL and NER.

However, as the task is to determine a 'benchmark' beta a further matter to be considered is the need to take account of the known inadequacies of the Sharpe-Lintner CAPM required by the NER. As demonstrated in the reports by CEG for equities that have actual betas below 1.0 the return on equity will be underestimated.[188] It is therefore essential for the 'benchmark' beta to comply with the requirement of the NER that the estimate of the parameter value, in this case beta, produce a 'forward looking rate of return that is commensurate with the prevailing conditions in the market for funds and the risks in providing prescribed '…services'.[189] That compliance can only be achieved by having regard to the analysis presented by CEG.

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187 ACG, *Beta for regulated electricity transmission and distribution*, September 2008, page 6

188 CEG, *Estimation of, and correction for, biases inherent in the Sharpe CAPM formula,* September 2008.

189 NER, version 21, 1 July 2008, clauses 6.5.4(e)(1) and 6A.6.2(j)(1)

6.10 Are there any other estimation methods that could be used to ensure that the benchmark beta is robust and statistically reliable?

A dividend growth model, as demonstrated in CEG's report, can provide useful cross-check against the total return on equity estimated from the Sharpe-Lintner CAPM.[190]

Empirical issues – Blume adjustment

6.11 Is there any validity applying the Blume adjustment in estimating an equity beta for regulatory purposes?

In the Joint Industry Associations' view there is validity in applying the Blume adjustment. The rationale for this is set out in the answer to Question 6.9. The rationale for the use of the Blume adjustment is set out in Gray et al.[191] As demonstrated by Gray et al the Blume adjustment is applicable and improves beta estimates, particularly where there is uncertainty about the quality of data and wide calculated confidence intervals.

The Joint Industry Associations have noted ACG's views against Blume because it associates Blume purely with mean reversion.

However, mean reversion is not the only rationale for the Blume adjustment. The Blume adjustment also deals with problems of statistical uncertainty as demonstrated by *Gray et al*.

The Joint Industry Associations understand that this limits the role of the Blume adjustment, which includes improving the precision of beta estimates in environments of high statistical uncertainty. In effect Blume is a limited case of the Vasicek adjustment where the assumed prior estimate is the market beta and the assumed weighting is 70:30 between the new estimate and the current estimate.

The caveats noted in the answer to question 6.4 above apply here also.

Empirical issues – portfolio estimation

6.12 Should equity betas from sample businesses be value-weighted, equally weighted or should a median value be used?

The methodologies applied by both SFG Consulting and ACG involve the use of the unweighted average. The Joint Industry Associations understand this to be because each business is likely to be as representative in the market as any other regardless of size.

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[190] CEG, *An analysis of implied market cost of equity for Australian regulated utilities* A report for the APIA, ENA and Grid Australia, September 2008

[191] S. Gray, Hall, Bowman, Brailsford, Faff, Officer, *The performance of alternative techniques for estimating equity betas of Australian firms*, May 2005, pages 25-26

ACG present their data as both mean and median data and in the context of this issue 'strongly advise against placing substantial weight on any single beta estimate'.[192]

In considering this issue the AER should recognise that applying a mechanical approach will not produce a single correct answer. An appropriate equity beta can only be obtained by considering all of the data and results in totality. In considering the data the AER should consider factors such as variation across firms, variations across time and r-squared values. These factors, and other factors, will influence the amount to which the AER should rely on the data.

Mechanical application of a pre-selected averaging process results in missing this important step and in concluding that the result is more precise than it really is.

The caveats noted in the answer to question 6.4 above apply here also.

Empirical issues – other conceptual or empirical issues

6.13 Are there any other conceptual or empirical issues that should be considered in determining an equity beta for regulatory purposes?

The Joint Industry Associations have already raised the very significant issue of the inadequacy of the Sharpe-Lintner CAPM in estimating the return on equity. It is critical that the AER recognise this matter if it is to determine a beta that is compliant with the requirements of the NER, that the WACC parameters provide a rate of return that is a 'forward looking rate of return that is commensurate with the prevailing conditions in the market for funds and the risks in providing prescribed …… services'. This issue is discussed fully in the setting out of the issues above and in the papers by CEG.

In summary what CEG demonstrates is:

- the current CAPM parameters understate the return on equity estimated using the dividend growth model;
- the outcomes of the DGM analysis are consistent with the problems of the Sharpe-Lintner CAPM identified since 1973 by Black et al, Merton, Fama and MacBeth and then Fama and French;
- it is clear that where an equity beta is less than 1.0 its use in the Sharpe-Lintner CAPM will underestimate the return on equity;
- underestimation of the return on equity applies not only to US equities, but also to Australian equities; and
- an adjustment must be made to the beta estimate derived from the raw data in order for the Sharpe-Lintner CAPM to provide an estimate of the cost of equity that properly reflects the required return on equity, in accordance with the requirements of the NER.

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[192] ACG, *Beta for regulated electricity transmission and distribution*, September 2008, page 35

The inadequacy of the Sharpe-Lintner CAPM should be considered in determining an equity beta for regulatory purposes.

The Joint Industry Associations have also raised the significant issue of data inadequacy, as highlighted in the paper by SFG Consulting. In summary these issues include:

- recent beta estimates from Australian data are characterised by low r-squared statistics, which are associated with unreliable estimates;
- beta estimates less than 1 are more likely to be downwardly biased by estimation errors;
- there are few comparator firms, and those that exist are likely to have issues that make them imperfect comparators. This is borne out in the fact that there is a wide range of estimates among the Australian firms, even though they are supposed to be estimates of the same thing;
- beta estimates for Australian firms have varied substantially in recent years, such variations could not be explained by non-diversifiable risk; and
- standard confidence intervals do not take account of possible bias and uncertainties about the appropriateness of the comparables, relevering or gearing.

The inadequacy of the data underpinning beta estimates, and hence the beta estimates themselves, should be considered in determining an equity beta for regulatory purposes.

In addition to the issues raised above, consideration of the equity beta should take account of the fact that the market beta of 1.0 is based on a gearing of approximately 30 to 35 per cent. If the assumed gearing of a regulated business was set to the market average of 30 to 35 per cent debt, the equity beta of the regulated business is estimated to be approximately 0.6.[193]

Thus in considering equity beta it needs to be recognised that there are two considerations. Firstly asset risk, which is relatively low, compared to the market, and financial risk which is relatively high compared to the market due in part to gearing. Any consideration of an equity beta outcome in the context of the market should take into account both the asset risk and the financial risk. In particular it should be explicitly recognised that any adjustment of the equity beta is implying a change in the asset risk or a change in the financial risk.

[193] This is based on an internal Joint Industry Associations estimate using the Monkhouse delevering approach.

7 Credit Rating Level

Introduction

The adopted benchmark credit rating for both electricity transmission and distribution is BBB+.

The benchmark credit rating should not be determined by mechanistic application of any one methodology. Both a quantitative and qualitative assessment of the circumstances affecting a business' ability to repay debt should be taken into account in this review process.

Appropriate comparators for reviewing the adopted benchmark credit rating would be transmission and distribution, gas and electricity companies, excluding those companies with characteristics not similar to a benchmark efficient network service provider.

At this stage there is no persuasive evidence to depart from the previously adopted benchmark credit rating of BBB+ (indeed the current information reinforces that BBB+ is appropriate), but that the best current market information shows that BBB+ is probably at the upper end of an appropriate credit rating.

Background

The cost of debt is a critical parameter in determining the weighted average cost of capital (WACC). The WACC is determined as the risk-free rate plus a debt risk premium[194] for the corresponding benchmark credit rating, which in turn reflects risks associated with a business' ability to repay debt. Standard & Poor's define a credit rating as:[195]

> our opinion of the general creditworthiness of an obligor (issuer credit rating/corporate credit rating), or the credit risk associated with a particular debt security or other financial obligation (issue rating).
>
> A rating does not constitute a recommendation to purchase, sell or hold a particular security.

[194] Debt raising costs should be dealt with by inclusion in the operating expenditure component of the aggregate revenue requirement

[195] Standard & Poor's, *Corporate Ratings Criteria 2008*, April 2008, page 5

The benchmark credit rating assumption is therefore an important input for determining the debt risk premium to apply for both electricity transmission and distribution businesses, in the WACC calculation. It is important for this review to identify the previously adopted values for this parameter. The following are the key points:

- for electricity transmission the NER provide the previously adopted value of BBB+;
- for the Tasmanian, Victorian, Queensland and South Australian electricity distribution businesses, the jurisdictional regulators adopted BBB+;
- for NSW and the ACT no explicit benchmark credit rating was adopted in the jurisdictional regulators decision but the transitional provisions under which their current regulatory resets are being undertaken adopt BBB+; and
- indeed BBB+ was the predominantly adopted credit rating for electricity businesses over the last 10 years by both jurisdictional and Commonwealth regulators.

There is no persuasive evidence to depart from the previously adopted value of BBB+. To the contrary, there is indeed evidence that strongly supports the continued application of BBB+.

In considering the issue of an appropriate credit rating it is important to describe the significance of a firm receiving a BBB rating:[196]

> An obligation rated 'BBB' exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitment on the obligation.

The addition of a plus or minus sign is used to show the 'relative standing within the major rating categories'.[197]

[196] Standard & Poor's, Corporate Ratings Criteria 2008, April 2008, page 8

[197] Standard & Poor's, Corporate Ratings Criteria 2008, April 2008, page 9

The key issues to be considered in determining the appropriate credit rating are:

- the need for persuasive evidence before the previously adopted value of BBB+ is altered;
- the fact that a wealth of previous regulatory decisions that did examine the available evidence supported adopting BBB+ in the past;
- examining and updating the data now available involves recognising that credit ratings are influenced by an assessment of a business' ability to repay debt, being principal and interest, in full and on time. This requires an assessment of a company's business and financial risk which provides a measure of both its capacity to pay and willingness to pay.[198] Such an assessment includes a review of a business' cash flow, gearing levels and qualitative factors such as senior management. For the purposes of determining a benchmark credit rating this means that benchmark cash flow and benchmark gearing levels are relevant, with actual information to be used to inform the benchmark assumptions;
- simple averaging of comparator business credit ratings is not appropriate when determining a benchmark credit rating as the sum of the constituent businesses in combination may not equate to the mean, median or mode of the standalone credit ratings; and
- any evidence to support a change to the credit rating assumption should be based on a number of approaches and information sources. This reflects the inherent uncertainty associated with determining a benchmark credit rating, and the inappropriateness of using a simplistic, mechanistic or formulistic approach.

A benchmark credit rating provides a simple indication of the risks of default associated with a particular business. It is influenced by a range of industry, business specific and financial factors that can impact on a business' financial risks, a business' cash flow and the willingness and capacity of the corporation to pay its debts as and when they fall due. Among other things these factors include the level of debt, the cash generated by the provision of services, the stability of revenue, and also non-quantitative factors such as regulatory stability, support from related companies, and the management of the business.

Credit ratings are made by independent rating agencies such as Standard & Poor's, Moody's and Fitch Ratings, who each have their own methods and rating system. This means that a rating of say, BBB+ by one agency may not be equivalent to the same rating made by another agency.

The remainder of this chapter briefly outlines the benchmark credit rating that has been previously adopted for electricity transmission and distribution network service providers, and considers the approach to determining the benchmark credit rating. The chapter concludes with a response to each of the questions asked by the AER.

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[198] Standard & Poor's, *Corporate Ratings Criteria 2008*, April 2008, page 94

The adopted benchmark credit rating

Table 7.1 sets out the previous adopted credit ratings for regulated electricity transmission and distribution businesses.

Table 7.1: Adopted Benchmark Credit Rating for electricity distributors[199]

Jurisdiction	Distribution Network Service provider	*Previously Adopted Credit rating*
TNSP as per Chapter 6A		*BBB+*
Australian Capital Territory	ActewAGL	*BBB+*
New South Wales	Country Energy	*BBB+*
	EnergyAustralia	*BBB+*
	Integral Energy	*BBB+*
Queensland	ENERGEX	*BBB+*
	Ergon Energy	*BBB+*
South Australia	ETSA Utilities	*BBB+*
Tasmania	Aurora Energy	*BBB+*
Victoria	AGL Electricity	*BBB+*
	CitiPower	*BBB+*
	Powercor	*BBB+*
	SP AusNet	*BBB+*
	United Energy	*BBB+*

For NSW and the ACT the previous regulatory decisions did not adopt an explicit credit rating but the transitional Rules under which their current resets are being undertaken do, see NER Chapter 11, Appendix 1, Rule 6.5.2(e).

[199] See Gilbert + Tobin Legal Opinion attached as Appendix B

Determining the Benchmark Credit Rating

To estimate the cost of debt as part of the weighted average cost of capital, it is necessary to estimate an appropriate debt risk premium to account for the risks associated with recovering debt from the regulated business. The NER defines the debt risk premium as:[200]

> the margin between the annualised nominal risk free rate and the observed annualised Australian benchmark corporate bond rate for corporate bonds which have a maturity equal to that used to derive the nominal risk free rate and a credit rating from a recognised credit rating agency.

The assumed benchmark credit rating is therefore an important input to determining the debt risk premium to apply to transmission and distribution businesses.

The Joint Industry Associations note at the outset that determining a benchmark credit rating is not a mechanistic exercise. This is emphasised by Standard & Poor's:[201]

> We strive for transparency around the rating process. However, it is critical to realize – and it should be apparent – that the ratings process cannot be reduced to a cookbook approach: Ratings incorporate many subjective judgments, and remain as much an art as a science.

This view has also been acknowledged by the AEMC who note in their consideration of the initial benchmark credit rating to apply to a regulated electricity transmission businesses that:[202]

> there is not a mechanistic relationship between the assumed gearing ratio and the appropriate credit rating for a benchmark transmission business with the later being influenced by a range of other factors.

This view acknowledges the fact that credit rating agencies take account of a range of factors and their interrelationships when determining a business' credit rating, including a business specific and industry specific assessment of the risks associated with a business' ability to repay its debt. For this reason, the AER should take account of a spectrum of information on business and financial risks for the relevant benchmark business in reaching its decision on whether there is persuasive evidence to depart from the previously adopted benchmark credit rating.

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200 NER, version 21, 1 July 2008, clause 6.5.2(e)

201 Standard & Poor's, *Corporate Ratings Criteria 2008*, April 2008, page 18

202 AEMC, *Review of the Electricity Transmission and Pricing Rules: Draft National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006,* Transmission Revenue: Rule Proposal Report, February 2006, page 64

In determining a benchmark credit rating, it is therefore appropriate to consider:

- the credit ratings for comparator businesses, which would include transmission and distribution businesses in both the electricity and gas industries;
- relevant financial ratios such as interest cover,[203] funds from operations[204] to total debt, free operating cash flow[205] to total debt, and the ratio of cash flow to capital expenditure;[206] and
- business or industry specific factors that might influence observed comparator credit ratings. Some of these factors are qualitative, such as the managerial ability within the business.

This information provides a basis for assessing the scope for comparator businesses to repay debt, which can then form the basis for an assessment of an appropriate credit rating for the benchmark efficient transmission and distribution business.

Based on the available information, the Joint Industry Associations consider that there is no information to support a change from the existing BBB+ assumption.

In relation to the AER's Review the central issues for the AER to consider in assessing the benchmark credit rating are:

- whether benchmark credit rating assumptions should vary between electricity transmission and distribution businesses;
- the choice of comparator businesses, and therefore the relevance of parent companies or the government on the benchmark credit rating;
- the data and techniques used to estimate the credit rating for comparators; and
- what could be considered persuasive evidence to support a shift in the benchmark credit rating from the regulatory precedent consensus view of BBB+.

These issues are discussed in greater detail below.

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203 *Interest cover* measures the ability of a company to meet its fixed financial obligations (sourced from pre-tax income from continuing operations). The pre-tax interest cover ratio is defined as earnings before interest and tax (EBIT) divided by gross interest.

204 *Funds from operations* is defined as operating profit plus depreciation and amortisation, less income tax plus/(minus) net non-cash abnormal losses/(gains), plus/(minus) net losses/(gains) on the sale of assets.

205 *Free operating cash flow* is defined as FFO less fixed assets purchases less movement in non-cash to non-debt working capital.

206 For further detail on the ratios used see Standard & Poor's (2004), Corporate Ratings: Australian Corporate Ratings Explained, August.

Credit Rating Assumption for Transmission and Distribution

As highlighted above, the credit rating determined by rating agencies is based on a quantitative and qualitative assessment of a business' overall capacity and willingness to meet is financial obligations as they come due. For this reason, it is relevant to consider the financial characteristics between electricity transmission and distribution businesses to determine whether there are likely to be differences that warrant the application of a different credit rating assumption.

ACG identifies that:[207]

> the main cash flow characteristics of electricity transmission and distribution are similar – namely that both receive revenues that are calibrated to cost and then recalibrated at periodic intervals, and both are very capital intensive operations.

Indeed, there is a degree of arbitrariness to the distinction between electricity transmission and distribution businesses particularly when considering infrastructure that operates between or near 66kV and 220kV. There is already one significant example of a business that, as a result of this arbitrary voltage based distinction has an integrated business that is both a transmission and a distribution business and as demand growth continues this is likely to increasingly become an issue. It would be peculiar indeed if there were inconsistent credit rating benchmarks to be applied to an integrated firm that was both a transmission and a distribution business. While some aspects of the regulatory regime can differ at the asset level (eg the connections regime) it makes no sense to apply inconsistent benchmarks for corporate wide factors such as credit ratings.

[207] ACG, *Credit rating for a benchmark electricity transmission business,* Report to Electricity Transmission Network Owners Forum, May 2006, page 15

Choice of Comparators

It follows from the discussion above that it is appropriate to review the evidence on credit ratings for both electricity transmission and distribution businesses, as comparators for a benchmark credit rating. In addition ACG considers that regulated gas businesses should also be used as comparators with electricity businesses for the purpose of obtaining information on business credit ratings.[208]

ACG's reasoning is that the financial characteristics of regulated gas businesses are unlikely to differ substantially to regulated electricity businesses, and the benefits from pooling information to increase the number of comparators would likely outweigh any concerns with inappropriate comparators. ACG notes that:[209]

> … it is common for Australian regulators to assume (implicitly) that equity betas are the same for regulated electricity and gas transmission and distribution entities and hence to 'pool' data from all of these entities to obtain a more robust beta estimate of the pooled estimate. The rationale for this pooling is that, given the data available on such matters in Australia, the priority should be to obtain the best estimate of the relevant parameter for the 'pool' of entities. We consider that a similar imperative is relevant for the derivation of a benchmark credit rating for regulated energy entities.

Importantly, regulated gas businesses are therefore a reasonable but not perfect comparator to use for the purposes of reviewing the evidence for the credit rating. For the reasons set out above, the Joint Industry Associations consider that the AER should take into account information on credit ratings for both gas and electricity comparator businesses in reaching its decision on an appropriate credit rating as part of its review. A note of clarification is important. While all the data from both industries is relevant to consider, the test to be applied having considered that information is whether there is persuasive evidence to adopt WACC parameters for the electricity industry that differ from the previously adopted parameters for the electricity industry.

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208 ACG, *Credit rating for a benchmark electricity transmission business,* Report to Electricity Transmission Network Owners Forum, May 2006, page 16

209 ACG, *Credit rating for a benchmark electricity transmission business,* Report to Electricity Transmission Network Owners Forum, May 2006, page 16

In doing so, some consideration should also be given to the view that gas infrastructure is sometimes perceived as being riskier than electricity. This view has been supported in previous regulatory decisions where equity betas have been set at greater than 1[210] and in regulatory decisions where credit ratings of below BBB+ have been used.[211] However, in general regulated gas transmission and distribution assets have been given benchmark ratings of BBB or BBB+ in regulatory decisions.

The final choice of comparators involves considering whether the comparator has characteristics that are not common with the benchmark efficient network service provider assumption, and which might influence its credit rating. These characteristics include:

- a financially supportive owner (ie, government) or parent company;[212]
- significant non-regulated activities; and
- significant restructuring, merger or growth, which could affect its cash flows.

Comparators with these characteristics should therefore be excluded from consideration in the assessment of a benchmark credit rating.

Relevant Data and Techniques to Determine the Benchmark Credit Rating

As highlighted above, determining whether there is persuasive evidence to depart from the previously adopted benchmark credit rating is as much an exercise in assessing the circumstances, competitive position and other factors that can affect the business and reviewing relevant measures of cash flow, rather than a simple application of a mechanistic formula. It is important to acknowledge that credit ratings generally only change where the circumstances affecting the risk of default for the business warrant a change. In general, credit ratings are stable for businesses over relatively long periods of time.

In determining whether there is persuasive evidence to depart from the previously adopted credit rating there needs to be a synthesis of quantitative techniques and qualitative judgements.

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210 For example some regulated gas pipelines, (eg, Goldfields Gas Pipeline) and some regulated gas networks (eg, Allgas network in Brisbane) have equity betas greater than 1. As such the ACG argument that regulators should assume that equity betas are the same for regulated electricity and gas transmission and distribution entities has some exceptions.

211 See for example the decision of the AER for the access arrangement applying to the Roma to Brisbane Pipeline, where BBB was assumed.

212 Government owned businesses have a stand alone credit rating that reflects their capital structure and business cash flows. This provides guidance for the business of its underlying business credit rating, and is used by State Governments to impose competitive neutrality fees in accordance with national competition policy.

There are a number of quantitative techniques that have been used in considering credit ratings including:

- regression analysis;
- selecting the average from the observed sample of comparators; and
- the 'best comparators' approach.

The Joint Industry Associations support the approach used by ACG to determine a credit rating in its paper for the AEMC's Chapter 6A review of the transmission revenue rules[213] which resulted in the AEMC selecting the benchmark credit rating of BBB+.

Professor Lally previously applied regression techniques to estimate the relationship between business gearing and its credit rating, which was subsequently reviewed by ACG.[214] The use of these techniques can incorrectly suggest that there is some precision in the approach to determining credit ratings. This is because the regression results can be influenced by the statistical methods used,[215] the choice of comparator businesses, and the measures of cash flow used.

ACG's review of Professor Lally's regression approach is important evidence to be used in determining whether to depart from the previously adopted benchmark credit rating. ACG's key conclusions being:

- there is a need to include information on electricity and gas, transmission and distribution businesses in the dataset used; and
- gearing is not the most appropriate explanatory variable for a business' credit rating. Interest cover and funds from operations as a proportion of total debt may provide more appropriate measures of cash flow to use as leading indicators of creditworthiness.

An alternative approach to using regression techniques is to consider the credit ratings of comparator businesses. There are two approaches that have been commonly used, namely, taking a simple average, and the 'best comparators' approach. Taking an average of the credit ratings of comparators is problematic as the result can be heavily influenced by one or two outlier businesses, leading to an 'average' that is not representative of any one comparator business. This is particularly the case when a small number of comparator businesses are used.

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213 ACG, *Credit rating for a benchmark electricity transmission business,* Report to Electricity Transmission Network Owners Forum, May 2006

214 ACG, *Credit rating for a benchmark electricity transmission business,* Report to Electricity Transmission Network Owners Forum, May 2006

215 Applying ordinary least squares estimation techniques in circumstances where the independent variable is discrete will result in biased coefficient estimates, because of the statistical error term will fail its normality assumption.

This was the case that arose before the Australian Competition Tribunal in its consideration of credit rating in the matter of the application by East Australian Pipeline Ltd, which reviewed the decision of the ACCC to approve its proposed gas access arrangement. Specifically, the Tribunal found that it was inappropriate for the ACCC to ***take a simple average*** of the credit ratings (ie, an A for AGL and BBB for the remaining comparators) to determine a BBB+ credit rating, because it led to a conclusion that was not supported by the evidence. In other words, the resulting 'average' credit rating was not held by any of the comparator businesses being considered. The Tribunal indicates:[216]

> The effect of the decision of the ACCC was to distribute part of the A rating of AGL to the other three members of the class in a crude averaging exercise. There is no logic or reason to that approach and there is no material to suggest it has any support in the theory or practice of statistics. If attention is directed to the chosen class, the only rational conclusion is that AGL as an 'outrider' out of line with the other members of the class and should properly be ignored. That conclusion is reinforced by the material which shows AGL to be of such a size and its business of such a nature as to be a poor proxy for a pipeline operator.

Implicitly, the Tribunal undertook a comparative assessment approach in combination with the calculation of the median credit rating from the comparator businesses to determine the appropriate benchmark credit rating. In this case, the appropriate credit rating was BBB.

The discussion above highlights that no single technique should be used to assess the benchmark credit rating. Ideally evidence from the application of a number of techniques would be assessed, taking account of the advantages and disadvantages of each approach.

Upcoming Risks and Their Effect on the Benchmark Credit Rating

As highlighted in the overview, electricity transmission and distribution businesses are faced with considerable uncertainty of a nature and scale not experienced in the past. This arises from the need for significant future network investments, and the changing mix of generation including the likely growth in distributed generation. This uncertainty results from businesses needing to respond to climate change policies including the introduction of a carbon pollution reduction scheme, increased network demand resulting from the mining boom, and the need to maintain energy security, all of which combine to impact on a business' cash flow. The uncertainty, combined with the slowing in the national economy and ongoing tight monetary conditions, has the potential to place transmission and distribution businesses in financial stress. ACG study found that the appropriate benchmark credit rating at that time, by applying its preferred methodology using both gas and electricity businesses was BBB+, when these uncertainties had not emerged to anything like the degree they now have. This implies that, at best, current credit ratings may well be BBB rather than BBB+.

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[216] Australian Competition Tribunal, Application by East Australian Pipeline Limited [2004] ACompT 8, paragraph 66.

There is no persuasive evidence that the BBB+ rating is flawed in any way and therefore it should not be departed from. Indeed, to the contrary, drawing upon the work of ACG, presented to the AEMC as part of the Chapter 6A Review of the NER (which is the most recently available full consideration of the issue), the available evidence indicates that the benchmark credit rating should in fact be BBB+ even if it were not the previously adopted value.

AER Questions

Benchmark credit rating – selection of benchmark businesses

7.1 To what extent will the inclusion of government owned business or private businesses that are not stand alone businesses bias the estimate of credit ratings? Should this be a concern?

In summary ownership and the extent of activities unrelated to the business may have an impact on an estimate of credit ratings, and therefore needs to be taken into consideration in any assessment of the benchmark credit rating. Ownership can be important because the credit rating takes account of the potential for owners to support the business to meet its debt repayment obligations. The nature of the business and the extent of unrelated activities can also affect the rating as the rating relates to the entire business and will be affected by the financial and business risks involved with the unrelated activities. For the purposes of determining a benchmark credit rating, it is therefore not appropriate to consider the credit rating for a business that has a substantial proportion of earnings from unregulated activities.

It is clear that the credit rating can be influenced by a range of factors including:

- the financial support that a business receives from a parent company or related company;[217]
- the activities of the business including business activities unrelated to the activity being regulated; and
- current or planned activities related to business restructuring.

Where a credit rating takes account of factors such as potential financial support or unrelated business activities, then it would be appropriate to exclude those comparators. Since the reported credit rating is likely to be influenced by the relationship with the parent or related company or owner or by the nature and scope of the unrelated business activity.

This means that government owned businesses or private businesses that are not stand alone businesses should be excluded as comparators. The inclusion of these businesses as comparators would likely improve the credit rating, as compared to a counterfactual where the business did not have parent support.

[217] Government ownership in particular can have a significant influence on the public credit issuer's credit rating.

In addition, it is also important to exclude those comparators that have a significant proportion of revenue earned in non-regulated activities, or where a business is undergoing significant restructuring or growth. Both of these factors would also likely bias the observed credit rating, meaning that it would no longer be an appropriate comparator for the purpose of determining a benchmark credit rating.

7.2 Which financial measures and qualitative factors should the AER consider when setting a benchmark credit rating?

The relevance of a specific financial measure or qualitative factor to the determination whether to depart from the previously adopted benchmark credit rating of BBB+ should be based on an assessment of the insights it provides into the credit worthiness of a business. Financial measures that provide insights into likely future cash flows for the business, and other qualitative business specific factors, are likely to be the most relevant for the AER to consider.

There are a number of factors that the AER should take into consideration when determining a benchmark credit rating, namely:

- metrics that reflect the cash flow of the business, namely:[218]
  - interest cover;[219]
  - ratio of funds from operations by total debt;
  - free operating cash flow to total debt;[220]
  - ratio of cash flow (net of dividends) to the business' capital expenditure requirement; and
- business specific factors including business prospects, management, and uncertainty surrounding business cost and demand forecasts.

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[218] The difficulties associated with measuring gearing means that credit rating agencies tend to rely more on cash flow measures than gearing when determining credit ratings. For this reason gearing is not included in the relevant metrics, although there is a clear relationship between gearing and credit rating. For more discussion on this issue see pages 17 – 18, ACG (2006), *Credit rating for a benchmark electricity transmission business,* Report to Electricity Transmission Network Owners Forum, May.

[219] *Funds from operations* is defined as operating profit plus depreciation and amortisation, less income tax plus/(minus) net non-cash abnormal losses/(gains), plus/(minus) net losses/(gains) on the sale of assets. *Interest cover* measures the ability of a company to meet its fixed financial obligations (sourced from pre-tax income from continuing operations). The pre-tax interest cover ratio is defined as earnings before interest and tax (EBIT) divided by gross interest.

[220] *Free operating cash flow* is defined as FFO less fixed assets purchases less movement in non-cash to non-debt working capital.

While gearing gives an indication of the potential financial risks to a business, it is only one measure and should not be used in isolation to provide a reliable indicator of creditworthiness. I It may be a less useful comparator metric when considered against other measures identified above because it is heavily influenced by the methodology used to estimate the asset value. While the AER identifies gearing as one factor Standard & Poor's takes into consideration in determining the credit rating, it is not as appropriate for a regulated business given the asset value uncertainty.[221] For this reason it should only be considered as one of a number of factors taken into account in an assessment of the credit rating.

A suite of measures is likely to be much more effective in determining a credit rating than reliance on one measure in isolation.

7.3 How should those financial measures and qualitative factors be applied and what weight should be given to each of these? To what extent should Standard and Poor's rating criteria be applied to set the benchmark credit rating?

While efforts have been made in the past to undertake technical quantitative analyses to 'estimate' the benchmark credit rating from comparator information, it is clear that there are a number of non-quantifiable factors that should also be taken into consideration when determining whether to depart from the previously adopted benchmark credit rating.[222] Financial measures and qualitative factors should be considered holistically in order to obtain a more complete overview of the business and its ability to repay debt. Mechanistic application of a series of financial measures is unlikely to provide a sufficiently complete overview of the business.

Each of the financial measures and qualitative factors are relevant to the benchmark credit rating, and should be given equal weighting in the assessment. That said it is important to emphasise that any assessment should not be mechanistic, and should therefore take account of all of the circumstances influencing the financial position of the business.

The rating criteria applied by Standard and Poor's is relevant in that it provides a framework for combining business and financial risk profiles to determine the credit rating. The criteria provide an indication of the relationship between the business risk profile, financial risk profile and the credit rating, as applied by Standard and Poor's when determining the comparator credit ratings.

However, there is likely to be little merit in seeking to replicate the assessment of benchmark financial risk and benchmark business risk to determine a benchmark credit rating by applying Standard and Poor's criteria. This is because the risk assessment as applied by Standard and Poor's involves a high degree of subjectivity, such that it would be impossible to replicate in a consistent manner. As highlighted throughout this chapter, the application of mechanistic approaches to determining the benchmark credit rating is not appropriate given the uncertainty by which parameters are estimated.

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221 AER, *Review of the weighted average cost of capital (WACC) parameters for electricity transmission and distribution,* Issues Paper, 2008, page 69

222 See for example ACG, *Credit rating for a benchmark electricity transmission business,* Report to Electricity Transmission Network Owners Forum, May 2006

Benchmark credit rating – analytical methods

7.4 What method should be used to set a credit rating benchmark?

As the AER highlighted in the Issues Paper (page 70), there are three approaches that have been used to analyse available comparator data to determine a benchmark credit rating. These are:

- regression analysis;
- using the median or average of comparator sample; and
- the 'best comparator' approach.

There are potentially flaws with each of these approaches, such that no one approach should be used in isolation and the results should be subject to an assessment of other factors that might influence the credit rating results of the comparators as compared with the benchmark business.

The problems with the regression analysis include:

- results can be affected by the sample choice, and the exclusion/inclusion of specific businesses; and
- the inappropriateness of using ordinary least squares (OLS) to estimate the relationship between financial indicators and the credit rating, because credit rating is a discrete variable. Using OLS in these circumstances results in the statistical error term failing its normality assumption, leading to the estimated coefficients being biased. Alternative statistical techniques should therefore be used.

Using an average of credit ratings from comparators suffers from problems associated with averaging. This potentially leads to an 'average' credit rating that might not be observed amongst any of the comparators or may be inappropriate for the electricity transmission or distribution asset in question. This problem was highlighted in the East Australian Pipeline Ltd decision, where the ACCC chose BBB+ on the basis of an averaging approach, while the sample included three businesses with BBB and one with A-. The Tribunal found that BBB was the appropriate assumption to have made based on the available data.

The 'best comparator' approach has the potential to result in biases based on the choice of sample. The focus therefore needs to be on choosing those comparators that are unlikely to result in biased results.

This discussion highlights the fact that:

- more than one method should be used;
- regression analysis is likely to have serious methodological flaws; and
- this information should be just one part of an assessment of the evidence on the credit rating.

Overall, no one specific approach should be used in isolation and all three approaches posited by the Issues Paper are relevant to consider. Having considered them, there is no persuasive evidence to depart from BBB+. Indeed, there is persuasive evidence to adopt a rating no higher than BBB+.

7.5 Are there any other methods not mentioned above that could viably be used to set a benchmark credit rating?

Any reliable additional information that could be obtained via different methods should be used in conjunction with the above approaches, so that no single approach is relied upon.

That said, there are no reliable additional approaches of which we are aware.

7.6 How should a 'best comparators' benchmark be determined?

The 'best comparators' benchmark approach was used by ACG to analyse the relationship between benchmark credit ratings and the characteristics of comparator businesses.[223] The approach involves:

- selecting a number of comparator businesses;
- calculating the financial ratios for these business including interest cover, funds from operations to total debt, free operating cash flow to total debt, and the ratio of cash flow to capital expenditure;
- comparing the financial ratios for the comparator businesses against the benchmark credit rating assumed financial ratios and explaining observed differences in ratios and credit ratings; and
- determining whether the evidence supports the existing BBB+ assumption for the credit rating for transmission and distribution businesses.

In essence, this approach allows for a consideration of both the quantifiable and non-quantifiable factors affecting the credit rating to determine whether there is evidence to support a change in the benchmark credit rating. It requires detailed consideration of all of the factors likely to affect the credit rating and the application of logic to the determination of the benchmark credit rating.

In our view, this approach is superior to a regression approach or a simple averaging approach because it requires logical assessment of the reasons for observed differences in factors influencing credit ratings between comparator businesses and the benchmark regulated business.

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[223] AER, *Review of the weighted average cost of capital (WACC) parameters for electricity transmission and distribution,* Issues Paper, 2008, pages 20-24

To determine the relevant comparator businesses, it is appropriate to exclude:[224]

- wholly government owned businesses;[225]
- businesses with significant non-regulated activities;
- businesses where Standard & Poor's has stated that the rating follows the rating of a parent company; and
- businesses currently undergoing financial restructuring, merger and acquisition activity, or rapid expansion.

These exclusions are made because these characteristics are inconsistent with a benchmark assumption of a stand alone electricity transmission or distribution business.

[224] ACG, *Credit rating for a benchmark electricity transmission business,* Report to Electricity Transmission Network Owners Forum, May 2006, page 21

[225] As indicated on page 13, the ownership of a business can have an influence over its credit rating. For this reason, to determine a benchmark credit rating for a stand alone business it would not be appropriate to use government owned businesses as a comparator.

8 Assumed Utilisation of Imputation Credits (Gamma)

Introduction

The previously adopted gamma is 0.5. There is a wealth of persuasive evidence that this value is inappropriate and that a different, considerably lower, value should be adopted.

There are two values multiplied together to give the utilisation of imputation credits (the value of gamma):

- the rate at which imputation credits are distributed; and
- the value to investors of imputation credits at the time they are received.

Considering gamma in isolation, market evidence supports the adoption of a distribution rate of 0.71 while the most recent dividend drop-off studies suggest that the market value of imputation credits is between 0.2 and 0.35. Consequently, the most recent market evidence is that gamma (0.71 x 0.2 to 0.35) is between 0.15 and 0.25.

Therefore, the Joint Industry Associations propose a point estimate of the assumed utilisation of imputation credits (the value of gamma) of 0.2.

However, the same data that delivers the gamma of 0.2 also shows that investors do not value cash dividends at their face value. As the attached expert material explains, the gamma of 0.2 can only deliver a coherent WACC on the condition that it is also recognised that the market value of cash dividends is less than the face value of those dividends. The CAPM, as previously used under the NER, does value dividends at their face value. Therefore, the AER needs to make a further adjustment to the way that the NER have previously established the WACC to ensure that it delivers a return that provides network businesses with a reasonable opportunity to recover at least the true and efficient cost of capital, as required under the NER and NEL.

There are several ways in which this may be done.

One approach would be to adopt the 0.2 value of gamma and make an adjustment to the MRP which, as discussed in Chapter 5 of this submission, would require the MRP to be rounded up to 7 per cent instead of the previous approach of rounding down to 6 per cent.

Alternatively, given that the benefit from imputation credits is of a magnitude that equally offsets the 'penalty' associated with the payment of dividends, the other way to resolve this modelling inconsistency is to set the gamma to zero and leave dividends at their face value.

Each of those methods of resolving the issue would be acceptable to the Joint Industry Associations. There may also be other ways to resolve the inconsistency and the Joint Industry Associations are ready and willing to be consulted with any such alternatives.

Gamma (the 'assumed utilisation of imputation credits') is the value of credits at the point of creation. There are two components of this value:

- **The distribution rate (F):** the proportion of imputation credits that are attached (franked) to dividends and therefore distributed to shareholders; and
- **Theta (θ):** the market value of an imputation credit at the time that shareholders receive a franked dividend.

The key issues and observations are:

1 The previously adopted gamma value for both electricity transmission and distribution service providers is 0.5.

2 Empirical analysis of the distribution rate and Theta should be based on a comprehensive data set to minimise estimation errors. In considering this data set it should be recognised that there is no empirical evidence to reject pre-2000 data.

The most appropriate distribution rate benchmark for regulated electricity transmission and distribution businesses is a market average, which is estimated at 0.71, for the reasons stated below:

i. it is unclear whether the dividend policy of a benchmark regulated electricity utility should be higher or lower than the market in general as:

- regulated electricity transmission and distribution businesses have relatively stable and predictable revenues and costs, which suggest they may have the ability to pay a higher than average dividend yield;
- the requirement on regulated firms to fund asset replacement and new infrastructure to meet demand growth suggests they have a lower than average dividend yield; and
- regulated electricity transmission and distribution businesses have debt gearing of around 60 per cent, approximately twice that of the average listed firm, which suggests they have a lower than average dividend yield.

ii. a benchmark based on the distributions of listed Australian regulated utilities is likely to understate the dividend policy of a benchmark regulated electricity transmission and distribution business because:

- only 29 per cent of the RAB of Australian electricity transmission and distribution networks regulated under the NER are listed;

- listed utilities include firms which use complex financial structures such as trusts and stapled securities to make distributions that comprise a return of capital, interest and dividends - the dividend component is therefore likely to understate the dividend yield of a benchmark regulated electricity utility; and

- the average capital expenditure growth rate of listed Australian regulated utilities is around 3 per cent.[226] Whereas the expected compounded growth rate of regulated electricity transmission and distribution businesses over the period 2003/04 to 2007/08 ranged from 1.8 per cent to 11.6 per cent, with 12 of the 19 utilities having a growth rate of 5 per cent or more.[227]

3 Setting aside the issue of the consistency with the other aspects of the CAPM, the value of distributed imputation credits (Theta) should primarily be estimated from market data. Theoretical arguments can assist in the interpretation of market data but prime reliance should be placed on the substantial body of empirical analysis.

The best estimate of Theta is derived from dividend drop-off studies which have recently estimated a value of between 0.2 and 0.35 because these studies are accurate, reliable and timely. However, these values are conditional on investors valuing cash dividends at less than their face value, for which there is strong empirical evidence.

4 Redemption rates for imputation credits are not a valid estimate of the market value of imputation credits and should be disregarded. To access credits investors must bear risk (ie, forego the benefits of diversification). Therefore, the value of imputation credits cannot be inferred directly from the fraction of credits redeemed. This is because the face value redeemed, represents a gross benefit and does not include the costs of redemption (foregoing diversification).

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226 AER, *Powerlink Queensland transmission network revenue cap 2007-08 to 2012: Decision*, 14 June 2007, page 100, as quoted in *NERA, The Value of Imputation Credits:* A report for the ENA, Grid Australia and APIA, August 2008, page 21

227 NERA, *The Value of Imputation Credits: A report for the ENA, Grid Australia and APIA, August 2008*, page 18

5 There are a number of inconsistencies between the value of gamma and other components of the cost of capital, including:

- the empirical evidence from dividend drop-off studies is that Theta has a positive value. However, this is conditional on the market value of dividends being less than one. In other words, the empirical evidence suggests that to accrue the benefits of imputation credits regulated electricity transmission and distribution businesses must incur a penalty from distributing dividends.

  It is relevant to note that dividend drop-off studies consistently show that the benefit from imputation credits is equally offset by the penalty associated with the payment of dividends. It would, therefore, be correct and preferable for these effects to be offset by setting a gamma value of zero.

- Officer and Bishop demonstrate that the currently adopted value of 6 per cent MRP was originally based on evidence that excluded any explicit consideration for the value of imputation credits.[228] This is clearly inconsistent with the adoption of a positive value for gamma. If the current adopted value of gamma is retained then the equivalent return value should be added to the MRP.

  If the AER were to continue to maintain a 0.5 value for gamma then the following recommendation of Officer and Bishop is strongly supported:[229]

  > The market risk premium of 6% was originally based on evidence that excluded any explicit consideration of a component to reflect any value of imputation tax benefits in the historical MRPs. Consequently the 6% can be viewed as an estimate of the MRP when this value is zero (the term 'gamma' is usually used to reflect the value of $1 of imputation tax benefits created by a firm however we are concerned with the value of a dollar of imputation tax benefits once distributed given that we are adjusting observed market returns). The inclusion of an estimate of the imputation tax benefits in the historical estimate of market equity returns forms the basis of our recommendation that the MRP be increased from 6% to 7% as qualified below.

To summarise, the empirical evidence provides persuasive evidence that the actual value of gamma is less than the currently adopted value of 0.5. Recent estimates suggest that the market distribution rate is 0.71 while updated dividend drop-off studies suggest that the market value of imputation credits is between 0.2 and 0.35. Consequently, the most recent studies suggest a gamma (established in isolation from the consistency issues) of between 0.15 and 0.25.

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228 Officer B & Bishop S, *Market Risk Premium: A Review Paper - Prepared for* ENA, APIA and Grid Australia, August 2008, page 39

229 Officer B & Bishop S, *Market Risk Premium: A Review Paper - Prepared for* ENA, APIA and Grid Australia, August 2008, page 39

However, these estimates are conditional on the market value of dividends being less than their face value, whereas CAPM as it has been previously applied under the NER values dividends at their face value.

Therefore, further adjustments are needed to the way that the NER have previously established the WACC to ensure that it delivers a return that provides network businesses with a reasonable opportunity to recover at least the true and efficient cost of capital, as required under the NER and NEL.

There are several ways in which this may be done.

One way is to make an adjustment to the MRP, rounding it up to 7 per cent instead of the previous approach of rounding it down to 6 per cent. The appropriateness of this is discussed further in the market risk premium chapter.

Another way is that, given the benefit from imputation credits equally offsets the penalty associated with the payment of dividends, one effect could be off set against the other by setting gamma at zero.

Either of those approaches (a gamma of 0.2 and an MRP of 7 per cent; or a gamma of zero and an MRP of 6 per cent) would be acceptable to the Joint Industry Associations.

There may also be other means of addressing the issue and the Joint Industry Associations are ready and willing to be consulted on any other solutions.

The Adopted Gamma Values

The 'adopted value' of gamma for electricity transmission and distribution is 0.5.

Gamma requires assumptions on the distribution rate of regulated electricity transmission and distribution businesses and estimates of the market value of credits distributed to shareholders. The NER requires that there be persuasive evidence before adopting a different value to the previously adopted value.

For electricity transmission businesses the gamma value is deemed by the NER to be 0.5.[230] The value of gamma for distribution is not explicitly set out in the NER. However, a gamma value of 0.5 has been adopted for all distribution businesses operating within the NEM. Table 8.1 sets out the values for gamma currently adopted for electricity distribution service providers.

[230] NER, version 21, 1 July 2008, clause 6A.6.4(a)

Table 8.1: Adopted values for electricity distributors – Gamma[231]

Jurisdiction	Distribution Network Service provider	*Previously Adopted Gamma value*
Australian Capital Territory	ActewAGL	*0.5*
New South Wales	Country Energy	*0.5*
	EnergyAustralia	*0.5*
	Integral Energy	*0.5*
Queensland	ENERGEX	*0.5*
	Ergon Energy	*0.5*
South Australia	ETSA Utilities	*0.5*
Tasmania	Aurora Energy	*0.5*
Victoria	AGL Electricity	*0.5*
	CitiPower	*0.5*
	Powercor	*0.5*
	SP AusNet	*0.5*
	United Energy	*0.5*

[231] See Gilbert + Tobin Legal Opinion attached as Appendix B

The Distribution Rate (F)

> Making the reasonable assumption that regulated electricity transmission and distribution businesses on average have a similar ability to distribute imputation credits as the market as a whole, F is estimated to be 0.71.

Imputation credits are conveyed to shareholders by attaching the credits to dividend payments. The distribution rate is the proportion of imputation credits that are expected to be attached (franked) to dividends and distributed to shareholders. It follows that the distribution rate will heavily depend on the expected dividend yield assumed by the AER.

Determining the proportion of imputation credits that should be assumed to be distributed for regulated electricity transmission and distribution businesses is a matter of contention. The Issues Paper identifies three estimates of the expected distribution rate that could be used:

- a firm specific distribution ratio;
- a market-wide historical average; or
- an industry historical average.

The Issues Paper also raises the question of whether it is reasonable to presume that changes in tax laws or distribution methods have resulted in the distribution rate increasing in recent years.

Changes in the distribution rate, or not?

Whether the changes to the imputation tax regime on 1 July 2000 that allowed domestic individuals to receive a rebate for the unused imputation credits (the 2000-tax changes) have increased the distribution rate should be a matter of empirical analysis. The Joint Industry Associations are not aware of any study that attempts to quantify shifts in the dividend policies of companies that resulted from the 2000-tax changes. That being said, the empirical evidence does not support a finding that there has been an increase in the market value of imputation credits in recent years (this is discussed in greater detail below).

Even if there was an increase in the value of imputation credits, it is unclear that this change would necessary lead to an increase in distribution rates. This is because the level of dividends paid by a firm, and therefore the imputation credit distribution ratio, will depend on a number of factors. One such factor is the extent to which it is appropriate for the firm to retain profits to fund future growth.

The AER recognised the importance of this factor when it concluded that an industry benchmark dividend yield was not appropriate due to differences in capital growth rates.[232]

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[232] AER, *Powerlink Queensland transmission network revenue cap 2007-08 to 2012: Decision, 14 June 2007*, page 100

The Issues Paper also suggests that alternative distribution methods such as off-market buybacks may allow large energy utilities to:[233]

> … fully distribute accrued imputation credits regardless of the origin of their shareholders.

The incentive to stream imputation credits is well understood by the Australian Taxation Office (ATO) and legislators and has resulted in several legislative measures to impede the streaming of credits. The Department of the Treasury's recently released Discussion Paper entitled 'Australia's Future Tax System (AFTS)' states:[234]

> The different treatment of non-resident shareholders also creates incentives to pay franked dividends to resident shareholders and dividends that are not franked to non-resident shareholders 'dividend streaming', or otherwise transfer imputation credits to residents 'franking credit trading'. Guarding against these practices involves significant complexity in the tax law and compliance costs.

This suggests that in the future there will be no less vigilance in guarding against the streaming of imputation credits. Consequently, any remaining ability that the firm has to legally use a particular mechanism to more effectively 'target' the distribution of imputation credits is likely to be transitory. It would therefore be incorrect to expect that large energy utilities will be able to stream their dividends in the future.

While there is no reason to believe that the distribution rate should remain stable over time, no empirical study has yet attempted to quantify the extent or direction of changes in such rates. Therefore, estimates based on a comprehensive data set are preferable as they are more statistically robust than those that limit themselves to a subset of the available data.

Empirical evidence of the distribution rate

Firm-Specific Distribution Rate

In the Officer (1994) model, the distribution ratio is a firm specific parameter rather than a market average.[235]

However, in a regulatory context, where a regulated firm's cost of capital is a forward looking benchmark rate of return, the distribution rate should be based on an estimated distribution rate of a benchmark firm. That is, a firm-specific estimate of the distribution ratio is not appropriate.

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233 AER, Issues Paper, page 81

234 Australian Government, *Architecture of Australia's tax and transfer system*, August 2008, pages 263-264

235 This was recognised in Lally, M., *Review of The Value of Imputation Credits for Regulatory Purposes,* 5 December 2005, page 7

In practice, the estimation of a benchmark firm-specific distribution rate is not possible since there is a degree of variation in the tax paying position and expected growth of different regulated electricity transmission and distribution businesses. Therefore, no single value can be applied to all electricity transmission and distribution businesses in the NEM. Consequently, while there may be some merit in using a firm-specific estimate of the distribution rate as a cross-check on the benchmark value, it is not appropriate or possible to use it as a primary method of estimating the benchmark value.

Notwithstanding the above, in its recent gas distribution determination the ESC attempted to measure the firm-specific distribution rate. The ESC's approach contained a number of flaws, one of which was the use of the average 'dividend' yield of listed Australian regulated utilities.[236] The dividend yield of regulated utilities in general is not comparable to that of electricity or gas transmission and distribution businesses since the dividends paid by these firms often represent the repayment of loans and interest charges. In a report commissioned by the Joint Industry Associations NERA and Wheatley,[237] highlight that:

> A problem with the ESC argument is that a large fraction of the dividends that listed utilities paid in 2006 represented not the payment of dividends conventionally defined but the repayment of loans and interest on the loans. For example in 2006, Envestra, paid 9.5 cents in dividends and of these 9.5 cents, 6.14 cents represented a partial loan repayment and 3.36 cents represented a payment of interest. Of the nine securities the ESC examined, seven (including Envestra) were stapled securities. Utilities tend to have high free cash flow relative to accounting profits because of the substantial depreciation charges they carry. Issuing stapled securities allows the companies to distribute the free cash flow and so limit the agency costs associated with accumulating free cash flow. The result is that few franking credits are distributed by utilities. In 2006, of the nine securities that the ESC examined, five distributed no franking credits.

By adopting the average dividend yield of listed Australian regulated utilities as a proxy for that of Victorian gas distributors, the ESC analysis overstated the ability of these distributors to distribute imputation credits.

The dividend yield of listed Australian regulated utilities is an inappropriate benchmark for that of regulated electricity utilities since it does not reflect the capital growth requirements of many electricity transmission and distribution businesses. The extent to which a firm requires capital to invest in growth is an important factor in determining its ability to distribute dividends and therefore imputation credits.

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[236] USB Investment Research 2006, Australian Infrastructure and Utilities Index, 6 October quoted in ESC, *Gas Access Arrangement Review 2008-2012: Draft Decision*, August 2007, pages 428-429

[237] NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 17, which is attached to this submission as Appendix K.

The importance of capital growth rates was emphasised by the AER in its Powerlink decision where it stated:[238]

> Unlike Powerlink, the capex growth rates of the entities in the sample, relative to their asset bases, average around 3 per cent. The AER notes that Powerlink faces an average capex growth rate of 12 per cent during the next regulatory period. This suggests that a dividend yield assumption of 8 per cent may be inconsistent with the capex profile of the businesses with high capex growth rates, like Powerlink.

NERA and Wheatley reviewed the expected capital expenditure growth rates of regulated electricity transmission and distribution businesses and found that capital expenditure growth ranged from 1.8 per cent to 11.6 per cent, with 12 of the 19 businesses having a growth rate of 5 per cent or more.

Estimation of the Distribution Rate – Market vs Industry Rate

In determining the benchmark distribution rate to be applied to all electricity transmission and distribution businesses it is relevant to consider whether such a benchmark should be based on market or industry-wide data.

The use of a market average distribution rate implicitly assumes that on average, regulated electricity transmission and distribution businesses have a similar distribution rate as all firms operating in Australia. This was the approach taken by Hathaway and Officer (2004).[239] Using ATO statistics they calculated that over the 1988 to 2002 period net company tax collections were $265 billion and that $77 billion in imputation credits were retained by Australian firms. Consequently, $188 billion (or 71 per cent) of the imputation credits created during this period were distributed.

It is unclear whether the dividend rate of a benchmark regulated electricity utility would be higher or lower than the average of all other firms in the market since:

- regulated electricity transmission and distribution businesses have relatively stable and predictable revenues and costs, which suggests a higher than average dividend yield is possible;
- regulated firms have unique investment requirements as they must reinvest funds to maintain the real value of their regulated asset base, which suggests they have a lower than average dividend yield; and
- regulated electricity transmission and distribution businesses have debt gearing of around 60 per cent, approximately twice that of the average listed firm, which suggests a lower than average dividend yield.

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238 AER, *Powerlink Queensland transmission network revenue cap 2007-08 to 2012: Decision*, 14 June 2007, page 100

239 Hathaway N. and Officer, B, *The Value of Imputation Tax Credits*, Working Paper, 2 November 2004, page 4. The Hathaway-Officer approach is a generally accepted and statistically robust method for estimating the market average distribution ratio.

Another possible market-wide benchmark has been suggested by Lally.[240] Lally estimated the ratio of distributed imputation credits to tax paid by the eight largest listed firms in 2001.[241] However, the applicability of this benchmark to regulated electricity transmission and distribution businesses is minimal:

- as the sample includes a range of industries including banking, mining, media and telecommunications but does not include any regulated energy infrastructure firms;
- there is no intuitive reason to believe that firms of a similar size would have the same distribution rate;
- in any case, most regulated electricity transmission and distribution businesses are substantially smaller than the firms sampled by Lally; and
- the use of a single year of data means that the calculated distribution rate is likely to be unrepresentative of the sample group given the high volatility seen in similar studies, eg, the Envestra study which is discussed below.

In a submission to the Queensland Competition Authority (QCA), Envestra suggested the use of an industry-wide benchmark distribution rate.[242] Envestra's sample included, AGL, Alinta, Australian Pipelines Trust, United Energy (until sale), Origin Energy, Envestra and GasNet Australia. Over the 2000 to 2004 period Envestra calculated that the distribution of imputation credits as a proportion of tax paid averaged 82 per cent. However, the distribution rate varied significantly over the 2000 to 2004 period from a minimum of 63 per cent to a high of 103 per cent.[243]

As discussed earlier, listed Australian regulated utilities have a number of features that limit their suitability as a proxy for a benchmark regulated energy utility, including:

- the use of complex financial structures such as trusts and stapled securities to distribute dividends that effectively comprises an effective return of capital; and
- strong differences in terms of capital expenditure growth rates.

As a result, the sample firms suggested by Envestra and Lally are not suitable proxies for an electricity utility. At a minimum the choice of a sample group to be used as a proxy should not include any firms that have complex financial structures that allow them to make non-dividend distributions. Further, the sample group should, as far as possible, include firms that have a similar expected capital growth rate as that of Australian electricity transmission and distribution businesses.

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240 Lally, M, *Regulation and the cost of equity capital in Australia*, Journal of Law and Financial Management, vol.2, no.1, November 2003, page 16

241 Telstra, News Corporation, NAB, BHP, Rio Tinto, Westpac, Commonwealth Bank and ANZ

242 Envestra, *Comments on the review by Martin Lally of the 'The Value of Imputation Credits for Regulatory Purposes'*, Submission to the QCA, February 2006 as quoted in Issues Paper, page 76

243 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 22

In the absence of a compelling industry benchmark it is reasonable to assume that, on average, regulated electricity transmission and distribution businesses have a similar ability to distribute imputation credits as the stock market average. The most robust current estimate of the market-wide distribution rate is 0.71 as calculated by Hathaway and Officer (2004).

Market Value of Imputation Credits (Theta)

The distribution rate determines the quantity of imputation credits assumed to be received by shareholders, while Theta determines the market value of those distributed credits.

Before assessing the current empirical evidence of the value of Theta the Issues Paper raises a number of theoretical and methodological issues. These issues are addressed in the following two sections.

Theoretical Issues with estimating Theta

> The focus on presumed benefits to an average or marginal investor that have been the subject of previous regulatory controversy is an unnecessary distraction. Empirical estimates correctly determine the market value of imputation credits.

The Issues Paper states that two of the key issues with estimating Theta are:

- the extent to which foreign investors should be recognised; and
- the identity of the investor from whom the valuation of imputation credits should be inferred (ie, the marginal or average investor).

Each of these is addressed in turn below.

Foreign investors

The evidence clearly indicates that the Australian equity market is to a large extent integrated with world equity markets. There are few barriers facing Australians who wish to invest in larger and more developed international equity markets or international investors who wish to participate in the Australian equity market.

It was recently estimated that non-residents own around 32 per cent of the shares in Australian companies.[244] Australia has run a current account deficit every quarter for the past 30 years and so has been borrowing from the rest of the world each quarter for the last 30 years.

[244] Australia Government, *Architecture of Australia's tax and transfer system*, August 2008, page 261

Average or marginal investors

Focusing on the benefits accrued by the average or marginal investor is both misleading and unnecessary. As discussed by NERA and Wheatley for risky assets all investors will generally be *marginal* investors. This occurs because:[245]

> All investors though, will wish to diversify and so all investors will typically hold some position in each stock. It follows that *all* investors will be marginal investors.

In other words, the principle that investors own diversified portfolios will result in all investors generally being marginal investors.

NERA and Wheatley, highlight that there is a substantial body of economic literature on the issue of differential personal taxation, which imputation credits affect.[246] This literature makes a number of valuable observations.

First, differential personal taxation rates on dividends will lead to individuals holding different portfolios.[247] The differing ability to redeem imputation credits for domestic versus foreign shareholders will lead to domestic investors holding portfolios more heavily weighted with domestic equities than foreign investors because of the franking credits that the equities provide. Foreign investors, on the other hand, will be discouraged from holding domestic equities because of their inability to use the credits fully. However, as all investors desire a diversified portfolio both domestic and foreign shareholders will generally own domestic and international shares.

Second, the impact of taxes on the cost of capital is determined by the taxes that a representative investor faces. The taxes that a representative investor faces are weighted averages of the taxes that individuals face. The weights are determined in large part by the *wealth* of each investor. Foreign investors share in common the characteristic that they cannot make full use of imputation credits and this characteristic is unlike domestic investors. So if equity markets are integrated, the impact of changes to the personal tax rates of domestic shareholders will be minimal as the representative investor will more closely resemble foreign investors (ie, investors who cannot fully redeem imputation credits).[248]

Third, a further implication of individual shareholders holding diversified portfolios is that there is largely a single *market value* for franking credits. In other words, the market value of franking credits will be similar for all Australian listed companies, regardless of the proportion of respective holdings of domestic or international shareholders.

While theoretical postulations can assist in the understanding of Theta, where possible estimates of Theta should be calculated by reference to market data. Empirical analysis can be used to estimates the market value of Theta whether or not you adhere to all the details of the above theoretical discussion and presume the relevant value of imputation credits is either the average or marginal investor.

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245 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 11

246 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, pages 8-11

247 For example, individuals who face high taxes on dividends will hold portfolios with a lower weight placed on high-yield stocks while tax exempt investors will hold portfolios heavily weighted with high-yield stocks.

248 As a result, the expectation is that the value of Theta would be low.

Methodological issues with estimating Theta

> Estimates that rely on redemption rates are flawed and should not be used to estimate the Theta.
>
> There is no evidence that the 1 July 2000 changes to the imputation tax regime significantly increased the value of Theta. Therefore, data from before and after 2000 should be included in the analysis in order to improve the precision and statistical reliability of the estimates.

There are two key methodological issues raised by the Issues Paper, specifically:

- the use of the proportion of imputation credits redeemed by the ATO as a proxy for the 'value' of imputation credits to investors; and
- that the value of imputation credits has changed over time, due to changes in the Australian imputation tax regime.

Each of these issues is addressed in turn below.

<u>The use of redemption rates</u>

Section 8.3.3.4 of the Issues Paper examines a number of studies that use ATO tax statistics to determine the proportion of credits redeemed by taxpayers. Underpinning this approach is the implicit assumption that the value of imputation credits redeemed by an individual is equal to its face value. If this approach is taken (which for the reasons discussed above and below it should not be), the 'average' value of distributed imputation credits is equal to the proportion of the imputation credits redeemed.

Both NERA and Wheatley as well as SFG Consulting are highly critical of an approach that purports to measure the market value of Theta by reference to the proportion of credits redeemed.

NERA and Wheatley highlight that a redemption ratio cannot ignore the costs to investors in acquiring the credits:[249]

> …to access a large share of the credits, Australian investors must forego the benefits that they would otherwise gain from diversifying internationally. Valuing the credits is not therefore as straightforward a proposition as it might first appear. Valuing the credits requires one to estimate their value. Their value cannot be inferred directly from the fraction of the credits that are redeemed because this overlooks the costs that investors bear in accessing the credits.

[249] *NERA, The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 14

On the other hand, SFG Consulting states:[250]

> In my view, measuring how many investors use a particular type of asset tells us nothing about its value. When estimating the risk-free rate, for example, we do not consider how many investors use government bonds, we examine their market price.

Further, the SFG Consulting report provides an illustrative hypothetical where the question is posed of whether banning all foreign investment would lower the cost of capital for Australian firms since it would increase the redemption rate to 100 per cent. SFG Consulting state:

> To see why this is the case, consider two Australian companies that are identical in all respects except that one operates under foreign ownership restrictions and the other does not. Specifically, suppose the first firm is prevented from raising any foreign equity. For this firm, all franking credits that were distributed would go to resident investors who could redeem them. The average redemption rate would be 100%. If this were used to estimate theta (and consequently gamma) the downward adjustment to the cost of equity would be much greater than even is the case where gamma is assumed to be 0.5. That is, the implication of using average redemption rates to estimate theta (and consequently gamma) is that a firm's cost of capital could be substantially reduced, relative to that of its peers, by imposing foreign investment restrictions on it. However, the exact reverse is true – less foreign investment means a lower supply of capital and consequently an increase in its cost.

SFG Consulting also draws attention to the Handley and Maheswaran paper which was cited in the Issues Paper. This study estimated the redemption rates over a number of sub-periods. SFG Consulting state:[251]

> The focus of this paper is on what the authors refer to as the efficacy of the imputation system – the extent to which franking credits are redeemed by investors. That is, the point of the paper is simply to describe which classes of investor redeem franking credits and which classes do not. To a large extent, the paper is unnecessary – we already know that franking credits distributed to non-residents will not be redeemed and that most franking credits distributed to resident investors will be redeemed. Thus, this paper really tells us more about the residency of investors than about how franking credits affect the corporate cost of capital. Indeed the terms 'theta' and 'gamma' are not referred to at all in the paper.

To conclude, estimates that rely on redemption rates are flawed and should not be used to estimate Theta.

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250 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, Report prepared for ENA, APIA and Grid Australia*, 15 September 2008, page 12, which is attached to this submission as Appendix L.

251 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, August 2008, page 13

Changes over time to the value of Theta

In general, estimates of Theta which are based on long term data periods provide estimates that are more precise and statistically robust. However, where there is evidence that the value of Theta has changed over time it may be appropriate to examine shorter time periods.

The Issues Paper suggests that the changes to the imputation tax regime on 1 July 2000 increased the value of imputation credits.[252] The 1 July 2000 changes allowed resident shareholders to claim a rebate for imputation credits in excess of those necessary to offset their Australian tax liability. Previously excess credits were wasted.

SFG Consulting explicitly reviewed the empirical evidence of a structural break in 2000.[253] They review the following three recent studies to ascertain whether there had been a structural break in the value of Theta, and concluded that:

- in Hathaway and Officer (2004) the estimated value of Theta fell for two and half years post 2000. However, by the end of the sample period the estimated value of imputation credits was no higher than it was when the rebate provision was introduced;
- when ACG (2006) estimated Theta for three year periods before and after the 1 July 2000 it found that for both periods the estimates of Theta were insignificantly different from zero; and
- in Beggs and Skeels (2006) there was no statistically significant change in the estimated value of Theta at any time other than in 2000, when the value of a dollar cash dividend increased to over $1.16.

SFG Consulting concluded that:[254]

> My view is that there is a strong weight of evidence to support the conclusion that the Rebate Provision did not cause a significant increase in the value of franking credits in July 2000. Accordingly, data from before and after 2000 should be included in the analysis in order to improve the precision and statistical reliability of the estimates.

There is no evidence to reject pre-2000 data. Therefore, empirical estimates of Theta should be based on a long term data set to minimise estimation errors.

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252 AER, Issues Paper, page 89

253 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 13-16

254 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 20

Current estimate of the value of Theta

> The current empirical evidence supports a value for Theta that ranges from 0.2 to 0.35.

SFG Consulting has been commissioned by the Joint Industry Associations to provide an independent assessment of the appropriate value of Theta. SFG Consulting assessed the results of three studies that attempted to estimate the value of Theta on the basis of empirical evidence:[255]

- the Cannavan, Finn and Gray (2004)[256] study estimated the value of Theta by comparing the prices of derivative securities and the shares underlying the securities. Cannavan et al concludes that:
  - the combined value of a dollar of cash dividends and attached imputation credits is $1.00, which is consistent with the results from dividend drop off studies; and
  - the cash dividends are fully valued and that Theta is close to zero after the 1997 tax amendments that effectively prevented non-residents from 'selling' imputation credits to residents.

  SFG Consulting, highlight that this approach is based on a large sample size, involves thousands of observations for each stock that is examined (whereas each stock only has two ex-dividend dates per year), and has met the criteria for publication in the leading journal.
- the Ickiewicz (2007)[257] study considered whether the introduction of imputation credits lowered the cost of capital (ie, that gamma had a substantial positive value). The author surmised that if imputation credits had a value then the introduction of the regime would coincide with a substantial appreciation of Australian stock market prices. The author controlled for things like US stock market movements, exchange rates, interest rates, commodity prices and so on, and plotted whatever could not be explained.

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255 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, pages 17-20

256 Cannavan D., Finn F. and Gray S., *The value of dividend imputation tax credits in Australia*, Journal of Financial Economics 73 (2004) pages 167-197

257 Ickiewicz J., *Valuing dividend imputation credits in Australia: An alternative approach*, Honours thesis, University of Queensland Business School, 2007. as quoted in SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 24

The results suggest that the introduction of imputation tax regime did not lead to a significant upward adjustment in Australian stock prices. As a consequence, a gamma value of 0.5 is inconsistent with the market evidence at the time the imputation tax regime was introduced.

- a dividend drop-off study done by SFG Consulting (2007)[258] updated the Hathaway – Officer and Beggs –Skeels studies for data through to the end of 2006.

  The results of this analysis were that on average:

  a. The combined value of a $1.00 dividend and the attached franking credit is approximately $1.00 (average 97 cents), corroborating this part of the result in Hathaway and Officer and Beggs and Skeels;

  b. Cash dividends are estimated to have an average value of 84.6 cents in the dollar (range of 75 to 95); and

  c. Franking credits are estimated to have an average value of 27.8 cents in the dollar (range of 20 to 35). This represents an estimate of gamma of 0.28 under the assumption of a 100 per cent distribution rate and 0.19 under the assumption of a 70 per cent distribution rate.

[258] SFG Consulting, *The impact of franking credits on the cost of capital of Australian companies: A report for Envestra, Multinet and SP AusNet*, 25 October 2007, page 28

The empirical result from the Cannavan, Finn and Gray (2004) study that Theta, and consequently gamma, has a negligible value) is consistent with the practice of Australian companies and expert valuation professionals. For example:

- KPMG[259] examined 118 independent expert reports on company takeovers from 1 January 2000 to 30 June 2005 to identify market practice in relation to the valuation of imputation credits. Key findings of their investigation are that of the 33 reports that adopted CAPM to estimate the cost of equity:
  - none adjusted for imputation credits;
  - all adopted a MRP in the range of 6 per cent to 8 per cent; and
  - 76 per cent adopted a MRP of 6 per cent;
- Lonergan[260] examined independent expert reports issued between 1990 and 1999 and found that 88 per cent of reports that used the CAPM approach made no adjustment for imputation credits;
- Truong, Partington and Peat[261] surveyed the capital budgeting practices of 356 listed Australian firms and found that:
  - 72 per cent use the CAPM approach;
  - the average MRP used is 6 per cent; and
  - 83 per cent make no adjustment for imputation credits in project evaluation.

These studies provide strong evidence that market practice is to set gamma to zero and use a MRP of at least 6 per cent.

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259 KPMG, *Cost of Capital – Market practice in relation to imputation credits,* Prepared for the Victorian Electricity Distributors, July 2005, as quoted in SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 8

260 Lonergan W (2001), *The disappearing returns*, JASSA, Issue 1, Autumn, pages 8-17, as quoted in SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 28

261 Truong G, Partington G and Peat M (2005), *'Cost of Capital Estimation and Capital Budgeting Practice in Australia'*, Working Paper, University of Sydney, and Conference Proceedings, AFAANZ 2005, as quoted in SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 28

Inconsistencies between the Value of Gamma and Other Cost of Capital Parameters

> Dividend drop-off studies find Theta has a positive value, however, it is conditional on the market value of dividends being less than their fair value. The regulated firm's cash flows should recognise both benefits and penalties of imputation credits and dividends.
>
> If a positive value for gamma is included Officer and Bishop demonstrate that the MRP should be increased from 6 per cent to 7 per cent.
>
> Alternatively, it would be reasonable to offset each of these effects by setting gamma at zero.

Adopting a positive value for gamma has implications on the value of the MRP.

The empirical evidence from dividend drop-off studies is that Theta does have a positive value. However, it is conditional on the market value of dividends being less than one. Therefore, it would be inconsistent to make an adjustment to the cash flows of a regulated firm to remove the benefits of imputation credits without a corresponding increase in the cash flows to compensate investors for the costs of receiving dividends. SFG Consulting[262] argues that consistency with the CAPM requires that the value of a dollar of cash dividends should be worth $1.00, in which case the value of Theta is negligible.

Alternatively, it should be noted, that all the empirical studies consistently estimate that the market value of a cash dividend plus imputation credits is approximately equal to the face value of the cash dividend. In other words, the market value of imputation credits equally offsets the penalty associated with the payment of dividends. So a correct, preferable and simpler alternative would be to offset these effects completely and set a gamma value of zero.

Officer and Bishop demonstrate that the 6 per cent MRP was originally based on evidence that excluded any explicit consideration for the value of imputation credits.[263] This is clearly inconsistent with the adoption of a positive value for gamma. If the current adopted value of gamma is retained a similar value should also be assigned to those imputation credits distributed to the market as a whole.

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262 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, pages 5-6

263 Officer B & Bishop S, *Market Risk Premium: A Review Paper - Prepared for* ENA, APIA and Grid Australia, August 2008, page 39

If the AER were to continue to maintain a 0.5 value for gamma then the following recommendation of Officer and Bishop is strongly supported:[264]

> The market risk premium of 6% was originally based on evidence that excluded any explicit consideration of a component to reflect any value of imputation tax benefits in the historical MRPs. Consequently the 6% can be viewed as an estimate of the MRP when this value is zero (the term 'gamma' is usually used to reflect the value of $1 of imputation tax benefits created by a firm however we are concerned with the value of a dollar of imputation tax benefits once distributed given that we are adjusting observed market returns). The inclusion of an estimate of the imputation tax benefits in the historical estimate of market equity returns forms the basis of our recommendation that the MRP be increased from 6% to 7% as qualified below.

AER Questions

The appropriate benchmark – industry average approach

8.1 Do regulated utilities have different characteristics from the 'average firm' in the Australian market which suggests that the use of an industry-average value for F is more appropriate than a market-average?

Since imputation credits are distributed through the imputation of dividends the setting of the distribution ratio is really a question of the appropriate dividend policies of regulated electricity transmission and distribution businesses.

There are a number of features that distinguish regulated electricity transmission and distribution businesses from an average firm, including:

- relatively stable and predictable revenues and costs, which would suggest a higher than average dividend yield;
- the requirement on regulated firms to fund asset replacement and new infrastructure investments to meet demand growth, which suggests a lower than average dividend yield; and
- high levels of debt gearing relative to the average market gearing, which suggests a lower than average dividend yield.

[264] Officer B & Bishop S, *Market Risk Premium: A Review Paper - Prepared for* ENA, APIA and Grid Australia, August 2008, page 39

A benchmark distribution ratio derived from the dividend policies of the sample of stock market listed Australian regulated electricity transmission and distribution businesses will also be distinguishable from regulated electricity transmission and distribution businesses, in two key characteristics:

- stock market listed utilities include firms which use complex financial structures such as trusts and stapled securities to make distributions that comprise a return of capital, interest and dividends - the dividend component is likely to understate the dividend yield of a benchmark regulated electricity utility. For instance, the 2007 Spark Infrastructure Annual Report indicates that distribution for 2007 comprised only interest on loan notes and return of capital with all distributions being unfranked; and

- strong differences in terms of real asset value growth rates.

NERA and Wheatley observed that:[265]

> For example, in 2006 Envestra paid 9.5 cents in dividends and of this 9.5 cents, 6.14 cents represented a partial loan repayment and 3.36 represented a payment of interest.
>
> Utilities tend to have high free cash flow relative to accounting profits because of the substantial depreciation charges they carry. Issuing stapled securities allows the companies to distribute the free cash flow and so limit the agency costs associated with accumulating free cash flow. The result is that few franking credits are distributed by utilities. In 2006, of the nine Australian listed utilities, five distributed no franking credits.

However, the more important distinguishing feature is that a sample of Australian regulated utilities is unlikely to reflect the capital expenditure growth rates of regulated electricity transmission and distribution businesses. The importance of capital growth rates was emphasised by the AER in the Powerlink decision:[266]

> Unlike Powerlink, the capex growth rates of the entities in the sample, relative to their asset bases, average around 3 per cent. The AER notes that Powerlink faces an average capex growth rate of 12 per cent during the next regulatory period. This suggests that a dividend yield assumption of 8 per cent may be inconsistent with the capex profile of the businesses with high capex growth rates, like Powerlink.

NERA and Wheatley reviewed the expected real asset growth rates of regulated electricity transmission and distribution businesses and found significant variations between businesses operating in different states.[267] It is therefore doubtful that an industry benchmark using listed regulated utilities will illuminate the likely distribution ratio of regulated electricity transmission and distribution businesses.

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265 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 17

266 AER, Powerlink Queensland transmission network revenue cap 2007-08 to 2012: Decision, 14 June 2007, page 100

267 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, pages 19-21

8.2 What firms should be included in calculating a benchmark industry-average value for F?

For the reasons set out in our answer to question 8.1, listed regulated utilities are not an appropriate industry benchmark.

However, if the distribution rate of regulated electricity transmission and distribution businesses is estimated by reference to a benchmark industry-average then:

- the industry benchmark should remove any stocks that have complex financial structures that allow the firms to make non-dividend distributions; and
- the sample should as far as reasonably possible reflect the expected real asset growth rates of regulated electricity transmission and distribution businesses.

8.3 Is it reasonable to use firm-specific estimates of F as a cross-check on the benchmark value for F established?

In the Officer (1994) model, the distribution ratio is a firm specific parameter rather than a market average.[268] However, in a regulatory context, where a regulated firm's cost of capital is a forward looking benchmark rate of return, the distribution rate should be based on an estimated distribution rate of a benchmark firm. In other words, a firm-specific estimate of the distribution ratio is not appropriate.

Notwithstanding the above, in its recent gas distribution determination the ESC attempted to measure the firm-specific distribution rate. The ESC's approach contained a number of flaws, one of which was the use of the average 'dividend' yield of listed Australian regulated utilities.[269] As outlined in the response to Question 8.1 there are a number of problems with using the dividend rates of Australian stock market listed regulated utilities.

Consequently, there is little merit in using firm specific estimates as a cross-check to the estimated distribution ratio.

8.4 In calculating an industry-average value for F, is it more appropriate to assume that imputation credits are generated once tax is paid rather than as tax expense is incurred?

Under the AER's Post Tax Revenue Model (PTRM) the value of gamma is applied to the firm's estimated income tax liability. In other words, the value of imputation credits reduces the firm's expected cost of paying company income tax. Moreover, the PTRM does not recognise future tax liabilities as required by accounting standards. This suggests that when calculating an industry average value for F, it should measure distributed imputation credits as a proportion of a firm's tax paid.

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[268] This was recognised in Lally, M., *Review of* The Value of Imputation Credits for Regulatory Purposes, prepared for the QCA, December 2005, page 7

[269] ESC, *Gas Access Arrangement Review 2008-2012: Draft Decision*, August 2007, pages 429-430

The appropriate benchmark – the impact of tax changes

8.5 Given the likely impact of the July 2000 tax change, is it more appropriate to focus on the post-2000 period in calculating F?

This is answered jointly with Question 8.6 below.

8.6 Has the July 2000 tax change increased F for regulated utilities?

The only reason to focus on the post-2000 period would be if there is credible evidence that the distribution ratio has changed due to the July 2000 tax changes. While the distribution ratio may change over time it is doubtful that it can be statistically detected given the variability of empirical estimates of the distribution ratio. For example, when Envestra calculated the industry distribution ratio over the 2000 to 2004 period the ratio varied from between 105 per cent to 63 per cent.[270]

It is also uncertain that the changes in the 2000 tax law would have a material impact on the distribution ratio of firms. The level of dividends paid by a firm and therefore the imputation credit distribution ratio will depend on a number of factors. One of the primary factors will be the extent that a firm is required to retain profits to fund future growth.

The importance of this factor has been recognised by the AER in its recent Powerlink decision where it concluded that an industry benchmark dividend yield was not appropriate due to differences in capital growth rates.[271]

Further, it is unclear whether the 2000-tax change has increased the market value of imputation credits. This issue is discussed in greater detail in our response to Question 8.19 of the Issues Paper.

In conclusion, while there is no reason to believe that the distribution ratio should remain stable over time, to our knowledge no empirical studies have attempted to quantify the extent or direction of that change. It is also a matter of debate whether the 2000 tax changes have increased the market value of distributed imputation credits. However, even if the market value of imputation credits were to increase, it is not clear that this would have a material impact on the distribution ratio. As discussed earlier in this submission, a firm's dividend policy is determined by a range of factors including the requirement to efficiently fund future growth and so any impact is not expected to be material.

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270 Envestra, *Comments on the review by Martin Lally of 'The Value of Imputation Credits for Regulatory Purposes'*, February 2006, page 9

271 AER, *Powerlink Queensland transmission network revenue cap 2007-08 to 2012: Decision*, 14 June 2007, page 100

The appropriate benchmark – methods of distribution

8.7 Are off-market share buybacks prevalent in the utilities sector? Are there other dividend streaming methods utilised in the utilities sector?

This is answered jointly with Question 8.8 below.

8.8 Does the ability of firms to distribute imputation credits via off-market share buybacks suggest a benchmark value for F closer to 100 per cent for utilities for arbitrage reasons?

The Joint Industry Associations are unaware of any regulated transmission or distribution business that has in the past, or intends to in the future, undertake an off-market share buyback.

It is understandable that firms may respond to legal opportunities to stream imputation credits to those shareholders who have the highest value for them. However, it is not clear that government policy with respect to streaming has changed such that large firms such as energy utilities may be able to fully distribute accrued imputation credits regardless of the origin of their shareholders.

The incentive to stream imputation credits is well understood by the ATO and legislators and has resulted in several legislative measures to impede the streaming of credits. The Discussion Paper recently released by the Department of the Treasury entitled *'Australia's Future Tax System (AFTS)'* states:[272]

> The different treatment of non-resident shareholders also creates incentives to pay franked dividends to resident shareholders and dividends that are not franked to non-resident shareholders 'dividend streaming', or otherwise transfer imputation credits to residents 'franking credit trading'. Guarding against these practices involves significant complexity in the tax law and compliance costs.

This suggests that in the future there will be no less vigilance in guarding against the streaming of imputation credits. Consequently, any remaining ability that the firm has to legally use a particular mechanism to more effectively 'target' the distribution of imputation credits is likely to be transitory. It would therefore be incorrect to expect that large energy utilities will in the future be able to stream their dividends.

[272] Australian Government, Architecture of Australia's tax and transfer system, August 2008, page 263

Estimating the utilisation rate (Theta) – recognition of foreign investors

8.9 Is it more appropriate to focus on empirical evidence in estimating Theta rather than considering the theoretical values of either one or zero?

Both empirical evidence and theory can provide useful insights into the 'true' value of all the cost of capital parameters. It is also evident that a position which is supported by clear and logical theory combined with robust empirical analysis is highly credible.

Conversely where a theoretical position is contradicted by empirical analysis it raises questions of the validity of the theoretical position or where empirical analysis leads to an implausible conclusion it raises questions about the robustness of the analysis or the data upon which the analysis is based.

The theoretical arguments that underpin a value for Theta of either zero or one are not sufficient to dismiss the large body of theory and empirical work presented in this submission. However, it is worth noting that the 'zero theory' is more consistent with the empirical data than is the theory supporting a value of 1. There are reasons that could explain the difference between the empirical evidence and a strict zero arising from a literal application of the theory.

8.10 Does the current value for Theta adopted in Chapter 6A of the NER (implicitly assumed to be 0.6) lead to over-compensation for regulated firms compared to the full segmentation and full integration scenarios?

Australian regulators have appropriately estimated the CAPM parameters including Theta by reference to domestic data. As a consequence, the CAPM assumes neither a fully segmented nor a fully integrated capital market. That is, any empirical domestic data on the risk-free rate, MRP, equity beta and Theta parameters will certainly be influenced by both domestic and international investors.

The use of domestic data implicitly acknowledges the presence of both domestic and international investors and the cost of capital is undoubtedly lower than would otherwise be the case in a fully segmented CAPM as:[273]

> …less foreign investment means a lower supply of capital and consequently an *increase* in its cost [of capital].

Furthermore a fully segmented CAPM rules out the use of empirical estimates of the value of Theta as the data will be influenced by both domestic and international shareholders. Consequently, the value of Theta to domestic investors would need to be assumed. Lally argues that since the 1 July 2000 changes to the imputation tax regime the value of Theta to domestic investors is one. However, as NERA and Wheatley have explained this approach over values imputation credits because it ignores the cost to investors of obtaining these credits.

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[273] SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 31

On the other hand despite the integrated nature of the Australian equities market, regulators have not employed an international CAPM. One of the reasons was noted by the ACCC (prior to the establishment of the AER):[274]

> The ACCC has previously noted that the use of an international version of CAPM tends to be more complex and consequently more difficult to implement. This may explain why they are not generally used in practice, despite the accumulating evidence of greater market integration.

It has also been explained that, estimates of the domestic WACC parameter values which are largely drawn from a period since markets have been integrated will be a good approximation for applying an international CAPM.[275]

Estimating the utilisation rate (Theta) – average or marginal investor

8.11 Given the differential valuation placed on imputation credits by different groups of investors (ie, resident / foreign), is it more appropriate (in theory) to place more weight on studies focusing on the valuation of the average investor in the Australian market?

A focus on the benefits accrued by the average or marginal investor can be misleading. As discussed by NERA and Wheatley for risky assets all investors will generally be marginal investors. This occurs because:[276]

> All investors will wish to diversify and so, at least in theory, all investors will typically hold some position in each stock. A representative investor has characteristics that are a weighted average of the characteristics of all investors.

The impact of individuals having different personal taxation rates on income and capital gains is that individuals will hold different portfolios. That is, individuals who face high taxes on dividends will hold portfolios with a lower weight placed on high-yield stocks while investors with low income tax rates will hold portfolios heavily weighted with high-yield stocks.

In the context of the imputation credits which domestic and foreign shareholders have differing abilities to redeem, it will generally lead to domestic investors holding portfolios more heavily weighted with domestic equities because of the imputation credits that the equities provide. Foreign investors, on the other hand, will be discouraged from holding domestic equities because of their inability to use the credits effectively. Again because investors (be they domestic or foreign) generally desire a diversified portfolio both domestic and foreign shareholders will own domestic and international shares.

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274 ACCC, *Statement of principles for the regulation of electricity transmission revenues – background paper: Decision*, 8 December 2004, page 94, footnote 40

275 Koedijk, Kees G & Kool, Clemens J M & Schotman, P C & van Dijk, Mathijs A, 2002, 'The cost of capital in international financial markets: local or global?', *Journal of International Money and Finance* 21(6), pages 905-929

276 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 9

While the Australian imputation tax regime will have differential impacts on individual shareholders the desire by all shareholders to diversify will mean that there is a single market value for imputation credits.

8.12 Is it correct to say that the average investor concept can only apply in a full post-personal tax version of the CAPM? What about if Theta is inferred from dividend drop-off studies?

NERA and Wheatley[277] indicated that with risky assets all investors will generally be marginal and the concept of an average investor is misleading. Further, an approach that attempts to estimate the value of Theta by reference to the average rate of redemption for imputation credit is not appropriate.

SFG Consulting directly addresses this issue:[278]

> In my view, measuring how many investors use a particular type of asset does not give us a *value* of that asset. When estimating the risk-free rate, for example, we do not consider how many investors use government bonds, we examine their market price.

This point was reinforced by NERA and Wheatley:[279]

> Valuing the credits requires one to estimate their value. Their value cannot be inferred directly from the fraction of the credits that are redeemed because this overlooks the costs that investors bear in accessing the credits.

As the value of imputation credits cannot be directly observed, because there is no market for imputation credits, empirical estimates infer a value for credits from market behaviour. The most common approaches are to analyse either dividend drop-offs or simultaneous security prices. Both are of similar robustness but the former can be generated more quickly than the latter.

Furthermore, NERA and Wheatley indicate that the required returns on equity and debt will be affected by the taxes that investors face on a personal level.[280] Therefore, a full post-tax personal tax version of the CAPM, which includes all personal tax rates on investors, should be applied. However, the required return to equity can safely disregard personal taxes and imputation credits if:[281]

> the tax disadvantage associated with the dividend is matched by a tax benefit associated with the franking credit attached to the dividend. In other words, evidence that the fall in stock price when the stock goes ex-dividend matches the dividend indicates that one can safely disregard personal taxes and imputation credits in estimating the required return to equity conventionally defined.

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277 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, pages 10-13

278 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 5

279 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 14

280 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 10

281 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 13

The empirical evidence from all the dividend drop-off studies suggest that the fall in the stock price when the stock goes ex-dividend equals the value of the cash dividend. Therefore, a conventionally defined CAPM is a reasonable approximation of a full post-tax personal tax version of the CAPM. Given the additional complication of defining international and domestic personal tax rates the joint industry association submits that a conventionally defined CAPM should continue to be used over a full post-tax personal tax version of the CAPM.

Estimating the utilisation rate (Theta) – valuation of imputation credits at the margin

8.13 Does the dividend drop-off methodology provide sufficiently robust empirical evidence of the value for Theta in the Australian economy?

The Issues Paper correctly highlights that there is considerable noise in the estimates derived from dividend drop-off studies. This is a primary reason that estimates of Theta should be based on a long data series (see response to question 8.14).

Notwithstanding the issues with statistical robustness of the dividend drop-off SFG Consulting have also looked at other sources of that provide a cross-check to the estimated market values derived from dividend drop-off studies, including:[282]

- studies that estimate the value of Theta by comparing the prices of derivative securities and the shares underlying the securities;[283]
- study of the Australian stock returns.[284]

As a cross-check these studies also strongly suggest that the value of Theta is less than 0.5 thereby providing additional confidence that the conclusions drawn from the various dividend drop-off studies that the value of gamma is less than 0.5 are persuasive.

It is also important to note that the issue of data reliability is considered by SFG Consulting in their consideration of the adequacy of Australian data for estimating beta for Australian energy distribution and transmission businesses:[285]

> This reinforces the view that the available Australian data, however it might be sliced or packaged, is simply unable to provide precise and statistically reliable estimates of equity beta for this industry.
>
> This can be contrasted with the results of the ordinary least squares regression that are used when seeking an estimate of gamma. In that setting, sample sizes, R-squared statistics are higher and confidence intervals are narrower. For example Cannavan, Finn and Gray (2004) report R-squared statistics in excess of 65%.

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282 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, pages 23-26

283 Cannavan D, Finn F & Gray S, *op. cit.*, *Journal of Financial Economics* 73 (2004) pages 167-197.

284 Ickiewicz J., op. cit., Honours thesis, University of Queensland Business School, 2007, as quoted in SFG Consulting op. cit., page 24.

285 SFG Consulting, *The reliability of empirical beta estimates*, September 2008, page 16

8.14 Given the tax changes in July 2000, is it appropriate to place more weight on data from the post-2000 period in estimating Theta from dividend drop-off studies?

In general, estimates of Theta that are based on long term data periods provide estimates that are more precise and statistically robust. However, where there is evidence that the value of Theta has changed over time it may be appropriate to examine shorter time periods.

Changes to the imputation tax regime made on 1 July 2000 allow resident shareholders to claim a rebate for imputation credit in excess of those necessary to offset their Australian tax liability. Previously excess credits that where not used to offset personal income tax liabilities were wasted.

SFG Consulting explicitly reviewed the empirical evidence of a structural break in 2000.[286] They reviewed the following three recent studies to ascertain whether there had been a structural break in the value of Theta, and concluded that:

- in Hathaway and Officer (2004) the estimated value of Theta fell for two and half years post 2000, however, by the end of the sample period the estimated value of imputation credits was no higher than it was when the rebate provision was introduced;
- when ACG (2006) estimated Theta for three year periods before and after the 1 July 2000 it found that for both periods the estimates of Theta were insignificantly different from zero; and
- in the Beggs and Skeels (2006) study there was no statistically significantly change in the estimated value of Theta at any time other than in 2000, when the value of a dollar cash dividend increased to over $1.16.

SFG Consulting concluded that:[287]

> Our view is that the strong weight of evidence favours the conclusion that the Rebate Provision did not cause a significant increase in the value of franking credits in July 2000. Accordingly, data from before and after 2000 should be included in the analysis in order to improve the precision and statistical reliability of the estimates.

[286] SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, pages 15-18

[287] SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 18

8.15 Does a cash dividend value of less than 100 per cent necessarily imply that dividends and capital gains are not taxed equally?

NERA and Wheatley have reviewed of the financial literature on the impact of personal taxes on the return on capital.[288] They highlight that the impact of taxes on required returns is determined by the taxes a representative investor faces.

The taxes that a representative investor faces are weighted averages of the taxes that individuals face. The weights are determined in large part by the wealth of each investor. So if equity markets are integrated, a representative investor will most closely resemble foreign investors because the aggregate wealth of foreign investors is greater than the aggregate wealth of domestic investors.

Given this, changes to Australian tax rates are likely to have only a limited impact on the required return to equity. Since equity markets are integrated the required return to equity will depend not only on Australian tax rates but also on international tax rates.

8.16 Is the empirical result that cash dividends are not fully valued a valid result in theoretical terms? If an adjustment is required, what is the most appropriate adjustment?

NERA and Wheatley suggest two alternatives adjustments to deal with the empirical result that cash dividends are not fully valued:[289]

> … these values for gamma are conditional on the idea that investors value cash dividends at less than their face value. There are two ways that the empirical evidence can be consistently applied. One way is to:
>
> - reduce the required return of a regulated firm to reflect a positive value for gamma of between 0.15 and 0.30, but also increase the required return to reflect the fact that the market values a one-dollar dividend at less than one dollar.
>
> Lowering the required return to equity to reflect a positive value for gamma and raising the return to reflect the penalty the market places on the payment of dividends leaves the return virtually unchanged. So a reasonable and simpler alternative is to:
>
> - disregard all personal taxes and imputation credits by setting gamma to zero and by not making any adjustment for the cost of issuing dividends.

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288 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, pages 10 -13

289 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 32

Estimating the utilisation rate (Theta) – valuation of imputation credits at the margin: inference from derivatives

8.17 Is it possible to infer the value of imputation credits from derivative securities, given the potential for significant clientele effects?

NERA and Wheatley argue that while the sample encompassed only a small number of stocks, theory suggests that the value of Theta will be identical across all stocks and all investors.[290]

If Theta were not identical across stocks, investors would face an incentive to shift funds from high-Theta stocks to low-Theta stocks to capture the additional return that would be offered by low-Theta stocks. Consequently, the potential for clientele effects to distort the estimated value of Theta are minimal.

Estimating the utilisation rate (Theta) – valuation of imputation credits for the average investor: other issues with estimating the valuation of the average investor

8.18 Do the currently available studies that use taxation statistics provide sufficiently robust empirical evidence of the value for Theta in the Australian economy?

An approach that attempts to estimate the value of Theta by reference to the average rate of redemption for imputation credit is flawed. The attached report from SFG Consulting directly addresses this issue and states:[291]

> In my view, measuring how many investors use a particular type of asset tells us nothing about its value. When estimating the risk-free rate, for example, we do not consider how many investors use government bonds, we examine their market price.

This point was reinforced by NERA and Wheatley:[292]

> Valuing the credits requires one to estimate their value. Their value cannot be inferred directly from the fraction of the credits that are redeemed because this overlooks the costs that investors bear in accessing the credits.

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290 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 22

291 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 12

292 NERA, *The Valuation of Imputation Credits: A report for the ENA, Grid Australia and APIA*, September 2008, page 14

Further, in the SFG Consulting provides an illustrative hypothetical by posing the question of whether banning all foreign investment would lower the cost of capital for Australian firms since it would increase the redemption rate to 100 per cent. SFG Consulting state:

> To see why this is the case, consider two Australian companies that are identical in all respects except that one operates under foreign ownership restrictions and the other does not. Specifically, suppose the first firm is prevented from raising any foreign equity. For this firm, all franking credits that were distributed would go to resident investors who could redeem them. The average redemption rate would be 100%. If this were used to estimate theta (and consequently gamma) the downward adjustment to the cost of equity21 would be much greater than even is the case where gamma is assumed to be 0.5. That is, the implication of using average redemption rates to estimate theta (and consequently gamma) is that a firm's cost of capital could be substantially reduced, relative to that of its peers, by imposing foreign investment restrictions on it. However, the exact reverse is true – less foreign investment means a lower supply of capital and consequently an increase in its cost.

To conclude, an approach that uses redemption rates to estimate of the market value of imputation credits is flawed and should not be used.

8.19 Given the most recent changes to the tax regime, is the assumption of 100 per cent utilisation for domestic investors in the post-2000 period reasonable?

As discussed in the response to Question 8.18, tax statistics are not a measure or a reasonable approximation of the market value of credits. Consequently, an assumption as to the utilisation of domestic investors provides no further information as to the value of imputation credits.

8.20 When using tax statistics to estimate Theta, should an adjustment be made for the time value of money between when a franked dividend is paid and when the investor receives the associated tax benefit? If so, what is the appropriate discount rate to apply?

As discussed in the response to Question 8.18, tax statistics are not a measure or a reasonable approximation of the market value of credits. So any adjustment for the time value of money provides no further information as to the value of imputation credits. Empirical analysis of the market value of imputation credits automatically factors in market assumptions as to the time value of money.

Consistency with the MRP

8.21 Is there an inconsistency between the currently adopted values for gamma and the MRP? If so, can the inconsistency be reliably addressed in the estimate of gamma?

A positive value for gamma leads to a number of inconsistencies with other cost of capital components. One such inconsistency is that the empirical evidence from dividend drop-off studies is that Theta does have a positive value, however, it is conditional on the market value of dividends being less than one.

It would be inconsistent to make an adjustment to the cash flows of a regulated firm to remove the benefits of imputation credits without also increasing the cash flows to compensate shareholders for the costs associated with distributing dividends. SFG Consulting[293] argue that consistency with the CAPM requires that one value a dollar of cash dividends to be worth $1.00, in which case the value of Theta is negligible.

There is an inconsistency with the estimated MRP. This is covered in greater detail in chapter 5 of this submission. To summarise, Officer and Bishop demonstrate that the 6 per cent MRP was originally based on evidence that excluded any explicit consideration as to the value attributed to imputation credits.[294] This is clearly inconsistent with the adoption of a positive value for gamma. If the current adopted value of gamma is retained a similar value should also be assigned to those imputation credits distributed to the market as a whole.

If the 0.5 value for gamma is retained then the following recommendation of Officer and Bishop must be adopted:[295]

> The market risk premium of 6% was originally based on evidence that excluded any explicit consideration of a component to reflect any value of imputation tax benefits in the historical MRPs. Consequently the 6% can be viewed as an estimate of the MRP when this value is zero (the term 'gamma' is usually used to reflect the value of $1 of imputation tax benefits created by a firm however we are concerned with the value of a dollar of imputation tax benefits once distributed given that we are adjusting observed market returns). The inclusion of an estimate of the imputation tax benefits in the historical estimate of market equity returns leads forms the basis of our recommendation that the MRP be increased from 6% to 7%.

Alternatively, the market value of imputation credits equally offsets the 'penalty' associated with the payment of dividends. So a reasonable and simple way to address the issue may be for the two effects to be offset and set a Theta (and consequently gamma) value of zero.

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293 SFG Consulting, *The impact of franking credits on the cost of capital of Australian firms, A Report prepared for ENA, APIA and Grid Australia*, September 2008, page 7

294 Officer B & Bishop S, *Market Risk Premium: A Review Paper - Prepared for* ENA, APIA and Grid Australia, August 2008, page 39

295 Officer B & Bishop S, *Market Risk Premium: A Review Paper - Prepared for* ENA, APIA and Grid Australia, August 2008, page 39

9 Forecast Inflation

Introduction

The AER's review of forecast inflation is a matter that falls outside of the AER's prescribed 'rate of return reviews' under the NER and is a separate consideration, even if that consideration is undertaken concurrently with the rate of return reviews.

There is no approach that establishes an appropriate forecast of inflation based on observable market information at this time. For NSW and the ACT distribution determinations the AER has stated its methodology is to use a 'range of indicators' identified at the time of each business' revenue reset to guide its assessment on a service provider's proposed approach to inflation (outlined in the regulatory proposal).

The Joint Industry Associations support this approach but considers that the AER should expand the 'range of indicators' it has used in recent determinations to include a portfolio of inflation forecasts from recognised experts, including the Reserve Bank of Australia (RBA), if this is the approach proposed by a service provider.

Establishing an appropriate estimate of forecast inflation for a regulatory period has become problematic in recent times because there are currently no reliable approaches using market data to forecast inflation.

In this chapter it is noted that the proposed review of the approach to identifying an inflation forecast clearly falls outside of rate of return reviews the AER must conduct under clauses 6.5.4(d) and 6A.6.2(i) of the NER. As such, if the AER wishes to undertake a review of the approach to identifying the forecast of inflation, it is separate from the rate of return review.

This chapter also provides strong evidence that demonstrates there is no reliable approach using market data to derive forecasts of inflation. Given this, the AER should use a range of indicators to guide its assessment of a service provider's proposed approach to inflation.

In recent determinations, the AER has relied on the short term forecasts of the RBA and the midpoint range of the RBA's target band to determine forecast inflation. The AER should expand its range of indicators to include a portfolio of inflation forecasts from experts, including the RBA, if this is the approach proposed by a service provider.

It is appropriate that the AER applies flexibility in its approach to forecast inflation, particularly where no one approach exists to appropriately and accurately forecast inflation based on observable market data. This flexibility allows the AER to consider and assess the proposal put forward by a service provider based on the prevailing conditions at the time of the proposal.

This chapter is set out as follows:

- the process issues associated with the AER conducting a review of forecast inflation as part of its review of rate of return parameters;
- the rule requirements relating to forecast inflation;
- the relevance of the previous approach adopted by the AER for a review of forecast inflation;
- evidence suggesting that there is no robust approach based on observations of market data to forecast inflation at this time; and
- reasons to indicate that a portfolio of inflation forecasts from recognised experts will likely result in a better estimate of inflation compared to using the RBA's forecasts only.

The following sections discuss each of these key points, followed by responses to the specific questions posed by the Issues Paper.

Process Issues with a Review of Forecast Inflation

> The review of the approach to forecast inflation is a matter that falls outside of the review of the rate of return parameters that the AER must conduct under clauses 6.5.4(d) and 6A.6.2(i) of the NER. Consequently the review of the approach to forecast inflation is clearly separate to the rate of return reviews.

The approach to forecast inflation is a matter that falls outside the review of rate of return that the AER must conduct under clauses 6.5.4(d) and 6A.6.2(i) of the NER. The reviews under clauses 6.5.4(d) and 6A.6.2(i) have a specific purpose and cannot be expanded upon to include a review of the forecast of inflation.

If the AER wishes to undertake a review of the approach to forecast inflation that review is separate from the rate of return process.

Rule Requirements

There is no single approach for establishing an appropriate inflation forecast using observable market data at this time. It is therefore appropriate that the AER applies flexibility so that a range of indicators can be used to estimate inflation.

The AER should maintain its current methodology of determining the forecast inflation rate at the time of each business' regulatory reset using a range of indicators to guide it in determining the appropriate expected inflation rate. The specific approach to implementing that methodology should be that, the service provider proposes the indicators of inflation to be used as part of its regulatory proposal.

Under the NER, the AER is required to consider indexation and inflation assumptions provided in a building block proposal as part of its determinations on:

- the annual revenue requirement under clause 6.3.2(a)(1) of the NER and the amount of the estimated total revenue cap under clause 6A.4.2(a)(1) of the NER; and
- appropriate approaches for indexing the regulatory asset base (RAB) under clauses 6.3.2(a)(2) and 6A.4.4(a)(2) of the NER.

As explained in section entitled *Market based approaches cannot be relied on for estimating inflation*, there is no single recognised approach for accurately forecasting inflation at this time. There are a range of approaches that can be used to forecast inflation and the reasonableness of a given approach may vary with time or circumstance.

In the absence of a single recognised and appropriate market based inflation forecasting approach, the AER should maintain its current methodology which is to determine forecast inflation at the time of a each business's regulatory reset using 'a range of indicators to guide it in determining the appropriate forecast inflation'.[296] The specific approach to implementing that methodology should be that, the service provider proposes the indicators of inflation as part of its regulatory proposal.

[296] AER, *Electricity transmission network service providers: Post-tax revenue model handbook*, September 2007, footnote 6 page 7

The AER has effectively used such an approach in recent regulatory decisions. Further, the AER contemplates such an approach in the DNSP PTRM handbook:[297]

> DNSPs are required to submit a completed PTRM to the AER as part of their revenue proposals. However, the AER recognises that there may be a need for some flexibility in applying the PTRM in order to account for the particular circumstances a DNSP may face. A number of elements of the PTRM where this may be the case have been identified in this handbook. A DNSP will need to propose and justify a departure from any element of the PTRM for the purposes of addressing its specific circumstances as part of its revenue proposal, which will be considered and assessed by the AER on a case-by-case basis in making its distribution determination.

Inflation is an important input to key decisions associated with a regulatory determination. It is appropriate that the AER applies flexibility in its approach to forecast inflation, particularly where no one approach exists to appropriately and accurately forecast inflation based on observable market data. It is also appropriate that this flexibility be provided by allowing the service provider to initiate the process with a proposal. This flexibility allows the AER to consider and assess the proposal put forward by a service provider on a case by case basis and with regard to the prevailing conditions in the market at the time of a determination process.

Previously Adopted Approach to Calculate Inflation

> The AER should, following an assessment of their suitability, apply a range of indicators put forward by the service provider in determining an appropriate inflation forecast.

This section of the submission examines the AER's recent approaches to forecasting inflation as a basis for establishing the most appropriate course of action for the future.

The Fisher equation has traditionally been the approach used in the PTRM to calculate inflation based on observed market values, notably indexed and nominal CGS yields. In recent regulatory determinations however, the AER and other jurisdictional regulators have recognised that the Fisher equation may not produce realistic inflation forecasts.[298] This is further discussed in section entitled *Market based approaches cannot be relied on for estimating inflation.*

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297 AER, Electricity distribution network service providers; Post-tax revenue model handbook, June 2008, page 1

298 AER, SP AusNet transmission determination, Final decision , 2008- 2013, January 2008, page 89

In recent determinations, the AER has moved away from the Fisher equation approach of calculating inflation and instead derived its forecast using indicators such as the short term forecasts and target bands of the RBA. As noted in the Issues Paper, the AER is:[299]

- adopting a forecast length which matches the maturity with that used to derive the nominal risk-free rate (presently ten years);
- using the short-term forecasts for the longest term available (usually two or three years) from the RBA's most recent Statement of Monetary Policy; and
- for the remaining years where the RBA has not provided a forecast, the midpoint of its target band (usually six to seven years).

It is argued in the following section entitled *Using a portfolio of forecasts* that the AER has applied a narrow range of indicators when assessing the proposal put forward by a service provider. The AER should expand its 'range of indicators' to take into account a portfolio of inflation forecasts from recognised experts, including the RBA, if this is the approach proposed by the network service provider.

Market Based Approaches Cannot be Relied on for Estimating Inflation

> There is extensive evidence to suggest that current conditions in the CGS market and the indexed swap market produce upwardly biased estimates of inflation. There are currently no other reliable approaches using market data that are likely to yield the best estimate of inflation.

It would be reasonable to rely on market observations of forecast inflation if the data is reliable and robust and there is evidence that the market observation correlates to actual outcomes.

For this reason, regulators have generally applied the Fisher equation to calculate expected inflation. The Fisher equation provides an observation of expected inflation based on the difference between indexed and nominal CGS yields. Previous versions of the PTRM have included the Fisher equation.

[299] AER, *Issues Paper*, August 2008, page 102

However, as noted above, the AER and other regulators have recognised that there is extensive evidence to demonstrate that the Fisher equation cannot be relied upon for estimating inflation any longer. A key problem with using the Fisher equation is the current supply and demand conditions in the CGS market, which are depressing the yields on indexed CGS bonds. This was noted by NERA in 2007:[300]

> The dramatic reduction in indexed CGS in 2004 (and the resulting reduction in indexed CGS relative to nominal CGS) occurred at the same time when our data suggests that indexed CGS yields became relatively more downward biased than nominal CGS yields (see below). It also came at a time when, according to the RBA, institutional demand for indexed CGS increased as super funds and other institutions with inflation-indexed long-dated liabilities attempted to match those liabilities with inflation indexed CGS.

The reduction in the number of indexed CGS together with the institutional demand for such securities has resulted in a premium on the price of indexed CGS. As such, the difference between indexed and nominal CGS yields no longer represents the market's expectations of inflation.

The view that current market conditions make the Fisher equation unreliable for estimating inflation were also expressed by Mr Handley from the University of Melbourne in a report prepared for the Australian Competition and Consumer Commission (ACCC). Mr Handley stated that:[301]

> … the root cause appears to be due to current market conditions – an increase in demand 'against a background of small tightly held domestic supply' – rather than an issue associated with the uniqueness or otherwise of indexed CGS. It is not clear how long this situation will last.

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300 NERA, *Bias in Indexed CGS Yields as a Proxy for the CAPM Risk Free Rate*, A report for ENA, March 2007, page 7

301 Handley J, A note on the Fisher Equation, Paper prepared for the ACCC, 23 July 2007, page 5

In a recent report prepared for NSW electricity distributors, CEG summarised the evidence which indicates that the Fisher equation produces upwardly biased estimates of inflation. CEG stated that:[302]

> The evidence that indexed Government bond yields are downward biased is compelling and is summarised below
>
> i. Analysis of the Reserve Bank of Australia (RBA) suggested that TCIB yields underestimated the truly expected real return on nominal Commonwealth Government securities;
>
> ii. Analysis of the Commonwealth Government Treasury reached the same conclusion as the RBA;
>
> iii. Empirical analysis of Professor Bruce Grundy and Dr Tom Hird analysing several different market data sources all supporting the RBA and treasury conclusions;
>
> iv. Conceptual analysis of Professor Bruce Grundy and Dr Tom Hird explained why this is consistent with the predictions of Finance theory; and
>
> v. All credible professional forecasters of long -term inflation predicted real yields on long-term nominal CGS that exceed yields on TCIBs.

Given that the Fisher equation has been demonstrated to produce upwardly biased estimates of expected inflation at this time, some proponents have proposed that the inflation rate swap market (inflation swap market) be used as an alternative market based approach.[303]

There are fundamental weaknesses in using the inflation swap market to inform future expectations of inflation. The current conditions in the CGS market also affect the conditions in the inflation swap market.

Effectively, the scarcity in supply of indexed government bond markets in combination with increased demand for inflation protection instruments have resulted in a premium for inflation swaps. For this reason, observations of market expectations of inflation from the inflation swap market cannot be relied upon. This issue was noted by NERA, when it stated that:[304]

> …one would expect that the supply issues currently responsible for the bias in the indexed government bond market which have would have broader implications for the inflation rate swap market and the inferred ten year inflation expectations encapsulated in the swap rates established within this market.

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302 CEG, *A methodology for determining expected inflation, A report for ACTEW*, January 2008, pages 3-4

303 For instance, EUCV in a submission to the AER on the draft determination for SP AusNet

304 NERA, *AER SP AusNet draft determination: inflation expectations*, A report for TransGrid, November 2007, pages 6-7

For this reason the AER showed no regard to inflation swap yields when determining forecasts of inflation. The Joint Industry Associations are not aware of any other credible approaches to observe forecast inflation from market data.

If, in the future data indicates that the current problem with indexed and nominal bond CGS yields has been resolved, then the approach of applying the Fisher equation could be reconsidered. The problem is not with the Fisher mechanism per se but with the reliability and accuracy of the data used in forecast inflation.

Using a Portfolio of Forecasts

> It is reasonable that the AER apply a range of indicators that allow a service provider to propose a portfolio of forecasts of inflation as part of its regulatory proposal. A portfolio of forecasts from recognised experts including the RBA is likely to produce more robust estimates of inflation compared to using the RBA's forecasts only.
>
> It is also reasonable to assume that medium to long term inflation forecasts will be at the midpoint of the RBA's target band for inflation. However, there may be circumstances where the AER's current indicator of medium to long term inflation may not be appropriate.

In the absence of a reliable and robust market based approach to estimate forecast inflation, there are limited options currently available to determine the likely best estimates of expected inflation. The AER has recently moved away from a market data based approach for calculating inflation forecasts and instead has relied on the RBA's short term forecasts and the midpoint of the RBA's target band to provide a range of indicators of forecast inflation.

It is inappropriate to apply a narrow range of indicators when assessing the proposal of a service provider's approach to estimate inflation. In the absence of an approach that uses observable market data, there are a range of approaches that can be used to determine the best estimate of inflation. Further, the reasonableness of a given approach may vary with time and circumstance.

Moreover, the AER's current range of indicators does not take into account the risks of forecasting error inherent in using a sample of one observation only (ie, the RBA's short term forecasts). A portfolio of forecasts from recognised experts including the RBA is likely to produce more robust estimates of inflation compared to using the RBA's forecasts only.

A key reason for using a portfolio of forecasts is to reduce the sample error from estimating forecast inflation. There is a high degree of imprecision in forecasting inflation and this principle applies equally to the RBA and other forecasters. This is because these forecasts are based on the inherent judgement of the forecaster and are therefore prone to error.

CEG in its report prepared for NSW distributors noted that using a sample of forecasters was superior to relying solely on RBA inflation forecasts:[305]

> ….as a general principle a large sample size is generally better than a small sample size, we believe that our approach of widely sampling economic forecasters is superior to the AER's approach or relying solely on RBA forecasts.

A portfolio approach to estimating inflation would minimise the effects of any single set of assumptions or judgements being exercised by market experts in determining the forecast of inflation. It is therefore reasonable that the AER apply a range of indicators that allow a service provider to propose a portfolio of forecasts as part of its regulatory proposal.

While supporting a portfolio approach, it is appropriate for RBA forecasts to be included in any portfolio. If a service provider chooses to exclude RBA forecasts from a proposed portfolio, it would be expected to provide reasons in support of its position.

Using a midpoint of the RBA's target band for estimating inflation in the medium to long term appears reasonable at this time. A CEG report which advised NSW electricity distribution businesses on the appropriate measure for inflation forecasts, provides evidence to suggest that medium to long term inflation forecasts of experts converge on the midpoint range of the RBA's target band. CEG also noted that:[306]

> … the best estimate of average long term inflation is 2.5 per cent. Specifically unless there is a reason to believe that the RBA's operation of monetary policy will fail to work in the future as it has in the past, the best estimate of medium to longer term inflation is 2.5 per cent.

It is therefore reasonable to assume that medium to long term inflation forecasts will be at the midpoint of the RBA's target band for inflation. The AER should have regard to this evidence when assessing the reasonableness of the approach put forward by a service provider as part of its regulatory proposal.

However, there may be circumstances or periods of time where the AER's current indicator of medium to long term inflation may not be appropriate (for instance if evidence suggests that the average long term inflation rate is higher than the midpoint of the band). It is for this reason that the AER should give consideration to the proposal put forward by a service provider rather than relying solely on one indicator. This would provide flexibility to assess the proposal with regard to prevailing conditions at the time of a determination process.

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305 CEG, *Expected inflation estimation methodology: A report for Transend*, April 2008, page 13

306 CEG, *Expected inflation estimation methodology: A report for Transend,* April 2008, page 5

AER Questions

General Approaches to forecasting inflation

9.1 Is there another market-based method that could be used to forecast the CPI (other than the application of the Fisher equation)?

At this time that there is no credible market based approach to forecast inflation. In particular:

- there is extensive evidence to suggest that the Fisher equation results in upwardly biased estimates of inflation.[307] and
- the inflation rate swap market cannot be used to observe reliable estimates of inflation as it is inextricably linked to current conditions in the market for CGS. This results in upwardly biased estimates of inflation.

9.2 If a general approach is adopted:

a) Should the term of the inflation forecast be matched to the maturity of the risk-free rate?

The term of the inflation forecast should be matched to the maturity of the risk-free rate. The maturity of the risk-free rate is discussed in Chapter 5.

b) Should forecasters other than the RBA be considered in determining the forecast CPI for the PTRM?

The AER should expand its 'range of indicators' to take into account a portfolio of inflation from experts, including the RBA, proposed by a service provider.

The AER's current range of indicators only takes into account the short term forecasts of the RBA and not the forecasts of other recognised experts. This approach effectively relies on a sample of one and does not take into account the risks of forecasting error inherent in the RBA's short term forecasts. A portfolio of forecasts from recognised experts including the RBA is likely to produce more robust estimates of inflation compared to using the RBA's forecasts only.

A key reason for using a portfolio of forecasts is to reduce the sample error from estimating forecast inflation as stated by CEG:[308]

> ….as a general principle a large sample size is generally better than a small sample size, we believe that our approach of widely sampling economic forecasters is superior to the AER's approach or relying solely on RBA forecasts.

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[307] The evidence is set out in the section entitled *Market based approaches cannot be relied on for estimating inflation* of this submission.

[308] CEG, *Expected inflation estimation methodology: A report for Transend*, April 2008, page13

There is a high degree of imprecision in forecasting inflation and this principle applies equally to the RBA and other forecasters. This is because these forecasts are based on the inherent judgement of the forecaster and are therefore prone to error. A portfolio approach to estimating inflation would minimise the effects of any single set of assumptions or judgements being exercised by market experts in determining forecasts of inflation.

c) For years where forecast data is unavailable, should the midpoint of the RBA's target be used or another method?

It is reasonable to assume that medium to long term inflation forecasts will be at the midpoint of the RBA's target band for inflation. For instance, CEG provided evidence that:[309]

- since 1996, the average inflation rate has been 2.5 per cent; and
- medium to long term inflation forecasts of experts converge on the midpoint range of the RBA's target band.

The AER should have regard to this evidence when assessing the reasonableness of the approach put forward by a service provider as part of its regulatory proposal.

However, there may be circumstances where the AER's current indicator of medium to long term inflation may not be appropriate. For instance, if evidence suggests that the average long term inflation rate is higher or lower than the midpoint of the RBA's band. It is for this reason that the AER should give consideration to the proposal put forward by a service provider rather than relying solely on the midpoint of the RBA's band.

d) Should weights be placed on different CPI forecasts? How should these weights be objectively determined?

In general it is inappropriate to weigh different inflation forecasts when taking into account a range of indicators. However, there may be particular circumstances where a service provider considers it appropriate to attach different weights to the portfolio of forecasts. For instance, there may be timing issues with the publication of a forecast which means that less weight could be attached to the forecast. There may be also instances where a forecaster is based in one sector of the economy.

As part of its proposal, if a service provider weights different inflation forecasts it is reasonable to expect an outline of the reasons for weighting different forecasts. The AER would then assess whether the reasons are reasonable when accepting or rejecting the approach proposed by the service provider.

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309 CEG, *Expected inflation estimation methodology: A report for Transend*, April 2008, page 12

10 Debt and Equity Raising Costs

The AER's review of debt and equity raising costs is a matter that falls outside of the AER's prescribed review of rate of return parameters under the NER.

The Joint Industry Associations consider this to be an important issue but it should be considered outside of this Review.

Debt and equity raising transaction costs are clearly legitimate costs associated with raising capital by regulated businesses. The Joint Industry Associations note that, in the past, regulators have provided allowances for debt and/or equity raising cost allowances in some decisions but not in others.

However, as explicitly identified by the AER in its Issues Paper310, consideration of methods for determining debt and equity raising costs is a matter that falls outside the scope of the AER's review of rate of return parameters under the NER.

The AER's decision to include this matter as part of the WACC Review process is intended to provide guidance only as to how the AER may approach these matters in future determinations.311 In addition, the AER has flagged that the outcome of a review of these costs will not bind it in terms of the method to be adopted as part of a future determination.

The Joint Industry Associations submit that as this matter is clearly outside the scope of the AER's review, consideration of debt and equity raising costs should be undertaken as a separate process.

The Joint Industry Associations are willing to actively engage with the AER on this important issue outside of the current review process.

[310] AER Issues Paper, p1.

[311] AER Issues Paper, p1.

11 Conclusion

The results of the Review will be a vital input into the regulatory environment affecting the regulated network sector. The Review will have a direct impact on the sector's ability to attract the substantial additional investment that the community requires to meet demand growth and to address the challenge of climate change. The cost of capital is one of the most important ingredients to an environment that fosters investment.

Based on the evidence presented in this submission, the Joint Industry Associations expects that the AER will arrive at the following conclusions on the individual cost of capital parameters.

	Previously Adopted Values (T)	Previously Adopted Values (D)	Proposed Values (T & D)
Headline Nominal WACC			
Equity Beta	1.0	1.0*	1.0
Market Risk Premium	6.0%	6.0%	7.0%
Debt / (Debt + Equity)	60%	60%	60%
Credit Rating	BBB+	BBB+	BBB+
Source of Nominal Risk Free Rate	10 year CGS	10 year CGS	10 year CGS**
Gamma (netted off tax liability)	0.5	0.5	0.2

* As discussed in the Gilbert + Tobin advice on the subject, although some businesses have a 0.9 beta in their last determination, 1.0 is the value that is best described as the previously adopted value.

** There is an issue as to which 10 year rate is appropriate and the Joint Industry Associations propose to explore this with the AER during the Review.

The Joint Industry Associations look forward to engaging with the AER and the other interested parties to the Review.

Attachment A

A history of the use of the CAPM and Beta in Energy Regulation in Australia

The first use of the WACC and the CAPM in energy infrastructure regulation dates back to the Office of the Regulator General's (ORG - the predecessor of the Essential Service Commission of Victoria) determination of the WACC as part of its decision about price paths for the five Victorian electricity distributors prior to their privatisation in 1995 and 1996. This was closely followed by the AGL Gas Networks Access Undertaking in 1997 by the Independent Pricing and Regulatory Tribunal (IPART) in NSW.

Assumptions about WACC parameters were not deeply researched for these regulatory decisions. It was not until the Access Arrangement Reviews for the Victorian gas distribution businesses and the transmission businesses in 1998 that a high profile and thorough debate about the WACC and parameter values was first undertaken. This debate was run jointly by the ACCC and the ORG as they both had responsibility for the concurrent Access Arrangement Reviews.

As a result of this debate the ACCC decided that the 60 per cent geared equity beta was 1.2. This figure was derived from determining an asset beta of 0.55.[312] The basis of this decision was a report by Credit Suisse First Boston that largely relied on asset betas for international gas companies to provide its benchmarks.

Regulatory decisions that followed for at least 3 years – both by the ACCC and jurisdictional regulators – also relied on estimates of the asset betas from international comparisons. Australian data was largely unavailable as, until the late 1990s, AGL was the only listed Australian company with significant regulated energy infrastructure available. A key example of the ACCC's reliance on international comparables is a report on International WACC Comparisons by NERA in March 2001[313].

The emergence of Envestra (1997) United Energy (UEL) (1998), Australian Pipeline Trust (APT) (2000), Alinta (2000), GasNet (2003), Diversified Energy Utilities Trust (DUET) (2004) and Spark Infrastructure (2005)[314] progressively added to the number of possible Australian comparators. A further possible, but less comparable investment vehicle, which was listed in 2004, is Hastings Diversified Utility Fund.

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312 ACCC, *Final Decision on the Victorian gas Transmission Access Arrangements*, 1998, page 62

313 NERA, *International Comparison Of Utilities' Regulated Post Tax Rates Of Return In: North America, The UK, and Australia*, March 2001

314 In considering these companies as comparators it should be recognised that they may not be ideal comparators for regulated electricity utilities as some may include unregulated activities such as energy retailing or be involved in activities, such as gas pipelines, which means that any comparison must necessarily be indicative rather than directly translatable.

More recently there have also been a number of delistings: United Energy (2003), AGL (2006), GasNet (2006) and Alinta (2007).

Thus while more comparators became available in the period 1997 to 2005, more recently the number of comparators has been falling due to delisting.

For almost all comparators the period for which beta measurements are available has been short and their usefulness in providing reliable measurements of betas for regulated electricity infrastructure businesses is therefore questionable.

The first use of Australian beta data was made by the ORG in the Electricity Distribution Price Review for the period beginning January 2001. The ORG also considered US and UK data, but sought to give greater weight to Australian data. At this time there were only 3 comparator companies – namely, AGL, Envestra and UEL. The ORG's Final Decision included discussion about techniques for estimation and adjustment of betas, but calculated a wide range of estimates of beta - both local and international - and put forward numerous reasons to qualify the reliability of the results. In reaching a conclusion the ORG recognised the problems with estimating the beta because of: [315]

> the limits on the capital market data available (in turn due to the absence of a deep pool of comparable entities on the Australian stock exchange)

In doing so it also recognised the need to be circumspect about the meaning of the data and decided an equity beta of 1.0.

The next significant consideration of betas for regulated Australian energy infrastructure was in a report for the ACCC by Allen Consulting Group (ACG) in July 2002.[316] This report undertook an analysis that covered many of the issues to be considered in estimating and appropriate proxy beta. In particular, it considered estimates of the betas for a group of Australian comparables as well as comparables from the US, Canada and the UK. By this time the number of Australian comparables had expanded to four, now including APT.

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315 ORG, *Electricity Distribution Price Determination, Volume 1*, page 283

316 ACG, *Empirical Evidence on Proxy Beta values for Regulated Gas Transmission Activities*, July 2002

ACG's 2002 report concluded that, based on market data for these four companies for a single period ending March 2002, the best available estimate of a representative equity beta was 0.7. ACG did not provide an assessment of confidence intervals for this estimate. However, ACG recognised some important issues for the application of its estimates,[317] but was only able to give brief consideration to them, namely:

- that variation of beta estimates over time with widely uncertain estimates may not - in fact almost certainly will not – reflect a variation in beta, but rather the uncertainty of the estimates;
- the statistically poor quality of data for firms with short listing periods added to the uncertainty of the estimate; and
- that there was variation of US, UK and Canadian results from previously much higher values with no clear explanation as to why. It is worthy of note that the explanation now accepted by ACG themselves in later reports and by others is the effect of the so-called 'technology bubble'.

In concluding ACG recognised that there were problems with the data and that moving substantially from prior estimates and practice of an equity beta of 1.0 was not appropriate.

Since that report a number of further reports considering the appropriate beta for energy infrastructure businesses have been prepared for regulators and service providers. In the Joint Industry Associations' view the reports of greatest significance were:

- Cost of Capital Study, Queensland Distribution Network Service Providers by ACG, December 2004; and
- the performance of alternative techniques for estimating equity betas of Australian firms, Gray, Hall, Bowman, Brailsford, Faff, Officer (*Gray et al*), May 2005.

The ACG report, in making estimates of beta, devotes considerable discussion to the importance of the 'technology bubble' to which it assigns the period from July 1998 to December 2001. It shows the significant reductions in equity betas observed during the period were associated with movements in both utility returns and 'technology stock' returns. ACG concluded that equity beta estimates would be distorted by this short-term market phenomenon.[318] A number of other experts including Gray et al have agreed with ACG's views about the effect of the 'technology bubble'.

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317 ACG, *Empirical Evidence on Proxy Beta values for Regulated Gas Transmission Activities*, July 2002, pages 41-43

318 ACG, *Queensland Distribution Network Service Providers Cost of Capital Study,* December 2004, pages 43-45

However, there were some key observations that the 2004 ACG Report's analysis did not investigate. These are consideration of:

- the quality of the data for available Australian comparables;
- consideration of the quality of the results including r^2 statistics and confidence intervals;
- consideration of whether time variation in beta estimates was a result of change in actual betas or a result of the problems associated with uncertainty and reliability of the estimates; and
- the variability of the results the 2004 ACG report was basing its conclusions on.

On this last consideration it is noted that the results based on weekly and monthly data differ considerably (0.73 vs 0.21). The difference between the maximum and minimum estimates is also very significant (weekly: 0.58 – 1.73; monthly: -0.30 and 0.69) providing clear evidence that there is a high degree of uncertainty about any of the measurements and of their accuracy in representing the equity beta of regulated energy infrastructure businesses. That is, ACG at the time along with many others failed to see that the estimates of equity beta being derived from their analysis were highly unreliable.

However, in recognising some of the measurement issues, the 2004 ACG Report came to the view that an equity beta of no less than 0.73[319] is indicated and that an equity beta of 1.0 is a better general estimate. ACG state:[320]

> the empirical evidence, together with the desirability of maintaining stability in regulatory decisions across time and consistency in regulatory decisions across companies justifies the use of an equity beta of 1.00 (for a gearing level of 60%) for the average regulated electricity distributor.

The ACCC adopted an equity beta of 1.0 in its Statement of Regulatory Principles released in December 2004, which applied to the electricity transmission business.

In recent times ACG has provided equity beta estimates for ESCOSA[321] and the ESC[322]. Both of these were gas network regulatory decisions.

For the Envestra South Australian Access Arrangement ACG recommended to ESCOSA a range for the equity beta of 0.8 – 1.1.[323]

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319 ACG, *Queensland Distribution Network Service Providers Cost of Capital Study*, December 2004, page iv

320 ACG, *Queensland Distribution Network Service Providers Cost of Capital Study*, December 2004, page ix

321 Envestra's 2006 Access Arrangement Review

322 Victorian gas distributors 2007 Access Arrangement Reviews

323 ACG, *Envestra's Proposed Revisions to its Access Arrangement: Revenue Project Report to the Essential Services Commission of South Australia*, 16 January 2006, page 74

For the Victoria Access Arrangement Review ACG was asked to undertake specified analysis related to beta estimation techniques raised by Gray et al in their paper discussed above. ACG was also asked to provide current beta estimates using a number of these techniques. The analyses undertaken by ACG also sought to assess the uncertainty of their estimates using 95 per cent confidence intervals.

From the various estimation techniques ACG calculated a wide range of equity beta estimates and confidence intervals, but did not provide advice about how to interpret the broad range of outcomes as it was not asked to do so. ACG are quite explicit in indicating that they have limited their work to undertaking data analysis. For example ACG state:[324]

> we have not been asked to advise the Commission on the most appropriate equity beta to use for a regulated gas distributor. Hence, we do not address matters such as whether stability and predictability may be promoted by requiring a hurdle to be satisfied before the beta is changed

One conclusion that is not drawn either by the ESC (for whom the report was prepared) is that the wide variation in the estimates indicates that estimating equity beta accurately and meaningfully from the market data is very difficult. That is, the range of estimates and confidence intervals does not provide a clear estimate of the equity beta and guidance and perspective on their meaning is required.

[324] ACG, *Empirical evidence on proxy beta values for regulated gas distribution activities*, June 2007, page 6