KPMG

Western Power Corporation

Weighted Average Cost of Capital

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Contents

1 Executive summary

1.1 Introduction

Western Power Corporation ("Western Power") owns and operates an electricity network, the South West Interconnected System ("SWIS") that covers the south west of Western Australia.

The SWIS is covered for the purposes of the Electricity Networks Access Code (the "Code"), which was gazetted in Western Australia on 30 November 2004. Under the Code, Western Power is required to submit a proposed access arrangement that establishes, amongst other things, revenues and prices for third-party access to the network. This process involves applying a weighted average cost of capital ("WACC") to a capital base established for the network.

The determination of the WACC is the subject of this report.

Western Power appointed KPMG and the Strategic Finance Group ("SFG") to provide assistance in estimating the WACC for its SWIS.

KPMG provides conclusions on the values to adopt for each of the underlying parameters as part of the process for estimating a reasonable point estimate for the WACC for its electricity network, and the basis for those conclusions.

SFG undertake an analysis on how to translate the parameter estimates recommended by KPMG into a point estimate using a probabilistic framework that takes into account the uncertainty surrounding the WACC parameter estimates. We have therefore also set out in this report, the key results of SFG's analysis.

KPMG is aware that the ERA recently published a report on the appropriate WACC methodology.[1]

KPMG is of the view that the WACC determined by the work it has undertaken with the SFG is consistent with the ERA's stated methodology, notwithstanding some concerns it has with the ERA interpretation of its obligations under the Code and thus with how it has approached the issue of determining the WACC methodology.

1.2 The objective of the Code

The Code provides the framework in which the ERA is obliged to consider the proposed access arrangement and the various components that make up the arrangement. The Code requires Western Power to propose an access arrangement and the ERA to assess whether it complies with the Code objective and specific criteria. The ERA is obliged to accept the proposed access arrangement unless it is demonstrably inconsistent with these requirements.

[1] Economic Regulatory Authority, Determination of the Preferred Weighted Average Cost of Capital Methodology to Apply to Covered Electricity Networks, 25 February 2005.

The recent public debate and anecdotal evidence about the inadequacy of investment in the infrastructure sector heightens the importance of erring on the side of promoting investment when estimating the WACC.

1.3 Key conclusions

Based on our review, KPMG considers that the rate of return for Western Power's electricity distribution system should be set by reference to the values / ranges for the relevant underlying parameters as set out in Table 1 below.

Table 1: Pre-tax real WACC – parameter estimates

	Feasible range	
Parameter	**Low**	**High**
Real risk free rate *	2.69%	2.69%
Equity beta	0.90	1.10
Market risk premium	6.0%	8.0%
Equity proportion	40%	40%
Debt proportion	60%	60%
Real pre-tax cost of debt	4.18%	4.37%
Debt margin *	1.49%	1.68%
Value of imputation credits	50%	0%
** estimate will be subject to movements in interest rates at the time of ERA's final authorisation*		

The SFG translate the above parameter values into a point estimate for WACC using a probabilistic framework. This framework quantifies the uncertainty surrounding the estimated WACC, by using standard Monte Carlo simulation techniques to construct a full probability distribution around the WACC estimate. By adopting the assumptions set out in Table 2 below, SFG estimates that the real pre-tax WACC for Western Power lays within a probability distribution with the following characteristics:

- A mean value of 7.3%;
- A standard deviation of 0.8%;
- A 90% chance the true value falls between 6.0% and 8.6%;
- A 75th percentile value of 7.8%; and
- An 80th percentile value of 8.0%.

SFG concludes that a real pre-tax WACC of between 7.8% and 8.0% would provide Western Power with a return that is sufficiently likely to meet the cost of funds so as not to

threaten the long-term viability of the business or to provide a disincentive for future investment.

Table 2: Assumptions adopted in SFG's Monte Carlo simulation

Parameter	Symbol	Source	Estimate	Distribution
Real risk free rate of return	Rf	Yield on 10 year Government bond (20 day average)	2.69%	None
Capital structure	D/V	Comparables and regulatory decisions	60%	None
Debt margin		BBB and BBB+ spreads from CBA Spectrum, and other allowances	1.49% – 1.68%	Uniform
Equity beta	βe	Comparables and regulatory decisions	0.9 – 1.1	Uniform
Market risk premium	MRP	Historical stock returns and 10 year government yields; Regulatory decisions	Mean = 6% Std dev = 1.8%	Normal
Value of franking credits	γ	Empirical evidence and regulatory decisions	0.0 – 0.5	Uniform

2 Introduction

Western Power Corporation ("Western Power") owns and operates an electricity network, the South West Interconnected System ("SWIS") that covers the south west of Western Australia.

The SWIS is covered for the purposes of the Electricity Networks Access Code (the "Code"), which was gazetted in Western Australia on 30 November 2004. Under:

- section 4.1 of the Code, the service provider of a covered electricity network is required to submit a proposed access arrangement that establishes policies for third-party access to the network, and establishes reference services and prices controls for those reference services;
- section 6.2 and 6.3 of the Code, the price controls for the first access arrangement reference services are required to be set in accordance with target revenue established by reference to the total costs of the service provider as approved by the Economic Regulation Authority ("ERA");
- section 6.43 of the Code, the total costs of the service provider include a return on the capital base of the covered network calculated by applying a weighted average cost of capital ("WACC") to a capital base established for the network.

It is the determination of the WACC under section 6.43 that is the subject of this report.

Western Power appointed KPMG and the Strategic Finance Group ("SFG") to provide assistance in estimating the WACC for its SWIS.

KPMG provides conclusions on the values to adopt for each of the underlying parameters as part of the process for estimating a reasonable point estimate for the WACC for its electricity network, and the basis for those conclusions.

SFG undertake an analysis on how to translate the parameter estimates recommended by KPMG into a point estimate using a probabilistic framework that takes into account the uncertainty surrounding the WACC parameter estimates. We have therefore also set out in this report, the key results of SFG's analysis.

2.1 Structure of this report

The remainder of this report is structured as follows:

- Section 3 contains a general discussion and overview of WACC concepts and identifies the WACC formulation that we have adopted in this report;
- Section 4 summarises the relevant sections of the Code;
- Section 5 outlines the key considerations relevant to assessing the cost of capital, including the principles arising from recent regulatory developments;

- Section 6 sets out KPMG's analysis of the appropriate values for the underlying WACC parameters and the evidence that we have relied upon in arriving at our choice of values; and

- Section 7 contains a discussion of how the parameter values estimated by KPMG are translated into a point estimate for WACC for Western Power, based on a separate analysis that has been undertaken by SFG.

2.2 Qualifications and disclaimer

This report has been prepared by KPMG on the basis of information available as at the date of this report. Nothing in this report should be taken to imply that KPMG has verified any information supplied to us, or has in any way carried out an audit of the books of accounts or other records of Western Power for the purposes of this report. We have considered and relied upon information from a range of sources, including information provided by Western Power, which we believe to be reliable, complete and not misleading. We have no reason to believe that any material facts have been withheld from us but do not warrant that our inquiries have revealed all of the matters which an audit or extensive examination might disclose.

In accordance with KPMG's policy, we are obliged to advise that neither KPMG nor any member nor employee undertakes responsibility in any way whatsoever to any person or organisation (other than Western Power Corporation) in respect of the information set out in this report, including any errors or omissions therein, arising through negligence or otherwise, however caused.

3 The Weighted Average Cost of Capital

3.1 Introduction

The cost of capital is the rate of return required by the marginal investor in a firm (i.e. the last investor willing to contribute funds). Equivalently, it represents the minimum return on capital that a firm must expect to earn on its investments to attract new capital and to maintain its current value.

The cost of capital of a firm is typically estimated by reference to the current cost of raising funds via the various classes of its capital (e.g. equity, debt, etc.), each weighted by the target proportion of each class of capital to the total market value of capital of the firm. Hence, the cost of capital of a firm is often referred to as a WACC.

In estimating WACC, the Capital Asset Pricing Model ("CAPM") is widely applied to estimate the cost of equity[2]. The CAPM is based on the assumption that an investor in a risky asset requires additional return to compensate for bearing additional risk. In simple terms, the CAPM asserts that the required rate of return on a risky asset is a function of the risk free rate of return (Rf) plus a risk premium that reflects the return on a well-diversified portfolio of risky assets over the risk free rate (Rm – Rf), scaled by the "beta" of the risky asset. Therefore, the required rate of return for equity securities (K_e) is determined as follows:

$$\mathbf{K_e = Risk\ free\ rate + Risk\ premium}$$

$$\mathbf{K_e = R_f + \beta_e * \{R_m - R_f\}}$$

Beta (denoted by β_e) is a measure of the risk of the risky asset relative to the market index. In theory, the only risks that are captured by beta are those risks that cannot be eliminated by the investor through diversification. Such risks are referred to as systematic, undiversifiable or uninsurable risks – they affect all assets since they derive from underlying economy-wide influences. Portfolio diversification is assumed to eliminate all other risks. In practice, however, diversification to the extent that the CAPM assumes is uncommon[3]. For this reason, some investors are likely to require compensation for risks that are considered to be diversifiable under the CAPM.

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[2] There are a number of other theories that can be applied to estimate the cost of equity. However, the CAPM remains the most popular theory.

[3] For example, Goeztman, W. and A. Kumar, *Diversification Decisions of Individual Investors and Asset Prices*, January 2004, unpublished working paper Yale School of Management, conducted an empirical study of 60,000 individual investors during a six year period (1991-1996) and found that the vast majority of investors in their sample were under-diversified. The authors suggest that if investors systematically hold less than fully diversified portfolios, they are likely to demand compensation for the idiosyncratic risk in their equity portfolios. Further analysis suggested that the diversification decisions of these investors will also be reflected in asset prices. In addition, we are also aware of research which has found that the non-systematic risk related to the risk of the firm has increased in recent times, and due to this, elimination of non-systematic risk is no longer possible by holding a portfolio of 20 to 30 stocks. (refer Campbell, Lettau, Malkiel and Xu, *Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk*, Journal of Finance, Vol. LVI, No. 1, February 2001). Finally, Malkiel and Xu (2002) also postulate that if there are investors who cannot hold the market portfolio for exogenous reasons (i.e. they are not diversified to the extent the CAPM presumes), other remaining investors will also be unable to hold the market portfolio (since the sum of the two make up the whole market). Under such a scenario, investors will care about total risk, not just market risk. (refer Malkiel, B and Y. Xu, *Idiosyncratic risk and security returns*, December 2002, unpublished working paper).

The risk-return concepts underlying the CAPM are applicable to any risky asset. Therefore, the required rate of return for risky debt securities can be similarly estimated:

$$\mathbf{K_d = Risk\ free\ rate + debt\ risk\ premium}$$

$$\mathbf{K_d = R_f + \beta_d * (R_m - R_f)}$$

In practice, rather than estimating the individual components underlying the debt risk premium (i.e. β_d, R_m and R_f)), the observed yields on issued debt securities provide an indication of the debt risk premium as a whole.

In addition to the CAPM, capital structure theory is also applied to estimate the target weights that are applied to the cost of equity and the cost of debt in estimating WACC. Capital structure theory focuses on the factors which influence the mix of capital employed by the firm.

In the context of revenue setting by regulators, the cost of capital is effectively converted into a cash flow item. That is, it is applied to a measure of the value of the regulatory asset base, and the result is then added to other revenue building blocks to derive a measure of the required revenue of the regulated entity. In order to ensure that the revenue derivation formula is internally consistent, it is clear that the cost of capital cannot be considered in isolation of the definition of other components of overall revenue determination in regulatory decisions. Care must be taken to ensure this mutual dependency is observed. This also applies to the treatment of inflation, risk and tax. It is in this context that capital structure theory and the CAPM also intersect. For example, the variance of possible future costs influences capital structure choice, the cost of debt and possible cash flows under conditions of distress. Consequently both the cost of capital and the expected operating costs are influenced by variance however the CAPM focuses only on the non-diversifiable element of variance.

3.2 WACC formula

WACC can be expressed in a variety of ways. For each definition, there is a corresponding cash flow definition. Consistent with the ACG Discussion Paper, we have estimated a pre-tax real WACC for Western Power. The pre-tax real WACC that we have estimated for Western Power is based upon the post-tax nominal WACC adjusted for imputation:

$$\mathbf{WACC = K_e * (1-t)/\{1-t*(1-\gamma)\} * E/V + K_d*(1-t)*D/V}$$

grossed up by 1 minus the statutory corporate tax rate to obtain the pre-tax nominal WACC:

$$\mathbf{Pre\text{-}tax\ nominal\ WACC\ \% = K_e * 1 /\{1-t*(1-\gamma)\} * E/V + K_d*D/V}$$

and then adjusted for inflation:

$$\mathbf{Pre\text{-}tax\ real\ WACC = \{(1+Pre\text{-}tax\ nominal\ WACC\ \%) / (1+CPI)\} -1}$$ [4]

[4] A number of regulators adopt a "post tax" WACC. This is often referred to as the "Vanilla" WACC, which is estimated using the following formula: Vanilla WACC = K_e*E/V + K_d*D/V

4 The Electricity Networks Access Code 2004

4.1 Introduction

The Code provides the regulatory framework to facilitate third party access to the SWIS. The Code requires Western Power to propose an access arrangement which achieves both the Code objective and specific criteria. The ERA is required to assess the proposed access arrangement and approve it, if it is consistent with the Code requirements.

4.2 Propose/Respond Model

The Code establishes a form of regulation that requires Western Power to develop an access arrangement to be submitted to the ERA for approval. The criteria for approval to be used by the ERA is whether the access arrangement meets the Code objective. At s.4.28(b) the Code removes the ability for the ERA not to accept Western Power's access arrangement if it has met the Code objective and the detailed requirements at chapter five of the Code. Moreover, it does not allow the ERA to refuse an access arrangement on the grounds that another form of access arrangement might better or more effectively satisfy the Code objective and the chapter five requirements.

The implication is that the ERA's role is restricted to reviewing the justifications presented in estimating the WACC parameters and determining whether it will achieve the Code objective.

4.3 Code Objective

The Code requires the Minister, the ERA and the Arbitrator to have regard to the Code objective when performing a function under the Code. The objective, as stated at s.2.1 is:

> *to promote the economically efficient:*
>
> - *investment in; and*
> - *operation of and use of,*
>
> *networks and services of networks in Western Australia to promote competition in markets upstream and downstream of the networks.*[5]

Recent judicial and regulatory precedent suggest that significant weight should be given to appropriate investment incentives. Section 4 of this report outlines these recent judicial and regulatory precedents.

Given the long-term nature of the assets involved in the provision of electricity, it is appropriate for long-term matters to be given primacy in the development of the access arrangements. It is in this context where potential for conflict between the twin objectives of economically efficient investment and operation can arise.

[5] Government Gazette, The Electricity Networks Access Code, 2004

Issues of conflict are addressed within the Code at s.2.3 and 2.4, such that if the Code objective is specified in a provision of the Code as a specific criterion, and this then conflicts with one or more other specific criterion the Code objective prevails. However, if the Code objective is not listed as a specific criterion, any conflict that arises requires the specific criterion to prevail over the Code objective.

In addition, were a situation to arise such that more than one specific criterion is to be applied, and a conflict arises between them, s.2.3(b)(ii) requires the Code objective to be applied to reconcile which specific criterion will prevail.

4.4 Price Control and the WACC

The price control applied under the access arrangement is to be determined so as to achieve the price control objectives. In determining revenue amounts which achieve these objectives, the ERA is required to treat this as a target rather than a ceiling or a floor.[6] In addition, any determination is required to apply the "Propose/Respond" model of regulation, with s.6.39 noting that each element of the price control is to be proposed by the service provider (including the WACC).

The key elements of the price control objective are detailed at sections 6.4(a), (b) and (c) of the Code. The price control in an access arrangement must have the objectives of:

- giving the service provider an opportunity to earn an amount of revenue that meets the forward-looking and efficient costs of providing covered services, including a return on investment commensurate with the commercial risks involved;
- enabling a user to predict the likely annual changes in target revenue during the access arrangement period; and
- avoiding price shocks.

The implication of these sections of the Code is that when determining an appropriate estimate of the WACC to be applied under Western Power's access arrangement, the ERA is to consider a target outcome, rather than a floor or ceiling, and in making its determination ensure the outcomes are consistent with the Code objective and the price control objectives. Where there is any conflict between these objectives the Code objective is to have primacy.

The ERA would appear to concur with this view, as is discussed below.

4.5 The process of setting the WACC

The appropriate value for the WACC is an important element in the price control process. The Code requirements with respect to determining the WACC under the access arrangement proposed by Western Power include:

[6] Government Gazette, The Electricity Networks Access Code, 2004

- the ERA may from time to time make and publish a determination of the preferred methodology for estimating the WACC (s.6.65);

- adoption of any methodology by Western Power, as long as it is consistent with both the Code objective and Chapter six of the Code and has regard to the above (s.6.64(a)(i)); and

- if the ERA makes a determination of the preferred methodology for estimating the WACC it must represent an effective means of achieving the Code objective and the price control objective – discussed above (s.6.66(a)).

KPMG is aware that the ERA recently published a report on the appropriate WACC methodology.[7]

It proposed the use, amongst other things, of:

- The CAPM methodology for calculating the return on assets;

- The use of a real, pre-tax formulation of the cost of capital;

- A debt premium based on market evidence for businesses with a credit profile consistent with a BBB or BBB+ rating;

- Nominal risk free rates, derived from the prevailing yields on Commonwealth 10 year bonds, calculated on the basis of a 20 trading day average;

- Real risk free rates derived from the prevailing yields on Commonwealth index-linked bonds with a term of 10 years, calculated on the basis of a 20 trading day average;

- An inflation forecast derived consistent with the above market information and estimated using the Fischer equation; and

- An appropriate benchmark gearing assumption to encourage efficient financing decisions.

KPMG is of the view that the WACC determined by the work it has undertaken with the SFG is consistent with the ERA's stated methodology, as it complies with all the ERA's "methodological" directives.

[7] Economic Regulatory Authority, Determination of the Preferred Weighted Average Cost of Capital Methodology to Apply to Covered Electricity Networks, 25 February 2005.
[9] Productivity Commission, Review of the National Access Regime: Inquiry Report, 28 September 2001.

5 Issues relevant to assessing the cost of capital

5.1 Overview

KPMG's estimate of the cost of capital for Western Power's SWIS electricity network recognises that:

- there is now a significant body of opinion from independent and legal bodies that regulatory decisions need to give greater weight to investment incentives and the provision of incentives consistent with those found in workably competitive markets; and
- the inevitable imprecision of cost of capital estimates, including the methodological limitations associated with approaches such as the CAPM, mean that the estimated cost of capital needs to be applied and interpreted with care. This is particularly relevant in a regulatory context because the impact of regulatory errors is magnified.

The first of these issues is addressed below, while the second is addressed in the context of the parameter analysis that follows this section.

5.2 Recent regulatory developments

KPMG considers that recent regulatory developments offer important clarification on the objectives of economic regulation and on how it should be applied. While most of these recent developments have occurred within the context of the gas industry, KPMG believes that they are equally relevant to electricity industry regulation, and particularly for Western Power given the requirements of the Code. This section outlines the key developments and explains their relevance.

The key regulatory developments have included:

- the Productivity Commission's (PC) report on its Review of the National Access Regime[9] and the Government's Response;[10]
- the PC's final inquiry report on the Review of the Gas Access Regime;[11]
- the Parer Report;[12]
- the Epic Decision;[13]
- the Australian Competition Tribunal ("ACT")'s decisions on appeals by:
  - Epic Energy on the ACCC's decision on the Moomba to Adelaide pipeline; [14]

[10] Government Response to the Productivity Commission Review of the National Access Regime, released 17 September 2002.
[11] Productivity Commission, Review of the Gas Access Regime: Draft Report, Canberra, December 2003.
[12] Council of Australia Governments Energy Market Review Panel, Towards a Truly National and Efficient Energy Market: Final Report [Parer Report], 20 December 2002.
[13] *Re Dr Ken Michael AM; Ex parte Epic Energy (WA) Nominees Pty Ltd* [2002] WASCA 231.

- GasNet on the ACCC's decision on its proposed access arrangements;[15] and
- APT on the ACCC's decision on the access arrangements for the MSP.[16]

5.2.1 The Productivity Commission

Review of the National Access Regime

The first and one of the strongest reassertions of the objectives of regulation came from the PC's Review of the National Access Regime. One of the major themes of this assessment was the risk of "regulatory error", and the realisation that the potential costs associated with too little infrastructure investment are far greater than those associated with too much investment. In short, there is asymmetry in the consequences of regulatory pricing errors:

> *"Given that precision is not possible, access arrangements should encourage regulators to lean more towards facilitating investment than short term consumption of services when setting terms and conditions …*
>
> *[and] given the asymmetry in the costs of under- and over-compensation of facility owners, together with the informational uncertainties facing regulators, there is a strong in principle case to 'err' on the side of investors".*

It is in this vein that the PC provided a clear warning against an excessive focus on the removal of so-called "monopoly rents" from the revenue streams of facility owners, quoting a submission to the review by NECG, which stated:

> *"In using their discretion, regulators effectively face a choice between (i) erring on the side of lower access prices and seeking to ensure they remove any potential for monopoly rents and the consequent allocative inefficiencies from the system; or (ii) allowing higher access prices so as to ensure that sufficient incentives for efficient investment are retained, with the consequent productive and dynamic efficiencies such investment engenders.*
>
> *There are strong economic reasons in many regulated industries to place particular emphasis on ensuring the incentives are maintained for efficient investment and for continued productivity increases. The dynamic and productive efficiency costs associated with distorted incentives and with slower growth in productivity are almost always likely to outweigh any allocative efficiency losses associated with above-cost pricing. (sub. 39, p. 16)"*

As a result the PC review highlighted the need to modify implementation of the regime and made 33 recommendations to improve its operation. In particular it identified as a:

> *"…threshold issue, the need for the application of the regime to give proper regard to investment issues" and "the need to provide appropriate incentives for investment"*[17]

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[14] Application by Epic Energy South Australia Pty ltd [2003] ACompT 5.
[15] Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6.
[16] Application by East Australian Pipeline Limited [2004] ACompT 8.
[17] PC, Review of the National Access Regime: Inquiry Report, 28 September 2001, p. xxii.

The Commonwealth Government's response

The PC's views were supported by the Commonwealth Government's response: it decided to make changes to the *Trade Practices Act* which *"endorse the thrust"* of the PC's recommendations.[18] In particular, it will modify the regime to:

- include a clear objects clause:

  "The objective of this part is to promote the economically efficient operation and use of, and investment in, essential infrastructure services thereby promoting effective competition in upstream and downstream markets…"

  (It is noteworthy that this element has been adopted in the Western Australian Code.)

- insert pricing principles:

  "The ACCC must have regard to the following principles:

  (a) that regulated access prices should:

  *(i) be set so as to generate expected revenue for a regulated service or services that is **at least sufficient** [our emphasis] to meet the efficient costs of providing access to the regulated service or services;*

  *(ii) include a return on investment commensurate with **the regulatory and commercial risks involved** [our emphasis]…"*

- include a provision for merit review of decisions by the ACCC on proposed undertakings.

The Review of the Gas Access Regime

The PC completed its Review of the Gas Access Regime and issued its final inquiry report in August 2004. Amongst other things, the Commission concluded that "*… there are problems with the current regime. These mainly arise from the considerable costs the regime imposes and its real potential to distort investment and inhibit innovation."*[19]

The PC highlighted its concerns that:

"The greatest concern for this inquiry is that the Gas Access Regime's form of cost-based price regulation leads to inefficient investment because of:

- *regulatory error — mistakes are made in applying regulation*
- *regulatory risk — uncertainty about how regulation is applied increases the riskiness of investment*

[18] Commonwealth Government, "Government Response to Productivity Commission Report on the Review of the National Access Regime: Interim Response", September 2002, p. 1.
[19] Productivity Commission, Review of the Gas Access Regime: Final Report, August 2004, page XXXVIII.

- *asymmetric truncation — profit is curtailed if it is better than expected."*[20]

In relation to regulatory risk, the PC expressed the view that:

"… there is high potential for regulated prices to incorporate regulatory errors that reduce expected returns. This is attributable to the combination of a number of factors:

- *there are many complex issues — and hence scope for errors — associated with calculating a regulated price that is designed to just cover expected costs.*

- *regulators have to make subjective judgments about risk, given that investment returns are uncertain. For example, regulators periodically assess service providers' forecasts of future demand and efficiency gains, and in some cases have required them to be amended. This necessarily requires regulators to use debatable assumptions, given that the future cannot be known with certainty.*

- *a regulator's subjective judgment of risk could differ from that of the business it regulates. A regulator might apply the rules correctly based on its judgment, but this is not the judgment held by the business whose behaviour it is trying to influence. It must be remembered that businesses make investment decisions, not regulators…*

- *appeal decisions have identified errors made by regulators in setting reference tariffs (Application by Epic Energy South Australia Pty Ltd (2003) ACompT 5; and Application by GasNet Australia (Operations) Pty Ltd (2003) ACompT 6). Such regulatory errors have tended to impose lower regulated prices than otherwise.*

- *economics provides little guidance on how to set efficient prices in imperfectly competitive markets, such as those that are evolving for gas pipelines in eastern Australia (section 4.7)."*[21]

The PC noted the large number of submissions which discussed issues associated with how regulators set the rate of return in its discussion on parameter risk.

The PC observed that asymmetric truncation could potentially occur at periodic regulatory reviews and due to the benefit sharing mechanisms applied by regulators. The issue with applying benefit sharing during periodic regulatory reviews was essentially that the review only provides a snapshot of circumstances at a point in time whereas in a competitive market, prices can be above costs for an extended period. The risk is therefore that a short term comparison of prices and costs could be misinterpreted by regulators as evidence of monopolistic behaviour.

In examining the evidence on asymmetric truncation of returns, the PC noted its disagreement with the views expressed in a submission by the ACG that the asymmetric truncation of returns for gas pipeline investments was not an issue in practice because the distribution of returns for such investments was narrow. The PC referred to its own analysis of asymmetric truncation contained in Appendix B of its final report:

"To illustrate, appendix B presents a numerical example based on the parameters that regulators have applied to regulate gas pipelines. The results suggest that the distribution of possible returns for pipelines is much wider than asserted by the Allen Consulting Group and implied in the ACCC's draft greenfields

[20] Ibid, page 101.
[21] Ibid, page 107.

guideline (figure B.2). In other words, an actual rate of return significantly above that expected by a regulator could be consistent with a pipeline that behaves competitively. If competitive returns are as widely dispersed as the example suggests, then regulators will find it extremely difficult to distinguish between a competitive pipeline that experiences a better than expected outcome and a pipeline that is exerting market power. In other words, it will be hard for regulators to avoid asymmetrically truncating competitive returns."[22]

5.2.2 The Parer Report

The Parer Report called for a less intrusive approach to utility regulation. It concluded that there are *"distorted and inappropriate signals from the current network regulation framework."*[23] It also noted *"that future debate would be most effective if it focussed on moving regulation to a less intrusive form."*[24]

5.2.3 The Commonwealth Government

In addition to endorsing the PC's findings on the review of the National Access Regime, the Commonwealth Government has been providing its views on how the Gas Code should be interpreted.

The Minister for Industry Tourism and Resources, Ian MacFarlane, recently overturned the NCC's recommendation on the application for revocation of coverage of certain portions of the Moomba-Sydney Pipeline System.[25] Instead, the Minister decided that coverage of part of the MSP Mainline be revoked.

While the Minister's decision relates to a case for lifting regulation – and it follows over 20 (mostly successful) revocation applications – the Minister in his Statement of Reasons emphasised a number of important points of regulatory implementation. The Minister stressed the need to move away from *"a presumption of access regulation or monopoly service provision"* and to provide evidence of the *"actual circumstances"* of pipelines as opposed to making a *"generic"* assessment or any assessment that *"bears limited relationship to the market realities"*, or arguing from a *"theoretical proposition."*[26]

The decision therefore highlighted the need for regulators to exercise their powers while recognising the commercial situation and market realities.

5.2.4 Judicial decisions

There has been a series of recent judicial decisions that have assisted in clarifying the role of the regulator and how access regulation should be applied.

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[22] Ibid, page 115.
[23] Council of Australian Government's Energy Market Review Panel, Towards a Truly National and Efficient Energy Market, 20 December 2002, p. 12.
[24] Ibid., p. 16.
[25] Final Decision: Applications for Revocation of Coverage on Certain Portions of the Moomba-Sydney Pipeline System, 19 November 2003.
[26] Statement of Reasons, 19 November 2003, sections 56-58, page 15.

The Epic Decision

The Western Australian Supreme Court ordered the Regulator to revise its Draft Decision for the Dampier-Bunbury Natural Gas Pipeline's ("DBNGP") access arrangement to be more in line with the objectives of the regulatory regime. More specifically, in applying the National Gas Code to set revenues for regulated gas businesses, the Court found that the regulator was bound by the considerations in section 2.24 over all other parts of the National Gas Code. That is, the Regulator was required to take into account the interests of the Service Providers, Users and Prospective Users, and the public interest.

In particular, the Court considered that application of regulation based on an underlying "perfect competition" model was inconsistent with the regulation. Rather the Court considered that regulation should be based on a model of "workable competition", and that this was consistent with the Hilmer reforms.

The Australian Competition Tribunal ("ACT") decisions

Three recent ACT decisions have offered important clarifications on issues such as the role and powers of the regulator and the way in which access arrangements should be assessed under the Code.

Appeal of ACCC decision on the Moomba to Adelaide Pipeline

In December 2003, the ACT handed down its decision on Epic Energy's appeal against the ACCC's refusal to approve its access arrangements for the Moomba Adelaide Pipeline ("MAP"). Some of the guiding principles emerging from this decision concern how the regulator should select estimates under circumstances where a range of possible values exist:

- regulators must give clear and substantiated reasons for reaching their conclusions regarding the values they select where a range of possible values exist;[27]

- where a range of possible values exists, there is no requirement in the National Gas Code that the lowest value should be selected.[28] The ACT stated that:

  "Epic must be allowed the opportunity to earn a revenue stream that recovers the efficient costs of operating the Reference Service, and the need to replicate the outcomes of a competitive market does not demand the use of the lowest indicated price based on general, albeit informed, inquiries."

- under conditions of uncertainty, a reasonable and prudent service provider would not select a value that lies at the low end of a range of possible values. Doing so creates an asymmetric exposure to risk.[29]

Appeal of ACCC decision on GasNet's proposed access arrangements

[27] Application by Epic Energy South Australia Pty ltd [2003] ACompT 5, paragraph 32, 48, 84.
[28] Ibid, para. 92.
[29] Ibid, para. 94.

In December 2003, the ACT also handed down its decision on GasNet's appeal on the ACCC's decision on its proposed access arrangements. This also outlines some important principles regarding the role and powers of the regulator.

The ACT expressed the view that it is beyond the power of the Regulator not to approve the service provider's access arrangements where the arrangements proposed fell within reasonable and acceptable ranges:

> *"…where the AA proposed by the Service Provider falls within the range of choice reasonably open and consistent with Reference Tariff Principles, it is beyond the power of the Relevant Regulator not to approve the proposed AA simply because it prefers a different AA which it believes would better achieve the Relevant Regulator's understanding of the statutory objectives of the Law."*[30]

The view expressed by the ACT reinforces the Court's finding in the Epic decision that there is no single correct value for most of the parameters used in setting reference tariffs. In this context, it is not open to the Regulator to reject the service provider's proposed access arrangements and replace it with its own judgments as to what is more appropriate, unless it is found that the proposals do not comply with the factors listed in Section 2.24 of the Code.

Importantly, these concepts can be extended to the regulator's assessment of the Rate of Return. The ACT stated that:

> *"Contrary to the submission of the ACCC, it is not the task of the Relevant Regulator under s 8.30 and s 8.31 of the* [National Gas] *Code to determine a 'return which is commensurate with prevailing conditions in the market for funds and the risk involved in delivering the Reference Service'. The task of the ACCC is to determine whether the proposed AA in its treatment of Rate of Return is consistent with the provisions of s 8.30 and s 8.31 and that the rate determined falls within the range of rates commensurate with the prevailing market conditions and the relevant risk."* [31]

Having clarified that the Regulator's role is not to set the Rate of Return but to assess if it falls within acceptable ranges under the provisions of Section 8.30 and 8.31 of the National Gas Code, the ACT concluded that:

> *"When the proposed AA was delivered by GasNet to the ACCC, insofar as it contained a Rate of Return which was used to determine the Reference Tariff established by the use of the CAPM, the only issue for the ACCC to determine in respect of the Rate of Return was whether GasNet had used the model correctly. That is, whether it had used the CAPM to produce a Rate of Return which was consistent with the conventional use of the model. If GasNet had done so, then there was no occasion to refuse to approve the proposed AA on the basis that the Rate of Return had not been determined on a basis which was consistent with the objectives contained in s 8.1."*[32]

<u>Appeal of ACCC decision on the access arrangements for the MSP</u>

More recently, the ACT made a decision on an appeal regarding the ACCC's decision to approve its own access arrangement for parts of the MSP. This decision also contained some important guidance on how regulators should exercise their role.

In upholding the appeal the ACT stated:

[30] Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6, paragraph 29.
[31] Ibid, para. 42.
[32] Ibid, para. 45.

> *"As the decision in relation to the ICB must be set aside in any event, it is not necessary for the purposes of this decision to come to any conclusion in relation to the contention put on behalf of EAPL that the ACCC was reasoning toward a predetermined conclusion. It would, of course, be wrong of a regulator to justify a decision taken for a particular reason by reference to other reasons. A regulator in the position of the ACCC has a delicate task. It must be conscious of the interests of the parties other than the proponent of the access arrangement and is bound to scrutinise carefully the information provided in support of it. On the other hand, it must have regard to the legitimate business interests of the proponent and should not put itself in an adversary position in relation to the proponent so that it may be perceived as a champion of other interests such as those of consumers."*[33]

The ACT concurred with the view that the approach adopted by the ACCC in this case had *"no support in the* [National Gas] *Code"* and was *"idiosyncratic"*.[34]

The ACT also argued, in relation to asset valuation under the National Gas Code, that:

> *"…the primary quest is for a proper contemporaneous value from which to deduce a tariff that will replicate a hypothetical competitive market. It is not to provide subsidies to customers. Pricing below a tariff based upon true value would not replicate a competitive market."*[35]

5.2.5 Conclusions on recent regulatory developments

The summary of relevant decisions and precedents detailed above are part of a significant body of authoritative and independent opinion that demonstrates the importance of avoiding regulatory error and the risks to regulated infrastructure investment, and thus the long term interests of customers, that might arise from those errors.

We have identified the following guiding principles to emerge from recent regulatory developments:

- the role of the Regulator is not to set the terms of a business's price-service proposal, but to assess if they are consistent with the relevant regulatory objectives.
- regulators must be conscious of and have regard to the legitimate business interests of the service provider and should not place themselves in a position where they can be perceived as favouring the interests of particular stakeholders (such as those of consumers, for instance);
- the regulator should only reject a price-service proposal if it is found to be inconsistent with the relevant regulatory objectives;
- a workably competitive market is the appropriate benchmark against which to make these assessments (ie. the incentives created and operations encouraged are consistent with those found in workably competitive markets);
- there is no requirement that regulators must approve prices based on the lowest value for any underlying parameters. Under conditions of uncertainty, a reasonable and prudent

[33] Application by East Australian Pipeline Limited [2004] ACompT 8, paragraph 33.
[34] Ibid, paragraph 25.
[35] Ibid, paragraph 34.

business would not pick the lowest value since this would expose the service provider to the highest risk of under-estimation;

- there is sufficient uncertainty regarding the principles that are applied in setting prices such that *"…different minds, acting reasonably, can be expected to make different choices within a range of possible choices which nonetheless remain consistent with the Reference Tariff Principles.*[36]*"*; and

- given this uncertainty, a regulator cannot reject a price-service proposal merely because it prefers a different one that it considers is more consistent with the relevant regulatory objectives.

As noted earlier, KPMG acknowledges that these regulatory developments have occurred specifically within the context of the gas industry and the National Gas Code. However, the Electricity Networks Access Code is consistent with these guiding principles. The correct application of the "Propose/Respond" model for access arrangements (s.4.28) restricts the ERA from imposing an arrangement that it considers might better, or more effectively meet the Code objective and specific criteria.

In addition s.6.5 of the Code acknowledges the range of possible outcomes, by referring to required revenues as a target not a ceiling or floor. The work completed by SFG provides detail on the range of possible outcomes with respect to the WACC parameters and appropriate decision making in the face of such uncertainty.

5.3 Recent debate on Investment in Utility Industries

5.3.1 The sale prices of assets

Some regulators, in defending their approach, have argued that the sale prices of regulated assets provides support for the notion that regulatory decisions are inherently conservative, although they less often justify particular decisions on this basis (at least in writing). For example, in recently refuting the criticisms of the Productivity Commission in a paper to the Ministerial Council on Energy, the Utility Regulators Forum reportedly states:

> Regulated assets remain attractive to profitable investments at regulatory values and rates of return set by regulators, often trading at a premium to their regulated value which arguably suggests that regulated rates of return exceed returns expected by the market from infrastructure assets.[37]

The relationship between market and regulatory asset values is often referred to as the Regulated Asset Base multiple ("RAB multiple"). It describes the ratio between the:

- Value the market places on the expected cash flows that will accrue to it from a firm, which owns a regulated asset; and

[36] Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6, paragraph 29.
[37] Esaa news, URF says energy regulation not a negative effect on industry, No 16, 25 April 2005, page 4.

- Value the regulator generally intends returning to the firm over that asset's life (ie. the RAB).

It is important to note that the RAB multiple concept involves the extension of a broader concept, known as "Tobin's Q" (or the "market multiple").[38] It describes the ratio between:

- The value the market places on the expected cash flows that will accrue to it from the market (or from a particular industry or individual firms); and

- The replacement cost of the relevant assets (eg. current cost and/or book values are used).

A number of studies have tested the applicability of Tobin's Q, and the results of these are useful in considering the value that should be ascribed to RAB multiples in the regulatory context.[39] The balance of opinion is that while there is strong evidence to support a relationship between the market value of companies and the replacement cost of their assets, the evidence is that the ratio is typically not equal to one. In addition the value is variable over time and across the business cycle. The factors influencing these results impact both on the numerator and denominator in the calculation and include:

- Replacement cost of assets – including difficulties in valuing intangibles, capital market imperfections and diminishing returns to investment;

- Market value assets – including future growth opportunities, the value of incumbency and market position, the inherent 'noise' contained in the capital markets and corporate governance factors such as management and Board composition; and

- Different cyclical properties – the market value of equity tends to be procyclical, while the investment prices to replace plant and equipment tends to be weakly countercyclical.

One of these factors that has received attention in recent times is the issue of diminishing returns to investment.

One implication of the regulators' position (putting aside momentarily the issue of the adequacy of the cost of capital), is that the marginal investment is as attractive as the average investment. There is no reason to suppose that this has to be the case. In principle, it is quite possible that the average investment may be attractive and the marginal investment less or unattractive or vice versa.

There is evidence to suggest that the relationship between the two will vary over the market cycle. Moreover, there is evidence to suggest that we may well currently be in a situation where the market views the average investment more favourably than the marginal investment. For example, the Economist recently stated:

[38] Tobin, J "A General Equilibrium Approach to Monetary Theory", Journal of Money, Credit and Banking, 1969.
[39] A summary of relevant studies is contained in a KPMG report which was included in the 2002 Australian Gas Association's Submission to the Essential Services Commission Draft Decision on the Review of Victorian Gas Access Arrangements (http://www.esc.vic.gov.au/apps/page/user/pdf/10_AustGasAssocationAccess.pdf)

> When the Sage of Omaha talks, his investors listen, although they don't always like what they hear. The most striking feature of the mea culpa sent by Warren Buffet, Berkshire Hathaway's chairman, to the diversified investment company's shareholders on March 5th was not his apology for failing to produce returns commensurate with those on the S&P 500 stockmarket index. It was his wistful admission that he is having trouble finding any company worth investing in.
>
> In that, he is not alone. Most companies do not even want to invest in themselves these days, and are instead returning cash to shareholders by the shovelful. In 2004, estimate J. P. Morgan, companies in the S&P 500 index paid $181 billion in cash dividends and spent $150 billion on share buybacks, handing a record sum back to their owners. There are many reasons for this phenomenon, including changes in dividend taxation in America and huge corporate profits in most places. But one thing is clear: companies do not think they can earn much by retained earnings. So it is better to hand the money back, or buy other firms.[40]

Similar trends are visible in Australia generally and in infrastructure as well. The anecdotal evidence seems to suggest that it is possible that the market wants to be invested in a company or a sector without necessarily encouraging investment (ie. it is possible that existing assets can be valued relatively "highly" without a similar value being attached to incremental direct investment).

In practice, market multiples reflect far too many variables to be of much practical use in determining a firm's ability to earn "excess profits". The same applies to RAB multiples.

It is unreasonable therefore to use the relationship between market and regulated asset values to draw conclusions about particular regulatory decisions or the regime in general because:

- The RAB multiple concept is derived from the market multiple concept. In principle, expecting to observe market multiples of one is unreasonable, as is attaching great significance to them if they arise. This is also true for RAB multiples;
- In practice, the empirical evidence suggests that expecting to observe market multiples of one is unreasonable. This is also true for RAB multiples; and
- Interpreting particular meaning from observed market multiples is an extremely challenging task. This is also true for RAB multiples.

To draw any conclusions about an industry from market multiples it would be necessary, at the very least, to demonstrate that the:

- Multiples observed are significantly different to those observed for the whole market; and
- Discrepancy has persisted at least over the relevant business cycle.

It would also be necessary to address adequately the measurement issues (eg. valuing intangibles). The market multiple concept at best provides very broad directional evidence on the market, which is how it is used in commercial practice.

[40] The Economist, 'Investment gurus: Herbal remedies', 12th March 2005, page 68.

The same is true for the regulated sector. In other words, if it were appropriate to use RAB multiples, they would need to be compared to market multiples. In other words, for it to be reasonable to conclude that regulators were being systematically conservative in their decisions, it would be necessary to demonstrate that:

- That RAB multiples are in excess of market multiples (potentially not just 1); and
- That they had been so over the relevant market cycle.

In practice, however, identifying discrepancies in both examples is likely to be difficult and unlikely to yield particularly definitive results because of the measurement problems.

Relying on RAB multiples in regulatory decision-making raises a broader question than whether it is reasonable to do so. It also raises a question of whether it is appropriate to do so. In other words, even if could be shown that it was reasonable to rely on RAB multiples, it is not obvious that it would be appropriate to do so in the context of incentive regulation.

There are several reasons why it is inappropriate to rely on RAB multiples in implementing incentive regulation.

First, this approach implies a degree of retrospectivity in regulatory decision-making which can only undermine the regulatory process. There is a real risk that such an approach would become a "self-fulfilling" prophecy (ie. regulation cannot be "right" until RAB multiples equal one). Such retrospectivity is fundamentally at odds with forward-looking, incentive regulation.

Second, the whole point of incentive regulation is to encourage out-performance. This has been recognised explicitly by most regulators. For instance, the Office of the Regulator-General, Victoria has stated:

> "To the extent that the distributors can achieve or exceed the set reliability targets and satisfy their licence obligations at a lower cost than implied by the expenditure benchmarks, the CPI-X regulatory regime allows them to retain the original benefit of doing so within the regulatory period. The Office's approach to out-performance in terms of both service and efficiency also allows the distributors to retain some of these benefits during the following regulatory period as an incentive to pursue further gains. Taken together, these measures mean that the distributors that exceed their service level targets and perform more efficiently than the benchmark levels will earn returns in excess of the benchmark cost of capital."[41]

An approach that focuses on RAB multiples risks punishing out-performance by assuming it is solely a function of regulatory discretion. Investors might value the additional income that might become available under an incentive-based regulatory regime. This factor provide might some explanation of the presently observable difference between RAB values and market valuations of assets. Equally, a regulatory approach which focuses on RAB multiples signals to investors that regulatory decisions may effectively confiscate efficiency gains made by successful and efficient regulated companies. Such an outcome would be inimical to the fundamental objectives of incentive regulation.

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41 Office of the Regulator-General, Electricity Distribution Price Determination 2001-05, page xiv.

Third, it involves using an inappropriate concept of competition, as has been recognised in a variety of recent regulatory developments. Key themes to emerge from these recent regulatory developments have been the need for regulators to use a realistic concept of competition in making their decisions and to avoid being too ambitious in removing perceived monopoly rents.

In summary, it is unreasonable and inappropriate to rely on the observed relationship between market and regulated asset values to draw conclusions about particular regulatory decisions or the regime in general. It is unreasonable because the broader concept underpinning this relationship and the empirical evidence do not support drawing conclusions of this type. Further, it is inappropriate because relying on this relationship can only undermine incentive regulation.

5.3.2 The most recent public debate

More recently, the issue of insufficient investment in utility industries has been the subject of unprecedented public scrutiny. Although the debate has encompassed the electricity, gas, water and transport sectors, the issue of ports has raised particular interest in recent times.

For example, export coal ports were the subject of a formal complaint from Japan and Taiwan, which citied growing bottlenecks at Newcastle and Queensland.[42] It was reported at this time that a queue of 42 bulk carriers were waiting off Dalrymple Bay Coal Terminal (DBCT) in Queensland, which has since increased to 50.[43]

The Queensland Government has entered the debate on the appropriate level of WACC in regulatory decisions and its impact on the level of investment in capital assets. In its submission to the Queensland Competition Authority on the DBCT draft determination Queensland Treasury stated its position on determining the WACC parameters was "*to err on the side of higher revenues rather than lower revenues,...decisions which lead to lower revenues can result in underinvestment, with far greater consequences for the economy than any costs associated with slightly higher prices for consumers*."[44]

This submission was in response to the QCA's draft decision to apply a WACC of 8.2% (nominal post-tax) and the subsequent decision of the owners of DBCT to refuse to commit to an investment in capacity expansion. As was noted in the Australian Financial Review stevedores Patrick and P&O are making 28% return on their assets but are exposed to a similar level of risk as DBCT.[45]

The situation for mineral exports in Western Australia however is much less problematic where the private sector is vertically integrated through the supply chain and not subject to price regulation. Iron ore exporters such as BHP Billiton own almost all of the infrastructure (mines, rail lines and port berths) and have been able to plan years in advance and undertake investment in capacity. For example BHP Billiton's investment in the past 10 years raised export iron ore

[42] Tingle, L. "Coal Customers Unrest Sparks Ports Review", Australian Financial Review, 21/2/2005.
[43] Ibid and Wisenthal, S. "Long Haul to Solve Export Block", Australian Financial Review, 11/4/05.
[44] Bradley, G. "Queensland Treasury Cost of Capital Submission", 22 April 2004.
[45] "Costello Must Get States Onside", Australian Financial Review, 9 February 2005.

capacity from 60 million tonnes to 110 million tonnes and is to increase to 118 million tonnes in 2006.[46]

The implication is that regulatory decisions that impose a restrictive WACC produce reduced capital expenditure and lower service standards. This has occurred in Queensland with necessary capacity expansion at DBCT being withdrawn as a direct result of the WACC applied by the regulator. This link between the WACC that can be earned and the willingness of regulated businesses to undertake expenditure is crucial to understanding infrastructure industries.

The QCA has recently recognised the risks associated with investment and increased the cost of capital, and the company has now committed to invest.

KPMG understand that the ERA may be of the view that the primary issue of concern is not the level of the WACC (which it believes is generous) but the adequacy of the allowances made for capital expenditure. In this respect, it is perhaps worth observing what is occurring in the context of the 2006 Electricity Distribution Price Review in Victoria. Despite the ESC providing a cost of capital that is similarly "generous" to that provided by the ERA, investment has been 33% lower than the benchmarks provided despite higher than forecast demand growth.

If the cost of capital were so generous, then it is not obvious why this would be occurring. The businesses would presumably have a powerful incentive to invest the total allowance and accrue the "economic" rents associated with the unduly high return on assets provided by the regulator. Yet such behaviour is not being observed.

Another practical example of how these uncertainties are addressed in commercial practice comes from the recent takeover activity surrounding Western Mining. Western Mining hired Grant Samuel to provide an independent valuation of its business, to defend it against the first takeover offer.[47]

It is worth noting what Grant Samuel say and do in relation to estimating the cost of capital.

> Selection of the appropriate discount rate to apply to the forecast cash flows of any business enterprise is fundamentally a matter of judgement. The valuation of an asset or business involves judgements about the discount rates that may be utilised by potential acquirers of that asset. There is a body of theory that can be used to support that judgement. However, a mechanistic application of formulae derived from that theory could obscure the reality that there is no "correct" discount rate. Despite the growing acceptance and application of various theoretical models it is Grant Samuel's experience that many companies rely on less sophisticated approaches. Many businesses use relatively arbitrary "hurdle rates" which do not vary significantly from investment to investment or change significantly over time despite interest rate movements. Valuation is an estimate of what real world buyers and sellers of assets would pay and must therefore reflect the criteria that will be applied in practice even if they are not theoretically correct.[48]

[46] Main, A. "Who's to Blame for These Ports in a Storm", Australian Financial Review, 26 February 2005.
[47] Grant Samuel, Xstrata Takeover Offer, 22 December 2004.
[48] Ibid., Appendix 1 page 1

The approach used by Grant Samuel is refreshingly simple compared to the debate regulators create and is different in a number of ways for various reasons.[49] It concludes that certain numbers can be calculated for the various business units of Western Mining using the theoretically pure approach. Critically, however, it then states as follows:

> These theoretically calculated WACC's are considered to be lower than the discount rates that real world potential acquirers would use in assessing these assets. In addition, the betas of comparable companies set out above are relatively low compared with those historically observed. Accordingly, Grant Samuel has judgementally increased the estimated WACCs for the purpose of selecting discount rates, as follows.[50]

This involved increasing its estimates by about 50 basis points in each case.[51]

This is precisely the type of perspective that the ERA should bring to assessing whether WPC's proposed cost of capital is consistent with the Code.

[49] For example, it suggests that WMC's assets are likely to be priced on the basis of costs of capital established in international capital markets. It therefore uses a US risk free rate for the US dollar denominated businesses of Western Mining but also uses its judgement to derive a value based on a mix of 10 and 30 year securities to address the problems associated with prevailing risk free rate for 10 year securities. It also uses a market risk premium of 6% and makes no adjustment for the value of imputation credits.

[50] Ibid., Appendix 1 page 9

[51] It should also be noted that Grant Samuel was hired by Western Mining to defend against a takeover action. Commentators have recently questioned the independence of these reports. See the Sydney Morning Herald, 'The value of hired experts', 14 March 2005, page 35. If anything therefore the valuation by Grant Samuel might be expected to be at the high end of a reasonable range, which can be achieved by adopting a cost of capital at the low end of a reasonable range.

6 Estimating the underlying parameter values

6.1 The risk free rate of return and inflation

For the purpose of establishing a cost of capital for input into the revenue setting process, the basis upon which the risk free rate of return is established must address:

- choice of proxy for the risk free security; and
- the sampling window over which the risk free rate of return is measured.

6.1.1 Choice of proxy

KPMG considers that for the purpose of establishing a cost of capital for input into the setting of access charges for Western Power's SWIS network, the real risk free rate should be estimated by reference to the yield on an Indexed Linked Government Bond with a term to maturity corresponding with the nominal 10 year government bond which financial markets regard as the benchmark security.

The current benchmark 10 year nominal government bond is the April 2015 government bond. As there is currently no equivalent Indexed Linked Government Bond maturing in April 2015, this yield has been estimated by interpolating between the August 2010 and August 2015 Index Linked Government Bond yields.

KPMG is aware that there has been substantial debate concerning the choice of proxy for the risk free security for a number of years. This debate originally emerged due to the ACCC's persistence in adopting a risk free rate of return that matches the length of the regulatory period, when other Australian regulators have universally accepted the approach we have adopted.

KPMG notes that this debate has now been resolved by the recent Australian Competition Tribunal's ("ACT") decision on GasNet's appeal against the ACCC's revisions to its access arrangements. In that decision, the Tribunal found in favour of GasNet that the ACCC's use of the five year government bond rate as the risk free rate was inappropriate in the context of the CAPM.

6.1.2 Sampling window for measuring the risk free rate

It has been the standard practice in regulatory determinations to adopt some period of historical averaging in estimating the risk free rate of return rather than an "on the day" rate. Given that the rates observed on any particular day could be temporarily influenced by market anomalies, KPMG agrees that some short term averaging of recent historical rates is desirable.

KPMG notes that the ACG's Discussion Paper adopts a 20 day sampling window in measuring the risk free rate of return. In theory, the most recent interest rates embody the latest information about market conditions, and therefore, the longer the period of averaging, the less weight would be attached to the latest market rates. This has led some regulators to adopt a shorter sampling window (e.g. 10 days).

KPMG is unaware of any rigorous technical analysis or justification that has been advanced to demonstrate a clear preference for either a 20 or 10 day sampling period. However, from a practical perspective, a sampling window that is too short could create problems for a regulated entity that is intending to seek to hedge over the sample period.

On balance, KPMG considers that adopting a 20 day sampling period is a pragmatic choice. It would also be desirable for the ERA to provide advance notice regarding the date on which the 20 day sampling period would commence or end to facilitate Western Power's forward planning with respect to hedging.

6.1.3 Inflation

The standard practice for estimating the rate of expected inflation is to solve for that parameter using the nominal and real risk free rates of return as inputs into the Fisher equation. We concur with this practice.

6.1.4 Appropriateness of conventional approach to measure risk free rate of return

While the approach outlined above is generally used within an Australian regulatory context, the merits of its continued use are subject to debate.

Regulators in the UK often have not relied solely on existing market rates when setting the real risk free rate or the debt premium.[52] This is despite having the world's second largest index linked bond market in absolute terms and the largest in proportional terms, and a large and sophisticated corporate bond market.

For example, in 2002 the Competition Commission states its preference for relying on market data:

> *"Unlike other inputs to the CAPM, the current risk-free rate can be observed directly from trading in liquid markets. The UK Government has issued index-linked securities (index-linked gilts) which are generally considered to have negligible default risk and inflation risk (inflation measured by the RPI, though lagged eight months). The redemption yield on these gilts provides an estimate of the real risk-free rate for different maturities. The Bank of England makes regular estimates of such rates over the whole yield curve which are, in addition, adjusted to a zero coupon basis which helps to deal with tax and other complications."*[53]

The Competition Commission, however, goes on to note that:

> *"There appears to be widespread recognition that gilt yields have been affected by special factors, including an increased demand from pension funds as a result of the introduction of the MFR requirements in 1997, just before the decline in gilt yields started. The strong demand has placed upward pressure on prices of both conventional and index-linked government securities. Relatively low UK Government borrowing in recent years could be another factor contributing to the upward pressure on gilts prices (and hence lower yields)…"*[54]

[52] This also has implications for estimating the expected rate of inflation.
[53] Competition Commission, BAA: A report on the economic regulation of the London airports companies, 2002, p. 172. It also noted that in more recent times corporate bonds had declined.
[54] Ibid., page 174.

As a result, the Competition Commission recommended a range of 2.5%-2.75% for the real risk free rate when 10 year gilt yields were around 2.3%.

More recently, Ofgem in its initial proposals for the Electricity Distribution Price Control Review states as follows:

> *"The issue for DPCR4 is the expected risk free rate going forward. It is therefore important to come to a view whether the current low market rates are likely to persist into the future or whether these are factors, which are not expected to persist, which depress rates at present.*
>
> *At present, the UK yield curve is still slightly downward sloping at longer maturities. This has been attributed to institutional factors such as the minimum funding requirement (MFR) for pension funds and the health of public finances (resulting in low supply of government bonds)."*[55]

Ofgem conclude that:

> *"The cost of capital is very sensitive to the risk free rate with the risk-free rate being an important input both in the cost of debt and the cost of equity. Given this sensitivity and given the considerable uncertainty surrounding the expected risk-free rate, it seems appropriate to adopt a cautious approach and hence a relatively wide range at this stage."*
>
> *"Given the above, it seems appropriate to adopt a slightly wider range than the most recent Competition Commission range. Ofgem gas widened the Competition Commission range symmetrically by 0.25%, which gives a range for the risk free rate of 2.25% to 3.0%."*[56]

At the time, 10 year gilt yields were around 1.9%.

It is difficult to determine the extent to which these developments are being driven by changes in market expectations or by exogenous factors (the decline in government borrowing). However, there is some evidence that exogenous factors could be having a significant influence on Australia's bond markets (eg. Australia faces similar demographic issues and has also reduced its government debt levels significantly in recent times). There is also some evidence to suggest that, to the extent that this is the case, the effects might be more pronounced.

For example, the Commonwealth Government bond market is already comparatively small by virtue of the Government's fiscal position. Indeed, in 2002 this lead to the Government holding an inquiry into whether it was necessary to maintain that market. The Government ultimately decided to retain the market, however, it decided that *"the issuance of Treasury Indexed Bonds will be suspended."*[57]

Since 1996 Commonwealth general government net debt has fallen from $100 billion to $30 billion. At the same time, funds under management in superannuation, a key investor in risk-free debt, have risen from about $300 billion to $600 billion. Indeed, some parties already argue that the market is already too small and less liquid than is desirable.[58] Moreover, the

[55] Ofgem, Electricity Distribution Price Control Review: Background information of the cost of capital, March 2004, 12.
[56] Ibid., 13.
[57] Treasury, Statement 7: Budget Funding, http:/www.budget.gov.au/2003-04/bp1/html/bst7.htm. None has been issued since February 2003.
[58] Skeffington, Business Review Weekly, 'Australia's illiquid bond market has its supporters, but others want it abolished, 18 July 2002, page 38.

indexed link bond market in Australia is, by any measure, particularly small (around $10 billion worth of bonds in total are on issue).

Legitimate questions can therefore be raised about the extent to which current market yields provide a reliable estimate of the expected risk free rate, which again highlights the uncertainties associated with estimating the cost of capital.

This again highlights the inherent uncertainties associated with estimating the cost of capital, even where forward looking market evidence is available.

6.1.5 Conclusion

For the purposes of estimating an appropriate WACC for Western Power's SWIS network, KPMG has adopted a real risk free rate of **2.69%.** This rate reflects the yield on an Indexed Linked Government Bond with a term to maturity corresponding with that on the nominal risk free rate of return. Given that there is currently no Indexed Linked bond maturing in April 2015, this yield has been estimated by linearly interpolating between the August 2010 and August 2015 Index Linked Government Bond yields, and averaging over the 20 days to 30 September 2004.[59]

For the purpose of estimating the expected inflation rate, KPMG has adopted a nominal risk free rate of **5.34%.** This rate reflects the yield on 10 year Commonwealth Government bonds, as currently represented by the benchmark April 2015 Commonwealth Government Bond, averaged over the 20 days to 30 September 2004. The real risk free rate of 2.69% and the nominal risk free rate of 5.34% together imply an expected inflation rate of around **2.58%.**[60]

6.2 The market risk premium

6.2.1 General

The equity market risk premium ("MRP") represents the additional return over the risk-free rate of return that an investor would require as compensation for the risks of investing in a diversified equity portfolio. It is essentially a measure of investors' appetite for risk.

Measurement of the MRP is a highly contentious issue. In theory, what we need to measure is the size of the risk premium that investors, on average, *require* over the risk-free rate to invest in the stockmarket. In essence, what we are really seeking to determine is the *forward-looking* price that investors place on risk. The problem is that this forward-looking measure is not directly observable and the tools available to estimate the forward-looking MRP are inadequate since they purport to derive a *forecast* of what the MRP is expected to be from forecasts of future equity returns rather than the premium that investors *demand* as compensation for investing in risky assets. The latter is the appropriate MRP for the purposes of the CAPM.

[59] It is acknowledged that the specific values adopted for the real and nominal risk free rate will change as a result of movements in interest rates depending upon the time it is measured.
[60] Calculated using the Fisher equation. Where (1 + real rate) = (1 + nominal rate)/ (1 + expected inflation)

6.2.2 Problems with ex-ante approaches

As noted above, an ex-ante (i.e. forward-looking) measure of the MRP is – ideally – the appropriate input for the purposes of computing WACC. An ex-ante measure of the MRP can be inferred based on analysis of certain financial indicators such as interest rates, the dividend to (current) price ratio (or its inverse), dividend yield (i.e. dividend to initial price) and earnings yield (or its inverse), which are regarded as having the ability to predict equity returns. The dividend growth model, for example, is one methodology that facilitates inference of the ex-ante MRP.

The dividend growth model is one of the many models that fall within a group of approaches known as 'supply side analysis[61]. The model relates the current price of a stock (P_0) to the next period's dividend (D_1), the required rate of return on equity (r) and expected dividend growth in perpetuity (g) as:

$$P_0 = D_1 / (r - g)$$

Which can be rearranged as:

$$r = D_1 / P_0 + g$$

where D_1 / P_0 is the dividend yield. Since the growth rate of dividends, g, is often assumed to be driven by the expected real growth rate (g_y) and expected inflation (g_p), the equation can be further expressed as:

$$r = D_1 / P_0 + g_y + g_p$$

By deducting the risk free rate from expected equity returns, an estimate of the ex-ante MRP can be inferred. However, it should be noted that the estimated market risk premium derived in this manner is itself the sum of three components, each of which is an estimate and therefore, subject to some degree of uncertainty.

The major methodological drawback with using the dividend growth model is that it assumes that dividend yields, growth in dividends and expected inflation are constant into perpetuity. These are strong assumptions which in reality are almost certainly to be violated. In addition, as we highlighted earlier, the approach purports to derive a *forecast* of what the MRP is expected to be from forecasts of future dividend yields and growth rates, rather than the premium that investors *demand* as compensation for risk.

Furthermore, equity prices are highly sensitive to changes in the dividend yield, which is in turn dependent upon the real bond yield, the rate of growth in real dividends per share and the equity premium. For example – Kortian (1998) – which is the only (unpublished) academic study of the Australian MRP that we are aware of – has demonstrated that if the dividend yield is

[61] The starting point for supply side analysis is the recognition that equity returns, and hence the equity risk premium, are driven by several fundamental factors including inflation, earnings, dividends, price-earnings ratios, dividend payout ratios, book value, return on equity and GDP per capita. Accordingly, by examining historical trends in these factors, it is possible to construct models that use the relationships between prices, earnings, dividends and other productivity measures to forecast the equity risk premium. A recent study by Ibbotson & Chen (2001) provides an excellent discussion of each of how supply side models can be constructed

currently 2%, then a 1% permanent decline in the equity premium would result in a 50% increase in share prices, all other things being constant.[62] This property of the dividend growth model means that its results should be interpreted with caution.

As noted above, there has been relatively little published research on the Australian MRP using ex-ante approaches. Considerably more research has been undertaken in relation to the US market. However, as the ESC noted in the 2001 Electricity Distribution Price Determination:

"…direct observation of foreign equity premium may not be relevant for at least two reasons:

- *the variance in the return on the market portfolio differs across equity markets. A lower variance implies investors should be prepared to accept a lower return. The variance of returns should be lower for larger equity markets, given the greater degree of diversification permitted; and*

- *where the average gearing level of the market portfolio differs across the countries, the equity premium should also differ (in the same way that theory predicts that the beta for an equity rises as its leverage rises). In particular, were the market portfolio has a higher level of gearing, the equity premium should also be higher."*[63]

KPMG concurs with the ESC's views that care should be taken to ensure that the equity premium estimate adopted is consistent with the Australian market. Structural differences between foreign and domestic capital markets, including the existence of a system of dividend imputation in Australia (but not in the US market, for example), mean that it may not be valid to directly infer the Australian MRP from observations of the MRP in foreign markets.

6.2.3 Survey evidence

Survey evidence is one way in which forward-looking expectations of market participants can be observed. One of the problems with survey evidence, however, is that it can provide answers that are not meaningful or ambiguous unless the questions posed to respondents are properly framed.

For example, in a recent discussion forum on a survey of the market risk premium in Australia (conducted by Jardine Fleming Capital Partners), to which the ACG Discussion Paper refers, it was noted by one of the participants of the forum that:

> *"…this survey was flawed because it asked the wrong question…the question should not have been "What do you expect the excess return from the stockmarket will be?" but rather "What do you think investors' required rate of return from the market is?" If the latter question had been asked I am sure they would have only given positive answers."*[64]

[62] Kortian, T. (1998), Australian sharemarket valuation and the equity premium, Dept of Finance, University of Sydney, unpublished manuscript. Kortian demonstrates this using a rearranged formula (by recognizing that r = real bond yield plus equity premium). The study estimated an equity premium of around 3% at the time (around 1996).
[63] ESC, September 2000, EDPD 2001-2005, Volume 1: Statement of Purpose and Reasons, page 261.
[64] Minutes of the meeting of the Trinity Best Practice Committee, "The Equity Risk Premium – An Australian Perspective", 15 September 2000. These comments were made by Professor Bruce Grundy (page references not provided).

It has also been previously noted by Professor Stephen Gray, in his analysis of the survey evidence in Welch (2000) that:

> *"Welch also reports the results of other surveys and highlights the reason that survey evidence should be given little weight – the results tend to be precisely aligned with the incentives of the survey promoter."*[65]

6.2.4 Extrapolation from foreign markets

A further alternative for estimating the MRP is through extrapolation from foreign markets. This is normally achieved by using the MRP of a particular market as a benchmark and adjusting for differences in the economies of the local and benchmark country. Bowman (2001)[66] for example, uses the US MRP range of 6% to 9% (with a point estimate of 7.5%) as a benchmark to estimate Australia's MRP to be around 7.8%. He argues that because Australia today is an open economy, it is possible to view Australia's MRP as being equal to an international MRP benchmark plus a premium for incremental risks associated with the equity market in Australia.

Bowman (2001) attributes a higher MRP to Australia largely due to two factors:

- differences in the nature of and size of the companies comprising the US S&P 500 Index and Australia's All Ordinaries Index. In particular, Bowman found that the Australian equity market is more over-weight in resource-based companies and the average size of listed companies in Australia is smaller than those in the US; and

- the fact that the 6% - 9% US MRP used as the benchmark MRP represents the excess of stock returns versus Treasury bills rather than government bonds.

In Bowman's opinion, the net effect of these two adjustments supports an adjustment of at least +0.3% where the MRP is defined as excess returns over government bonds.

It is important to note that in reaching the above conclusion, Bowman (2001) examined some other differences between the Australian and the US economy that could potentially flow through into a higher or lower MRP for Australia. These other factors included differences in taxation and differences in country risk[67]. With respect to taxation, Bowman concluded that whilst differences existed, there was no clear argument for an adjustment in either direction[68]. With respect to country risk, Bowman concluded that whilst there was empirical support for the view that Australia was more subject to a higher level of country risk than the US, it is less clear whether this risk is fully priced within the risk free return such that there is no additional

[65] Gray, S., Issues in Cost of Capital Estimation, 19 October 2001, downloadable at http://www.esc.vic.gov.au/PDF/2001/SubUQBS_GasPosPapOct01.pdf (page 10, 11).
[66] Bowman, R., 2001, Estimating Market Risk Premium, JASSA, 3, Spring.
[67] Bowman describes this risk as being related to the risk that a government will abruptly alter its policies with respect to investments in the country (including expropriations), shifts in monetary and fiscal policy, regulatory changes, defaults and tax changes.
[68] In this regard, we note that the ESC, in its recent draft decision on the Victorian gas distribution access arrangements, appears to have misunderstood the rationale for Bowman's adjustments. The ESC appears to have assumed that Bowman recommended an adjustment to account for country risk.

premium necessary in the MRP. Due to this uncertainty, Bowman's preference was not to add to the benchmark MRP.

6.2.5 Historical averages

6.2.5.1 Australian empirical evidence

Empirical evidence based on the historical market risk premium in Australia provides support for an MRP in the range of 6% to 8%[69]. Table 3 below sets out the measured historical MRP in Australia reported in various studies and research.

[69] This same conclusion was arrived at by the Queensland Competition Authority ("QCA") after considering various historical measures of the MRP. Refer QCA, Proposed Access Arrangements for Gas Distribution Networks, October 2001, p.216.

Table 3: Measured historical MRP in Australia

Source	Period	Risk premium (%)
AGSM:		
Arithmetic average, incl October 1987	1974-1995	6.2
Arithmetic average, excl October 1987	1974-1995	8.1
Arithmetic average[70]	1974-1998	4.8
Arithmetic average, incl October 1987[71]	1974 – Sep 2000	6.2
Arithmetic average, excl October 1987	1974 – Sep 2000	7.7
Officer (1989) – arithmetic mean	1882 – 1987	7.9
Officer (1989) updated – arithmetic mean[72]	1882 – 2001	7.2
Officer[73]:		
Arithmetic mean	1946-1991	6.0 to 6.5
Hathaway (1996)[74]		
Arithmetic mean	1882-1991	7.7
Arithmetic mean	1947-1991	6.6
Gray (2001) (note 1)	1883 – 2000	7.3
Gray (2005)[75]		
	1972 – 2001	5.6
	1975 – 2004	7.7
	1883 – 2004	7.2
Dimson, Marsh and Staunton (2000)[76]	1900 – 2000	7.6

Notes:

1 Gray (2001) is based on an update of Officer's work as reported in S. Gray, Issues in Cost of Capital Estimation, 19 October 2001 downloadable at http://www.esc.vic.gov.au/PDF/2001/SubUQBS_GasPosPapOct01.pdf

In interpreting the evidence presented above, KPMG notes that the MRP estimates show some degree of variation but has remained largely within the 6% to 8% range. Whilst this might appear to be a relatively wide range, we do not find the variance disconcerting since we expect

[70] Refer ABN AMRO (1999) Submission to the Office of the Regulator General Victoria Regarding 2001 Electricity Distribution Price Review; the Cost of Capital Financing (Consultation Paper No. 4) p12. A copy of this is available at http://archive.esc.vic.gov.au/1999/electric_ConsPap4Resp_abnamro.pdf
[71] Referred to in independent expert report by Deloitte Touche Tohmatsu dated 19 December 2000 to Woodside Petroleum shareholders in relation to a takeover offer by Shell Investments.
[72] ABN AMRO (1999), op cit, p12
[73] Officer, R.R. (1992), Rates of Return to Shares, Bond Yields and Inflation Rates: An Historical Perspective, as updated for a 1993 Seminar at the University of Melbourne.
[74] ABN AMRO (1999), op cit, p12.
[75] Gray, S. (2005) "Estimating MRP", unpublished.
[76] Dimson, Marsh and Staunton, "Twelve Centuries of Capital Market Returns", Business Strategy Review, 2000, Vol 11 Issue 2

that the actual MRP will vary from one point in time to another. When averaged over long time frames however, we expect that such variation will be smoothed out.

KPMG also notes that post-1987 MRP data is biased downwards since the market index used to measure the MRP does not capture the average value of franking tax credits. We note that its final determination on the 2003 Victorian gas access arrangements, the ESC estimated that the inclusion of the average value of franking credits since 1987 would add 0.2 percentage points onto the long-term average. However, in the minutes to the Trinity Best Practice Committee Meeting which discussed the results of the Jardine Fleming Capital Markets Survey 2001[77], Professor Robert Officer stated that:

> *"…if you assume that franking credits represent about 20% of total stock returns, the historic ERP could be biased downward by as much as 1%."* [78]

KPMG also advocates taking a longer term view on the MRP as it leads to a lower standard error of the estimated MRP. Table 4 below shows that over the period 1883 – 2000, the average Australian MRP (as previously estimated by Professor Stephen Gray) is 7.3% with a standard error of 1.56%, whereas the estimate from 1971 – 2000 is 4.8% but is much less reliable with a standard error of 4.4%. As Gray points out, the 4.8% average obtained for more recent decades (i.e. 1971 – 2000) is not statistically different from the longer term historical average.

Table 4: Historical Australian Market Risk premium with varying start and finish years

Start Year	Finish Year	Mean %	Standard Error %
1883	2000	7.3	1.56
1883	1970	8.2	1.5
1971	2000	4.8	4.4

Source: Gray, S (2001), Issues in Cost of Capital Estimation, available at http://www.esc.vic.gov.au/PDF/2001/SubUQBS_GasPosPapOct01.pdf

KPMG is also aware of work being undertaken by Gray analysing the implications of applying short-run (30 years) data. This work demonstrates the significant variability in the results and the increased statistical problems it entails. For example, application of a 30-year data set for the period 1972 to 2001 generates an MRP value of 5.6%, however application of the most recent data from 1975 to 2004 generates an MRP of 7.7%.[79] This result demonstrates how the application of long-run data is statistically more precise and less volatile over time. Using data for the period 1883 to 2004 Gray estimates an MRP of 7.16%, and notes the need to adjust this upwards to reflect the estimated value of franking credits.

[77] Jardine Fleming Capital Partners Limited, The Equity Risk Premium – An Australian Perspective, Trinity Best Practice Committee, September 2001.
[78] This increment of 1% estimated by Officer is also consistent with the increment that Mercer Investment Consulting advised that it would apply to the equity premium to account for imputation credits. Refer page 330 of the ESC's 2003 Review of Gas Access Arrangements, Final Determination.
[79] Gray, S. (2005) "Estimating MRP", unpublished.

6.2.5.2 US empirical evidence

KPMG does not disagree that examination of the foreign market MRPs can provide some degree of guidance on the Australian MRP. We have chosen not to examine historical averages for the US MRP for the purpose of this report since our research indicates that there is ample evidence on the historical average Australian MRP as set out earlier in Table 3.

If US evidence is to be considered, however, we do not agree that any weight should be placed on such evidence unless some attempt has been made to adjust such evidence for structural and other differences between the US and Australian markets, as was discussed in Section 6.2.4 of this report. The rationale for making such adjustments is no different to the rationale for exercising caution in estimating a beta for an Australian company from foreign market comparables.

6.2.6 Regulatory precedents

With the exception of the NSW regulator, IPART, regulators around Australia have consistently adopted a point estimate of 6% for the MRP. IPART in the past has used 7% and a range of 5% to 6% for the MRP. However, more recently in its December 2004 Draft Decision on the Revised Access Arrangement for AGL Gas Networks, IPART suggested that a range of 5.5%to 6.5% is now appropriate.

Again, highlights the uncertainties associated with estimating the MRP and the inherent dangers in taking a short term view.

6.2.7 Conclusion

KPMG supports the estimation of the MRP by reference to long term historical averages. Given the importance that the Productivity Commission (and the Federal Government) has attached to encouraging incentives for investment in essential facilities, Western Power would be strongly justified in adopting an approach for estimating the MRP that is consistent with commonly observed market practice.

The evidence that we have reviewed provides strong support for an Australian MRP in the range of **6% to 8%.** Whilst there are limitations associated with historical based estimates, we do not consider these limitations to be any greater than those associated with the alternative methodologies for estimating the MRP.

As highlighted earlier, ex-ante approaches – which are probably the leading alternative estimation approach for the MRP – require the use of some highly questionable assumptions. Furthermore, the credibility of attempts to predict the forward looking MRP using ex-ante approaches can be questioned given the fact that economic theory has failed to explain why predicted MRPs (based on what economic theory or fundamentals suggests the MRP should be) consistently understate the actual measured MRP. This phenomenon has been dubbed the 'equity premium puzzle' in financial economics literature. As the founders of the puzzle have noted:

> *"The puzzle cannot be dismissed lightly, since much of our economic intuition is based on the very class of models that falls short so dramatically when confronted with financial data. It underscores*

the failure of paradigms central to financial and economic modelling to capture the characteristics that appear to make stocks comparatively so risky."[80]

Furthermore:

"The data used to document the equity premium over the past 100 years is as good an economic data set as we have and this is long series when it comes to economic data. Before we dismiss the premium, not only do we need to understand the observed phenomena but we also need a plausible explanation why the future is likely to be any different from the past. In the absence of this, and based on what we currently know, we can make the following claim: over the long horizon, the equity premium is likely to be similar to what it has been in the past and the returns to investment in equity will continue to substantially dominate that in T-bills for investors with a long planning horizon."

Given the lack of success that economic theory has had in predicting the MRP to date, it would seem inappropriate to place weight upon ex-ante approaches in estimating the MRP, particularly for investment in long lived network assets.

6.3 Beta

6.3.1 Introduction

Under the CAPM, the total risk of an asset can be divided into two parts: systematic risk and unsystematic risk. Systematic risk is a function of broad macroeconomic factors that affect the prices of all assets. Unsystematic risk[81] is a function of the characteristics associated with a particular asset as opposed to the overall market.

Under CAPM theory, investors can eliminate unsystematic risk by holding a diversified portfolio of assets. The rationale is that in a diversified portfolio, positive events affecting some stocks will be offset by negative events affecting other stocks, so that on average, the overall return on a diversified portfolio will equate to the weighted average expected return on all stocks in the portfolio. Hence, it is assumed that investors will not care about unsystematic risk and will not require any compensation for such risk in the form of a higher return. By contrast, diversification cannot eliminate systematic risk since it affects all stocks. Under the CAPM, the systematic risk of an asset is measured by its 'beta' factor, which reflects the contribution of that asset to risk of a diversified investor's portfolio.

In statistical terms, the beta factors reflect the extent to which possible future returns are expected to co-vary with the overall market return. A beta of 1 means the asset has the same risk as the market whereas a low risk asset will have a beta less than one and display less systematic response to market-wide events than will the average asset.

[80] Mehra, R., and E. Prescott, The Equity Premium in Retrospect, Forthcoming in the Handbook of Economics of finance, Edited by G.M. Constantinides, M. Harris and R. Stulz, North Holland, Amsterdam.
[81] Unsystematic risk is also commonly referred to as unique risk, diversifiable risk or non-market risk.

6.3.2 Estimation method and issues

6.3.2.1 Equity beta

Betas are usually estimated by regressing historical share market returns against a market index. There are a number of services that provide such estimates including, the Risk Measurement Service of the Centre for Research in Finance at the Australian Graduate School of Management's ("AGSM") Centre for Research in Finance ("CRIF"), London Business School, Bloomberg, DataStream, and Value Line. These services can assist in quantifying the likely equity beta for a stock, however, we stress that such estimates provide a *guide* rather than a definitive estimate of the appropriate equity beta for a stock. There are a number of reasons for this.

- Estimation error is high. Confidence intervals around beta estimates are quite wide and in addition, betas vary over time and often, significantly so. The AGSM beta estimates shown later in Table 8 of this report demonstrate the extent of the imprecision in the estimates.

- Beta estimates are highly sensitive to outlier observations. As discussed later in section 6.3.3.3, some beta estimates can shift substantially (e.g. from negative to positive) when outliers are removed.

- In theory, the market portfolio under the CAPM should be a market value weighted index of the entire universe of investable assets – not just equity. However, in practice no such index exists. As a result, it is necessary to adopt a proxy for the market portfolio. An overall market index is the most common choice for a proxy, however, even so, many market indices exist and each one will produce a different measure of the equity beta for a stock.

- Beta estimates can be measured over different return intervals – daily, weekly (including weekly ending or starting on specific days) or monthly. Depending on the size of the return interval, return correlations between the stock and the market may or may not be properly captured.

- The beta estimates (derived from regression analysis) are historical estimates even though the CAPM is forward looking. Therefore there is an assumption of stability in betas across at least the estimation period and the period for which it is used. The selection of an estimation period is a trade off between:

  - being long enough to obtain enough observations to minimise the standard error of the estimate; and

  - minimising an error in the estimate due to changes in the underlying determinants of beta.

  The measurement period varies across risk measurement services. For instance, CRIF at AGSM uses 48 monthly observations and the default for Bloomberg's is 60 monthly observations. Beta estimates derived from these different sources can differ due to the time period selected.

- Comparables are used as a guide if the business under examination is not listed or there is too much estimation error to rely solely on the beta estimate for one business alone if it is listed. Unfortunately listed, pure play comparables are few and far between, particularly in Australia and for electricity distribution. Often, comparables from other countries are used as a guide in order to present an expanded data set for consideration. However, interpretation of overseas data presents additional challenges because different tax regimes can influence financial leverage and different mixes of industries and sectors can mean betas relative to the home country index would not be the same as those relative to an Australian index. The Australian economy is quite unusual in that it is very heavily influenced by the resources sector. Thus translating betas from other countries to Australia requires careful judgment. We note that the ESC has acknowledged that it is appropriate of exercise caution in interpreting overseas proxy beta estimates for these same reasons.

- Since financial leverage can vary across industries, countries and firms, and furthermore, financial leverage is a determinant of equity beta, it is common to de-lever comparable betas to arrive at an "asset" beta then to re-lever at the target financial leverage considered appropriate for the business in question. However, there are a number of different formulas that can be applied to de-lever/re-lever betas which adds a further layer of complexity.

- For regulated utilities which face an asymmetry in their return distribution[82] due to limitations in upside price potential, there is some evidence to indicate that the conventional CAPM cost of equity understates the true cost of equity. Conine and Tamarkin (1985) demonstrates this with testing on a sample of 60 utilities over the period from 1971 – 1980 and their results indicated that on average, the cost of equity was understated by approximately 1.35 percentage points.[83] The Productivity Commission, in its draft report on the Review of the Gas Access Regime also noted that "*The **total risk** distribution is relevant considering ROR truncation. The reason being that the asymmetric truncation of unsystematic risk causes its mean to be less than zero, thereby reducing the expected value of ROR." [emphasis added]* [84] In particular, the PC's analysis highlighted that:

  - regulators typically institute benefit sharing arrangements under price capping regimes when realised returns exceed expected returns to benefit users. However, "*In implementing such a process, the regulator risks truncating the distribution of the ROR (total risk). If this occurs, the expected value and standard deviation of the ROR for these regulated assets will be altered and the expected ROR will no longer be consistent with the choice of asset beta."*[85]*;* and

  - the consequence of asymmetric truncation of returns for regulated utilities is that "*…as the degree of asymmetric truncation increases, the coefficient of variation increases, distorting the risk-return trade-off for the investment. Compared with the unregulated*

[82] Specifically, regulated utilities faced a truncated distribution of returns. Factors contributing to this includes regulatory lage, unexpected price inflation, and risks arising from the discretions afforded to price regulators.
[83] Conine, T.E., and M. Tamarkin, Implications of skewness in returns for utilities cost of equity capital, Financial Management, Winter 1985, p. 66-71. Specifically the study noted that the standard CAPM estimate for the utilities in their sample was 15.81% as compared with 17.16% under a model that was adjusted to deal with skewness.
[84] Productivity Commission 2003, Review of the Gas Acess Regime, Draft Report, Canberra, page 393.
[85] Ibid, page 396.

situation, the regulated investment offers a lower expected value of ROR for comparable levels of risk."[86]

The discussion above serves to highlight that selection of an appropriate value for beta for a regulated utility entails more than merely selecting a number from a beta measurement service. It also requires an understanding of the limitations of the CAPM particularly as the concept is applied to regulated utilities that face an asymmetric truncated return distribution, the measurement biases that can arise and careful judgment. Our estimate of the appropriate beta for Western Power's SWIS network is the outcome of a number of processes guided by theory, evidence and practice.

6.3.2.2 Debt beta

The debt beta (β_d) can, in theory, be estimated by "reverse-engineering" the CAPM. That is:

$$\mathbf{K_d = R_f + \beta_d * (R_m - R_f)}$$

Therefore: $$\mathbf{\beta_d = (K_d - R_f) / (R_m - R_f)}$$

In practice, it is not uncommon for market practitioners and regulators to ascribe a zero value to the debt beta. We note, however, that the approach of some regulators, such as the ESC (as indicated in the 2003 GAAR Final Decision) is to estimate a debt beta using a variation of the above formula:

$$\beta d = \{\text{Debt margin}^{87} - \text{Default premium} - \text{Debt raising costs}\} / \text{MRP}$$

The rationale for this approach is essentially that it is the expected return on debt (which is equal to the cost of debt less default risk) that drives the debt beta. In the formula, the component of the debt margin that represents a default premium was established using the statistics for debt of 10 year maturity as presented in Elton, Gruber, Agrawal and Mann (2001)[88] which are reproduced in Table 5.

In our view, it is feasible to adopt a range between zero at the low end and a value determined broadly in accordance with the methodology proposed by the ESC, at the high end.

[86] Ibid, page 400.
[87] Debt margin is inclusive of debt raising costs.
[88] Refer Elton, E., M. Gruber, D. Agrawal, C. Mann, "Explaining the rate spread on corporate bonds", Journal of Finance, vol LVI No. 1.

Table 5: Estimated default premia (Industrial sector) – recalculated results

Maturity	Estimated default premia (%) [1]		Measured spread from Treasury (%) [2]		Estimated default premia as a % of the measured spread from Treasury	
	A	BBB	A	BBB	A	BBB
2	0.053	0.145	0.621	1.167	8.53%	12.4%
3	0.063	0.181	0.680	1.205	9.26%	15.02%
4	0.074	0.217	0.715	1.210	10.35%	17.93%
5	0.084	0.252	0.738	1.205	11.38%	20.9%
6	0.095	0.286	0.753	1.199	12.62%	23.97%
7	0.106	0.319	0.764	1.193	13.87%	26.74%
8	0.117	0.351	0.773	1.188	15.13%	29.55%
9	0.128	0.380	0.779	1.184	16.43%	32.09%
10	0.140	0.409	0.785	1.180	17.83%	34.66%

Source: Elton et al (2001)

Notes:

1. These figures are taken from Table VI of Elton et al (2001)

2. These figures are taken from Table 1 Panel A (Industrial sector) of Elton et al (2001).

6.3.3 Equity beta estimates

6.3.3.1 De-levering / re-levering equity betas

According to CAPM theory, observed equity betas of companies are affected by the target level of gearing of a business. For this reason, it is often useful to conduct comparisons on the basis of a company's asset beta, which is derived by de-levering (i.e. stripping out the gearing component) the observed equity beta of the company.

There are various "de-levering formulas" available to achieve this. The formula generally preferred by regulators is known as the Monkhouse formula:

$$\beta e = \beta a + (\beta a - \beta d) \{1 - Te[kd / (1+Kd)]\} D/E$$

where Te is defined as: Imputation credits payout ratio x imputation credits utilisation rate x Statutory corporate tax rate.

6.3.3.2 Evidence from recent regulatory decisions in Australia

Table 6 and Table 7 below provide a summary of betas and de-levering formulas assumed during recent regulatory reviews of gas and electricity distribution pricing. The information displayed below indicates that an equity beta around 1.0 has been adopted in a large number of regulatory decisions. In some cases, this has resulted from reliance placed on equity betas in other regulatory decisions, whilst in other cases, the equity beta value has been estimated from empirical analysis of implied asset and debt betas, and applying the de-levering formula.

Table 6: Beta values determined at recent gas industry access arrangement reviews

Gas decision	Equity beta	Asset beta	Debt beta	De-levering formula
Moomba Sydney (2003)	1.00	Not reported	Not reported	Not reported
DBNGP (2003)	1.20	0.60	0.20	Simple
NT Gas (2002)	1.02	0.50	0.15	Monkhouse
GasNet (2002)	0.98	0.50	0.18	Monkhouse
Victorian Gas Distributors (2002)	1.00	0.40 – 0.54	0.00-0.23	Monkhouse
Queensland Gas Distribution (2001)	0.98	0.55	0.26	Monkhouse
AGLGN (2000)	0.90 – 1.15	0.40 – 0.50	0.06	
Average	**1.03**	**0.51**	**0.16**	

Table 7: Beta values at recent electricity industry regulatory reviews

Electricity decision	Equity beta	Asset beta	Debt beta	De-levering formula
NSW electricity distribution (2004)	0.78 – 1.11	0.35 – 0.45	0.00-0.06	Monkhouse
Transend (2003)	1.00	0.40	0.00	Monkhouse
SPI PowerNet (2002)	1.00	0.40	0.00	Monkhouse
ElectraNet (2002)	1.00	0.40	0.00	Monkhouse
Envestra (2001)	1.10	0.50	0.12	Not reported
Powerlink (2001)	1.00	0.40	0.00	Monkhouse
Average	**1.00**	**0.425**	**0.03**	

6.3.3.3 Market evidence – equity betas

AGSM data

As noted above, it is conventional practice to estimate an appropriate beta having regard to recent empirical evidence on the betas of comparable publicly listed companies.

There are a number of problems to this approach, including:

- with the exit of United Energy as a publicly listed entity, but the inclusion of GasNet as a publicly listed entity, the Australian proxy group still comprises only five companies; and
- as at September 2004, the AGSM beta for GasNet was based on only 36 observations.

A further problem is that the beta estimates of these companies display a high degree of variation. Table 8 below, for example, sets out the betas of these companies five Australian publicly listed comparable companies[89] commonly included in the analysis of proxy betas, and highlights the extent of the instability of the data over time. The betas have been derived from the AGSM Risk Measurement Service as reported over the past six quarters. The figures shown in parentheses indicate the high-low ranges provided by the AGSM.

[89] The data we used for United Energy was before its recent ownership change which led to its delisting.

Table 8: AGSM equity betas

Company	Code	Equity beta estimates measured over the 48 months ended					
		June 2003	Sep 2003	Dec 2003	Mar 2004	June 2004	Sep 2004
Australian Gas Light	AGL	-0.01 (-0.31 to – 0.29)	-0.07 (-0.36 to 0.22)	-0.06 (-0.35 to 0.23)	-0.02 (-0.30 to 0.26)	-0.04 (-0.31 to 0.23)	-0.01 (-0.28 to 0.27)
Alinta	ALN	0.29 (-0.06 to 0.65)	0.33 (0.01 to 0.66)	0.37 (0.06 to 0.68)	0.36 (0.04 to 0.67)	0.40 (0.09 to 0.70)	0.42 (0.11 to 0.72)
GasNet	GAS	n.a.	n.a.	0.05 (-0.21 to 0.31)	0.07 (-0.17 to 0.31)	0.07 (-0.15 to 0.29)	0.05 (-0.16 to 0.27)
Envestra	ENV	0.39 (0.13 to 0.64)	0.28 (0.03 to 0.53)	0.30 (0.05 to 0.54)	0.28 (0.03 to 0.53)	0.40 (0.16 to 0.65)	0.44 (0.24 to 0.65)
Australian Pipeline Trust	APT	0.39 (0.15 to 0.62)	0.35 (0.11 to 0.59)	0.36 (0.12 to 0.59)	0.33 (0.10 to 0.55)	0.35 (0.13 to 0.57)	0.34 (0.12 to 0.56)

Source: AGSM Risk Measurement Service, June 2003, September 2003, December 2003, March 2004, June 2004 and September 2004.

Notes:

1 GasNet beta estimate for December 2003 is based on only 36 observations.

The variation is, in part, attributable to the sensitivity of beta estimates to outlier observations.

SFG's analysis of beta

A recent report by SFG on behalf of AGL demonstrates the sensitivity of beta measurement to outlying observations.[90]

SFG's analysis demonstrates that standard beta estimates are not statistically reliable. This result has important implications for the use of beta estimates in estimating the appropriate WACC. The report notes that if a primary reliance is placed on a single set of beta estimates from a few comparables, the consequences include:

- The estimated betas will vary dramatically over time resulting in substantial variation in WACC estimates;
- The estimates could be vary significantly if a different data period, frequency or statistical method had been adopted; and
- The estimates will vary significantly if one or two outlier observations occurred in a different month.

In a commercial setting, this would result in a firm's investment strategy being driven by statistical aberrations in small data sets rather than economic fundamentals. In a regulatory setting it would cause substantial regulatory uncertainty.

[90] Strategic Finance Group., The Equity Beta of an Energy Distribution Business, 10 February 2005.

It is for these reasons that SFG advocates the application of a range, centred around 1.0 for Australian energy distribution businesses with 60% gearing, be examined when estimating the cost of capital. This conclusion is based upon the following evidence:

- The available data does not support a conclusion that the equity beta of an Australian electricity distribution business (re-geared to 60%) less than 1.0 is statistically significant;
- The average re-levered equity beta of comparable Australian firms has been 1.0 until very recently. Unusual market circumstances have had a pronounced effect on the way betas are estimated. For example, AGL's equity beta (re-geared to 60%) is in the range 0.9 to 1.05 when influential outliers are removed;
- The appropriate estimate of the equity beta (re-geared at 60%) from a large industry-level portfolio is a range centred around 1.0; and
- When the effects of the technology bubble are removed the equity beta of the average Australian distribution network service provider is 1.0 (assuming 60% gearing).

6.3.4 Conclusion

KPMG acknowledges that whilst current market evidence on betas should be reviewed as part of the process for determining an appropriate beta for regulated businesses, it is often difficult to draw firm conclusions on the appropriate beta given the limited number of Australian company proxies and the high degree of instability in beta measurements. The Australian proxy equity betas reviewed in Table 9 highlights the extent of this problem.

The rate of return approved by the ERA is used as an input for setting revenues until the next WACC reset and it is incumbent upon the ERA to ensure that the value adopted is commercially sound and reflects a sustainable return. To the extent that current market data reflects transitory factors which do not reflect a permanent shift in betas, setting a beta based on such information may result in inadequate returns. Such an approach would reflect one that errs on the side of consumers rather than investors. This approach is inconsistent with the Code objective to promote economically efficient investment, as well as being counter to the recommendations of the Productivity Commission.

Consistency with recent regulatory decisions would indicate that an equity beta of 1.0 should be adopted as the default value, as per the ACG Discussion Paper. This approach would not require any further assessment to be made about the value of the underlying asset beta and the debt beta.

Having regard to the above considerations, KPMG has adopted an equity beta range of **0.90-1.10** for the purpose of estimating an appropriate WACC for Western Power's SWIS network.

6.4 Gearing

In selecting an appropriate capital structure for the purposes of estimating WACC, it is standard practice to examine the observed gearing levels of other businesses operating in the same industry.

In Australia, an assumed gearing level of 60% has emerged as the regulatory benchmark for regulated gas network businesses, as shown in Table 9 below.

Table 9: Gearing values adopted in recent gas and electricity determinations

Decision	Regulator	Gearing (D/V)
NSW electricity distributors (2004)	IPART	60%
Transend (2003)	ACCC	60%
Moomba Sydney (2003)	ACCC	60%
DBNGP (2003)	ERA	60%
NT Gas (2002)	ACCC	60%
GasNet (2002)	ACCC	60%
Victorian Gas Distributors (2002)	ESC	60%
SPI PowerNet (2002)	ACCC	60%
ElectraNet (2002)	ACCC	60%
Powerlink (2001)	QCA	60%

As shown in Table 10 below the empirical evidence that we have reviewed suggests that the regulatory benchmark capital structure of 60% debt to total assets is reasonably consistent with market practice.

Table 10: Observed gearing (defined as year end debt to total enterprise value[91]) levels of comparable companies

Company	2001	2002	2003	Average
Australian Gas Light	46%	40%	29%	**38%**
Australian Pipeline Trust	54%	56%	51%	**54%**
Alinta	39%	32%	36%	**36%**
GasNet	67%	66%	64%	**65%**
Envestra Limited	81%	78%	72%	**77%**
Average	**57%**	**54%**	**50%**	**54%**

Source: Bloomberg

On the basis of the above evidence, KPMG considers that, as per the ACG Discussion Paper, a 60% gearing ratio is not an unreasonable assumption to adopt for the purpose of establishing the cost of capital for Western Power's SWIS network.

6.5 Debt margin

For the purpose of determining the WACC for a regulated business, the debt margin is a premium that is added on to the risk free rate of return to derive the cost of debt financing.

For a regulated business, the debt margin is influenced by a number of factors:

[91] Enterprise value is defined as net book debt plus the market value of equity at the relevant year end.

- the credit worthiness of the entity, which is indicated by the credit rating of the entity. This rating in turn depends upon the financial ratios that flow from the firm's projected cash flows (given the benchmark regulatory assumptions made);

- supply / demand conditions in the relevant debt markets at the time that the debt is being (or assumed to be) raised; and

- debt raising / establishment costs.

6.5.1 Credit rating assumption

Australian regulators have typically assessed an appropriate debt margin on an opening assumption that an efficient regulated business implementing best practice financial management will structure their business operations to seek to target – at a minimum – an investment grade credit rating profile. Such an opening assumption is required to resolve the circularity involved in estimating the debt margin, which both affects the credit rating (through its impact on cash flows), and is also affected by the credit rating.

KPMG has estimated an appropriate debt margin for Western Power's SWIS network by reference to data on generic debt margins for investment grade rated debt securities of 10 year maturity from CBA Spectrum, an online resource provided by the Commonwealth Bank. CBA Spectrum provides information on the pricing of various rated nominal bonds issued in the Australian capital market, and is therefore consistent with giving primacy to current information from capital markets.

The data we have examined suggests that the debt margin for BBB+ rated bonds averaged over the 20 days to 14 February 2005 was **98 basis points**, and for BBB rated bonds, **107 basis points**.

In adopting these debt margin estimates from CBA Spectrum, KPMG is aware that there is currently some debate regarding the possibility that the data on yields supplied by CBA Spectrum may be understated relative to observed yields. This observation was made by NERA in a report prepared for ActewAGL as part of the ICRC's electricity distribution review.[92] NERA stated in its report that:

> *"One source of market data that Australian regulators, such as the ACCC, IPART and ESCOSA, have recently relied on is CBA Spectrum data. On the 25th of February 2004, CBA Spectrum was reporting estimated debt margins of 101bp for 10 year maturity BBB+ bonds. However, CBA Spectrum's database only includes three BBB+ bonds. Moreover, two out of these three bonds have maturity dates of less than 3 years with only one having a maturity date of 9 years. The reported margins on these bonds as at 25 February 2004 and their year of maturity is summarised in the table below."*[93]

[92] ActewAGL Supplementary Submission, Estimating the debt margin for ActewAGL, A Report for ActewAGL prepared by NERA, February 2004.
[93] Ibid, page 4.

CBA Spectrum's database of BBB+ bonds

	Maturity	Spread relative to equivalent maturity government bond	"CBA Spectrum" estimate of the 'fair' debt margin for given maturity
BBB+ bonds			
BritAmerTob	2006	1.11%	0.82%
Qantas	2007	1.01%	0.87%
Snowy Hydro	2013	1.37%	1.00%
Source: ActewAGL Supplementary Submission, Estimating the debt margin for ActewAGL, A Report for ActewAGL prepared by NERA, February 2004.			

NERA goes on to state that:

- *"…for BBB+ bonds, CBA Spectrum is on average 27 basis points below the actual observations of debt margins on BBB+ rated debt. For the only observation of long dated debt (Snowy Hydro), CBA Spectrum is 37 basis points below the equivalent actual observation."*[94]*;* and

- *"The explanation for this lies in the fact that CBA Spectrum simultaneously estimates the 'fair' relationship between debt margins and maturity for all 10 investment credit ratings from Government to BBB. In doing so, CBA Spectrum constrains these estimated curves to follow similar shapes to one another and never to cross (eg. 'fair' debt margin on a BBB+ bond must always be below that on a BBB bond). This effectively means that the estimates of 'fair' debt margins for BBB+ bonds, for which there are only three observations and for which there are even fewer long dated observations, are largely driven by observations for higher rated bonds…"*[95]

KPMG notes that the ACG Discussion Paper recommends utilising a debt premium implicitly based on the CBA Spectrum BBB+ margin. However, in a cost of capital study for Queensland distributors undertaken on behalf of the QCA, ACG recommended a range with CBA Spectrum data being used as the lower estimate and Bloomberg data being used as the upper estimate. Given the uncertainty associated with the quality of the CBA Spectrum data, we suggest that the approach adopted in the QCA paper is more appropriate. KPMG understands that due to the thinness of trading activity in BBB+ and BBB bonds, the most recent data available from Bloomberg for either of these rated bonds is for 27 October 2004. The spread between BBB+ and BBB rated bonds as measured by CBA Spectrum and Bloomberg is 27 basis points, based on the 20-day average to 27 October 2004. We note that the NERA analysis outlined above also found that CBA Spectrum is on average 27 basis points below the actual observations of debt margins on BBB+ rated debt.

Accordingly, we suggest that the CBA Spectrum estimates for BBB and BBB+ rated debt be used as a base range for the debt margin and that a range of 13.5 to 27 basis points be added on to reflect the uncertainty with the accuracy of CBA Spectrum estimates.

[94] Ibid, page 4.
[95] Ibid, page 5.

6.5.2 Supply / demand conditions in the relevant debt markets

The benchmark cost of debt is determined by adding a debt margin over the real risk free rate of return. As the real risk free rate of return is proxied by yields in the index-linked bond market, the benchmark cost of debt implicitly assumes that an efficiently financed distributor will finance its operations by raising long term debt in the index-linked bond market.

We note that this benchmark assumption is adopted by regulators notwithstanding that there is widespread market evidence suggesting that most corporations typically raise nominal rather than index-linked debt:

- the debt margin that is added to the real risk free rate of return to determine the benchmark cost of debt, is determined from observations on actual borrowing costs of similarly rated debt;

- analysis by the ESC in its 2001 EDPR highlighted that of the Australian company proxies used in its analysis of beta, *"…only Envestra has partly hedged against these risks [imposed by nominal financing] (which it has done by issuing index-linked bonds), and these bonds only account for a relatively small share of its total borrowing's"*[96]; and

- Australia's index-linked debt market is widely regarded as being relatively small and illiquid, particularly at the A-/BBB+ rating level. For example, the Reserve Bank of Australia has previously noted that:

  "The indexed bond market is small relative to the overall bond market (indexed bonds make up 6 per cent of all bonds outstanding)….At present, the Commonwealth government accounts for 50 per cent of indexed bonds, the states a further 21 per cent and non-government issuers 29 per cent."[97]

  KPMG notes that in the ESC's 2001 EDPR, Westpac Bank expressed the view that the index-linked market may not be able to absorb a substantial debt issuance over a short period of time without adversely affecting credit spreads:

  "…as one of Australia's leading intermediaries in the area of index-linked funding, we would argue strongly that the current capacity within the index-linked market is well short of meeting the funding requirements of the entire electricity distribution business. Westpac currently estimate that the market capacity for index-linked debt issued by Victorian distributors is approximately $600m… Moreover, it is unreasonable to assume that this capacity could be filled in a short time without any adverse impact on credit spreads or the underlying real risk free rate…Westpac's estimate of the incremental costs associated with index-linked funding is of the order of ***25-35 basis points****."*[98] *[emphasis added].*

As a further complication, KPMG understands that credit spreads can also be further affected, depending upon the assumption as to the order of debt issuance. For example, United Energy has previously provided further analysis from Westpac that suggests that as a late issuer, United Energy may incur additional costs of up to 20 basis points in the indexed bond market and up to

[96] Ibid, page 27.
[97] Refer RBA article which provides an explanation of how this would work at http://www.rba.gov.au/PublicationsAndResearch/StatementsOnMonetaryPolicy/Boxes/2001/2001_08_c_box.pdf
[98] Refer Westpac letter, dated 19 July 2000 at http://www.esc.vic.gov.au/docs/electric/21westpac.pdf

25 basis points in the nominal plus inflation swap market.[99] This analysis assumed that United Energy had an A- credit rating. Similar analysis undertaken for Powercor (which at the time had a BBB credit rating) indicated that additional costs of up to 30 basis points could potentially be incurred in the indexed bond market.

Given the way in which the regulators typically chose to define and set the benchmark cost of debt, KPMG believes that it is necessary to consider whether the benchmark cost of debt will systematically understate the borrowing costs that the electricity distributors would in fact incur. If there is, in fact, insufficient capacity for the index-linked bond market to absorb the debt issuance by Western Power, it would effectively have to bear the cost of expanded credit spreads in the index-linked market, or be forced into alternative (and more expensive) financing arrangements which would include:

- raising long term fixed rate funding from the nominal debt market and entering into an "inflation swap" arrangement in order to achieve the same net cash flows as those resulting from borrowing from the index-linked bond market;[100]; or

- raising shorter term floating rate funds from the nominal debt market. We note that short term financing is no less efficient a benchmark than long term fixed rate financing[101]. Furthermore, additional costs would need to be built in to take into account of more frequent re-financing and uncertainties associated with nominal interest rate movements.

Despite market evidence to the contrary, regulators typically only approve of the assumption that an efficiently financed distributor would raise long term index-linked debt. Given this, KPMG considers that it is reasonable to provide Western Power with an allowance for the costs potentially associated with financing its operations in accordance with a benchmark assumption that is unrepresentative of what is practically achievable in the market. It is insufficient to adopt an unrepresentative benchmark and to then deny the costs associated with its assumption on the basis that the assumption does not place a constraint upon the distributors' actual financing decisions.[102]

We therefore consider that the debt margin for Western Power should include an allowance of **25 to 35 basis points** to account for the expanded credit spreads that would likely be incurred based on the estimates provided by Westpac.

6.5.3 Debt establishment costs

This category of costs represents the transaction costs associated with raising debt capital and is paid to the bank or financial institution arranging such debt. We note that in the Australian Competition Tribunal decision on GasNet's appeal against the ACCC's decision on its transmission revenues, the Tribunal ordered that an allowance of 25 basis points be provided.

[99] Figures quoted in this statement are exclusive of debt raising fees and assume United Energy has an A- credit rating. Higher costs would be incurred for weaker credit ratings. Refer submission by United Energy to the ESC: Response on CPI Linked Funding, 17 August 2000 at http://www.esc.vic.gov.au/PDF/2000/58uecda.pdf .
[100] Refer RBA article which provides an explanation of how this would work at http://www.rba.gov.au/PublicationsAndResearch/StatementsOnMonetaryPolicy/Boxes/2001/2001_08_c_box.pdf
[101] ESC, EDPD 2001-2005, page 284.
[102] For example, refer comments by the ESC on page 293 of the EDPD 2001-2005.

This is double the estimate adopted in recent regulatory estimates of 12.5 basis points, which would suggest that a number within this range is not unreasonable.

6.5.4 Forward hedging costs

In order to mitigate its exposure to interest rate movements between the date the ERA approves the return and the commencement of the next access arrangement period, an efficiently financed distributor would likely seek to "lock in" its debt position to match the ERA's approved cost of debt for the regulatory period ahead of the commencement of the next regulatory period. In doing so, an efficiently financed distributor would incur costs associated with forward hedging.

In estimating an appropriate debt margin for Western Power, KPMG has not taken into account any forward hedging costs in this report but wishes to reserve the right to re-assess its position on this matter at a later date.

6.5.5 Conclusions on debt margin

Based on the analysis outlined above, we have estimated a debt margin for Western Power's electricity distribution system of between **149 to 194 basis points**.

Table 11: Estimated debt margin for Western Power

Debt margin components	Estimated cost
Credit risk margin over real risk free rate	0.98% – 1.07%
Allowance for understatement of CBA Spectrum	0.13%
Allowance for expansion of credit spreads due to reduced capacity to borrow in the index-linked bond market	0.25% – 0.35%
Debt establishment costs	0.125%
Total debt margin	**1.49% – 1.68%**

The resulting real pre-tax cost of debt would therefore fall within a range of **4.18% to 4.37%.**

6.6 Value of imputation credits

6.6.1 Introduction

The value of imputation or franking credits has generated a significant amount of debate in recent times, albeit predominantly in regulatory circles. The debate has focussed on the three issues:

- The value assigned to imputation credits under the various approaches to estimation;
- The appropriateness of these different approaches to estimation, which largely hinge on whose perspective it is appropriate and reasonable to take when estimating their value (eg. the average or marginal investor); and

- The consistency of the assumption made in relation the value of imputation credits in light of the assumptions made on the Market Risk Premium.

The section introduces the topic before discussing each of these issues in turn.

6.6.2 Background

Under Australia's dividend imputation system, domestic equity investors receive a taxation credit (i.e. a franking credit) which is attached to any dividends paid out of after-tax company returns. This franking credit, which reflects the amount of tax that has been paid by the company on each dollar of dividend, may be used to offset the personal tax of the investor, and hence, represents additional cash flow to the investor after-company and personal tax. Without the franking rebate, shareholders would, in effect be paying personal tax on profits that had already been subject to company tax. In a sense, therefore, franking credits effectively represent personal tax collected or withheld at the company level.

The value attributed by an investor to imputation credits is represented by "gamma" and denoted by γ. Officer, is widely recognised in finance literature as having developed the formula for the cost of capital that appropriately accommodates an imputation tax system, describes the notion of γ in the following way:

> *"… γ is the proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend. This franking credit can be utilised as tax credit against the personal tax liabilities of the shareholder. γ can be interpreted as the value of a dollar of tax credit to the shareholder."*[103]

In a footnote to the above statement, Officer provides some additional explanation of γ:

> *"For example, if the shareholder can fully utilise the imputation tax credits then ("value") $\gamma = 1$, e.g. a superfund or an Australian resident personal taxpayer. On the other hand a tax exempt or an offshore taxpayer who cannot utilize or otherwise access the value in the tax credit will set $\gamma = 0$. Where there is a market for tax credits one could use the market price to estimate the value of γ for the marginal shareholder, i.e. the shareholder who implicitly sets the price of the shares and the price of γ and the company's cost of capital at the margin, but where there is only a covert market, estimates can only be made through dividend drop-off rates…"*

It is clear that different investors will attach a different value to γ, depending on whether they can access the value of imputation tax credits. Most firms, particularly large firms, will have an investor base that typically comprises a mix of investors, some of whom would be able to access the value of credits, and some of whom would not.

6.6.3 Estimates of gamma

The value attributed to γ consists of two elements – the rate at which franking credits are distributed by the firm ("distribution rate") and the rate at which franking credits are utilised by shareholders ("utilisation rate").

[103] Officer, R. R., 1994, The Cost of Capital under an imputation tax system, Accounting and Finance, May, pp 1-17, page 4.

6.6.3.1 Distribution rate

Regulators have previously adopted a distribution rate assumption of 82%.[104] This assumption was based upon the study by Hathaway and Officer (1996), which found that the value of franking credits distributed in each year averaged 82% of the value of credits created.

An update of this study by Hathaway and Officer (2004) using more recent data and improved analysis estimates the appropriate value at 71%. In the absence of any other data, to the extent that reliance is placed on this approach to estimating the value of gamma, it is reasonable to rely upon the updated estimate provided by Hathaway and Officer (2004).

6.6.3.2 Utilisation rate - empirical studies

The table below summarises the various estimates of the franking credit utilisation rate that have been derived from empirical studies. All of these studies use data from Australian-based companies, to create a sample that is representative of the overall Australian market.

[104] ESC, 2003 GAAR Final Decision, page 393.

Table 12: Empirical estimates of the utilisation rate of imputation credits

Study	Methodology	Utilisation rate estimate
Brown & Clarke (1993)	Dividend drop-off	72%
Bruckner, Dews and White (1994)	Dividend drop-off	33.5% - 68.5%
Hathaway & Officer (1999)	Analysis of tax statistics	60%
	Dividend drop-off	49% (large co., all stocks)
		44% (all companies, all stocks)
Hathaway & Officer (2004)	Analysis of tax statistics	40% to 50%
	Dividend drop-off	
Walker & Partington (1999)	Dividend drop-off	88% or 96%
Cannavan, Finn & Gray (2004)	Inference from value of individual share futures and low exercise price options	0%
Chu & Partington (2001)	Rights issues	Close to 100%[105]
Twite & Wood (2002)	Inference from analysis of trading in derivatives	45%

Sources:

Brown, P. and A. Clarke, 1993, The Ex-Dividend day behaviour of Australian share prices before and after dividend imputation, Australian Journal of Management, 18, 1, pp. 1-40; Bruckner, K. N. Dews and D. White, 1994, Capturing value from dividend imputation, McKinsey & Company; Hathaway, N. and R. R. Officer, 1999, The Value of Imputation Tax Credits, Unpublished manuscript, Graduate School of Management, University if Melbourne; Hathaway, N. and R. R. Officer, 2004, The Value of Imputation Tax Credits Update 2004, Capital Research Pty Ltd; Walker, S. and G. Partington, 1999, The Value of Dividends: Evidence from cum-dividend trading in the ex-dividend period, Accounting and Finance, vol 39, p293;Cannavan, D., F. Finn and S. Gray, 2004, The value of imputation tax credits, Journal of Financial Economics, Vol. 73, Issue 1, July 2004; Chu, H. and G. Partington, 2001, The market value of dividends: Theory and evidence from a new method, working paper, University of Technology, Sydney, p39; Twite, G. and J. Wood, February 2002, The Pricing of Australian imputation tax credits: Evidence from individual share futures contracts, working paper.

As is evident from the above table, the existing empirical evidence on the utilisation rate of franking credits is dominated by studies that employ a methodology known as dividend drop-off analysis. Under this methodology, the utilisation rate is analysed by comparing the cum-dividend share price of a dividend-paying company with its ex-dividend share price. As the difference between these share prices (i.e. the drop-off) theoretically represents the value of the money distributed, any decline in the share price in excess of the cash dividend entitlement is assumed to be attributed to the value of the imputation credit attached to the dividend.

[105] Whilst the results suggest imputation credits are close to fully valued, it should be noted that the standard error of the estimate is 97% which indicates substantial variation around the mean estimate.

KPMG has a number of concerns with the quality of the evidence on γ from dividend drop-off studies. In particular, we note that advice provided by Professor Stephen Gray to AGLE indicates that the studies by Bruckner, Dew and White (1994) and the dividend drop-off analysis contained in Hathaway & Officer (1999) suffer from the statistical problem of multicollinearity, which makes it difficult to separate the value of cash dividends from the value of imputation credits.[106] This problem occurs because the cash dividend and the imputation credit variables are highly correlated, making it impossible to obtain a reliable measure of their individual coefficients. Professor Gray's advice notes that the methodological flaw in Bruckner, Dews and White (1994) means that the study could just as easily support the view that imputation credits are of negligible value.[107] Indeed, such a result would be consistent with a number of research papers which suggest that cash dividends are fully valued by those who trade around ex-dates. Gray suggests that such evidence, coupled with the estimate of the joint effect of dividends and imputation credits, implies that imputation credits have negligible value.

For similar reasons, Gray also notes that the results of the dividend drop-off analysis of Hathaway & Officer (1999, 2002) are unreliable. Gray demonstrates that summing the values of the cash dividends (in table 1 of Hathaway & Officer) and the franking credit (in table 2 of Hathaway & Officer) yields results that suggest that "*…a $1 dividend and an accompanying 64 cent franking credit are associated with a drop of around $1 in the stock price*"[108], which implies that franking credits are worthless.

In relation to the study by Walter & Partington (1999), Gray's analysis indicates that the main concern with this study is its focus on a special market available at the ASX which is very small and which exists only for a very limited number of shares. The results of this study display an extremely wide variation in the estimates of the value of dividends and franking credits for different ex-dividend events, which Gray notes is unusual given the nature of market examined in the study.[109]

The recent published study by Cannavan, Finn & Gray (2004) employs a methodology that compares the differences in the pricing of certain derivation securities and their underlying shares. Cannavan, Finn & Gray (2004) infer the value of imputation credits from the value of individual share futures ("ISF") and Low Exercise Price Options ("LEPOs"), as compared with the price of the underlying shares. Advice provided by Professor Gray suggests that this methodology has several advantages over the dividend drop-off regression technique:

- *"every time an ISF or LEPO trades within one minute of a trade in the underlying share, it is possible to infer the value of dividends and imputation credits. Thus, instead of two observations each year for each company, there are potentially thousands. This increased sample size brings statistical benefits and also enables calculations to be done on a company-by-company basis.*

- *ISFs and LEPO's trade well in advance of ex-dividend dates, so prices are not contaminated by the activities of short-term arbitrage traders."*[110]

[106] Refer Strategic Finance Group, October 2004, The Value of Imputation Franking Credits: Gamma, Report for AGL in relation to the ESC Electricity Distribution Review.
[107] Ibid, page 19,20.
[108] Ibid, page 23.
[109] Ibid, page 29.
[110] Ibid, page 27.

The results in Cannavan, Finn & Gray (2004) suggest that market participants place a low value on imputation credits, particularly since the 1997 introduction of the 45-day holding period rule:

> *"We find that: (i) cash dividends are fully valued relative to futures payoffs, (ii) prior to the 45-day rule, imputation credits were valued at up to 50% of face value for high-yielding firms, and (iii) since the 45-day rule, imputation credits are effectively worthless to the marginal investor of ISFs and LEPOs."*[111]

On this basis, Professor Gray has suggested that setting gamma equal to zero is more appropriate than assuming a 50 percent value.

6.6.4 The benchmark investor assumption

The ACG Discussion Paper recommends a gamma value of 50 percent on the basis that it is consistent with regulatory precedent. Accordingly, ACG suggests that a value lower than this can be considered internally inconsistent in the context of a domestic CAPM model. The implication is that gamma should be estimated on the basis that ownership of Western Power is that of the average Australian investor. No justification is provided for this.

We note that there are problems with the definition of the benchmark investor that is used to support the views held by a number of regulators on the value of γ.

To date, the value of γ has been set on the basis that the actual tax residence of the owners of the regulated entity is irrelevant for revenue setting, and that the appropriate benchmark investor should be an " average Australian investor". Regulators has previously suggested that the average Australian investor benchmark is the only practical benchmark because if the actual identity of the owner is used, consistency would require that the tax position, beta and gearing of the actual owner, amongst other things, be reflected in the value of γ. In essence, a domestic version of the CAPM needs to be applied.

KPMG disagrees with this position. Specifically:

- we do not agree that placing weight on Australian company data for beta estimates leads to the conclusion that the relevant investor is necessarily an Australian investor. Beta estimates are derived by examining the share price movements of the relevant Australian stocks. As foreign investors exist in the Australian stockmarket, it does not automatically follow that beta estimates based on Australian company proxies reflect the view of an Australian investor. It would be more accurate to argue that beta estimates reflect the view of the "marginal investor" of the relevant Australian stocks examined by ACG – as it is well known that share prices are set by the marginal investor - and that the relevant stocks are utility company stocks rather than the average stock listed on the Australian Stock Exchange ("ASX");

- ACG's suggested benchmark gearing assumption is based upon the gearing levels of comparable utility companies listed on the ASX – it does not reflect the gearing level of the average company listed on the ASX;

[111] Cannavan, D., F. Finn and S. Gray, 2004, The value of imputation tax credits, Journal of Financial Economics, Vol. 73, Issue 1, July 2004, page 26.

- as with beta estimates, it cannot be concluded that because the equity premium is based on Australian market data, it reflects the views of an Australian investor. It is a fact that foreign investors invest in Australian stocks and therefore, it could just as easily be argued that the returns reflected in the Australian stockmarket, from which the equity premium is derived, are those required by foreign investors. We consider that a more accurate statement is that the Australian equity premium reflects the premium required by the "marginal investor" in the Australian stockmarket; and

- the debt margin reflects the cost of raising debt in the Australian debt market, but it does not automatically follow from this that the party raising debt is necessarily Australian in its identity. ACG may well have adopted a benchmark assumption of an "efficiently financed Australian distributor" but there is a clear disconnect between this benchmark and the data that is relied upon to establish the cost of debt (e.g. CBA Spectrum data).

In order for ACG's benchmark investor assumption for γ to be consistent with the assumptions for the parameters noted in the discussion above, it would need to, amongst other things, adopt an equity beta estimate of 1.0, reflecting the market average beta of the overall Australian market (rather than just examining comparable company data) and adopt gearing levels consistent with that of the average company listed on the ASX (and which would be reflected in the equity beta of 1.0).

There are strong conceptual reasons why an "average Australian investor" benchmark is not an acceptable benchmark for the purposes of measuring the cost of capital. This is because the CAPM measures the cost of capital or the required rate of return from the perspective of the marginal investor. We have previously highlighted comments from Officer that the marginal investor is the one who implicitly sets the price of shares, the value of γ and the company's cost of capital at the margin.

The broader question of what value to attribute to γ therefore, should be defined as *what proportion of taxes paid at the corporate level is really a pre-collection of the personal tax of the **marginal** investor*. This definition can be simply stated in theory. However, in practice, determining the identity of the marginal investor can be difficult.

One view that has been expressed by Officer is that the marginal investor – the one who sets the price of Australian stocks - is the foreign investor. The argument is expressed in terms of whether Australia is a price-taker or price-maker in capital markets.

> *"In an open capital market, such as Australia, where the size of the market relative to offshore markets implies it is a price taker, we would not expect the cost of capital to change – the arguments to support this proposition have been made in Officer (1988)."*[112]

Cannavan, Finn and Gray (2004) also support this view:

> *"Officer (1988) points out that since Australia is a small open economy, the cost of capital for Australian companies will be determined by supply and demand conditions in world capital markets. That is, large companies are unlikely to be financed solely by resident investors – at*

[112] Officer, R.R., 1994., The cost of capital of a company under an imputation tax system, Accounting and Finance, May, pp. 1-17.

> *least some non-resident investment is likely to be required. Also, participants in world capital markets are free to invest anywhere, so they will only invest in a small open economy such as Australia if they receive a return that is fair by world standards. If imputation credits are worthless to these investors, they will only invest if they are provided a sufficient return by way of cash dividends and capital gains.*
>
> *In this case, resident investors will receive capital gains, cash dividends and imputation credits and non-resident investors will receive capital gains and cash dividends only. Since resident investors receive a higher return (via the imputation credits granted by the local tax system), they will the first to invest. The marginal investor will then be a non-resident, who will receive a return in the form of capital gains and cash dividends that just meets their required return. This means that in a small open economy such as Australia, the company's cost of capital is not affected by the introduction of a dividend imputation system."*[113]

The important consequence of the marginal investor being a non-resident / foreign investor is that the value of γ is likely to be closer to zero than the 50% that is currently being used in regulatory decisions. In Cannavan, Finn and Gray (2004), the authors state that:

> *"…prior to the introduction of the 45-day rule, imputation credits for the average company are valued at around 33 cents in the dollar by the representative investor. This is consistent with Wood's (1995) estimate of 32% from an analysis of listed warrants using a different empirical technique. This is consistent with the representative investor being a foreign investor who can extract some, but not all, value from imputation credits by transferring them to domestic tax-paying investors…*
>
> *… we cannot reject the hypothesis that imputation credits are worthless to the marginal investor after the introduction of the 45 day rule."*

The use of a marginal investor concept for attributing an appropriate value to γ is not only underscored by basic CAPM concepts, but is also dictated to a large extent by the empirical evidence that is available on the likely value of γ. Other than the evidence from national taxation statistics, the empirical evidence previously presented in Table 12 of this report, necessarily measures the franking credit utilisation rate from the perspective of the marginal investor in the Australian market because:

- this basis of measurement is evident from the underlying data analysed in each study, which is share price data on Australian companies in general. None of these studies focus on companies that have purely Australian-resident shareholders, which is a necessary assumption to support the ACG's apparent view that the utilisation rate should be measured from the perspective of the "average Australian investor"; and

- it is accepted that share prices are set by the marginal investor. Whether the marginal investor is Australian or foreign is the subject of a separate empirical exercise that would depend upon the type of company being examined.

As a result, the measure of the utilisation rate that emerges from empirical studies that ACG has implicitly (by deferring to regulatory precedent) used to support its choice of value for γ (other than from national taxation statistics) can only represent the utilisation rate to the marginal

[113] Cannavan, Finn and Gray (2004), op cit, page 27.

investor, not the "average Australian investor". In our opinion, it is therefore not possible to maintain an "average Australian investor" assumption and draw support from available empirical evidence (as provided by the studies listed in Table 12) that measures the utilisation rate to the marginal investor in the Australian stockmarket, who is most likely a foreign investor.

The only benchmark investor assumption that leads to an internally consistent estimate of the cost of capital is to adopt a utilisation rate that reflects the value of imputation credits to the marginal investor.

KPMG notes that one argument used by regulators (such as the ESC) to reject the argument that the "average Australian investor" assumption is not an appropriate benchmark is that gamma is based a "benchmark ownership" rather than "actual ownership" assumption.

KPMG does not consider that it inconsistent to retain a benchmark ownership assumption, but to define the "benchmark" by reference to the marginal investor in comparable businesses listed on the ASX rather than the average Australian investor. As we have argued, a benchmark defined in this way would be internally consistent with the way in which all of the other parameters of the cost of capital (e.g. equity beta and MRP) have been determined. There is also no acceptable reason why the Commission should continue to require that the national identify of equity investors should reflect that of the average investor in the Australian market if as the Commission states *"…it is unlikely that the choice of benchmarks as to ownership would result in a material difference to the benchmark revenue requirements for the distributors…".*[114]

Reliance on Hathaway & Officer (2004)

As noted above, KPMG firmly believes that the only benchmark investor assumption that leads to an internally consistent estimate of the cost of capital is to adopt a value of γ that reflects the value of imputation credits to the marginal investor.

Should the ERA adopt an "average Australian investor" benchmark ownership assumption for estimating the value of imputation credits, however, then the most relevant empirical study conducted in Australia that provides an estimate of γ that is not inconsistent with that benchmark concept is Hathaway & Officer (2004) – specifically that part of this study that examines aggregate taxation statistics. This study estimated a γ value equal to 0.35.

We note in this respect that the ERA has paid particular regard to the evidence previously provided by these authors in setting gamma. In its recent Draft Decision on Alinta's gas access arrangements, it states:

> *"In Australia, regulators under the Code have generally adopted a "γ" value of 0.5 based on the 1999 study by Hathaway and Officer, which estimates gamma at close to 0.5. The Authority takes the view that this assumption is appropriate for the GDS (Gas Distribution System)."*[115]

[114] ESC, 2003 Final Decision, GAAR, page 398.
[115] Economic Regulatory Authority, Draft Decision on the Proposed Revisions to the Access Arrangement for the South-West and Mid-West Gas Distribution Systems, February 2005, page 77.

To the extent that the ERA proposes to adopt a similar approach for Western Power, it would appear to be bound to take into account the new evidence from this source.

6.6.4.1 Market practice

It is worth noting that it remains common market practice to assume that imputation credits are not fully valued or not valued at all[116]. Evidence drawn from expert reports on takeovers to support such practices was provided in recent analysis, which showed that of 122 reports reviewed only 48 (or 39%) provided support showing how they had arrived at the WACC used in their reports. Of these, 42 (or 88%) used the classical CAPM model and made no adjustment for dividend imputation. Only six reports made an adjustment to reflect dividend imputation[117]. Furthermore, of the seven reports (6%) that did attribute value to imputation credits, it appears that five attributed little or zero net effect on the value of the company being assessed."[118]

This study goes on to provide a long list of conceptual grounds cited in reports for not adjusting for imputation credits, including:

- the value of franking credits is dependent on the tax position of each individual shareholder;
- there is no evidence that acquirers of businesses will pay additional value for surplus franking credits;
- there is little evidence that the value effects of dividend imputation are being included in valuations being undertaken by companies and investors or the broader market;
- foreign shareholders are the marginal price-setters of the Australian market yet many such shareholders cannot avail themselves of the benefit of franking credits; and
- there is a lack of certainty about future dividend policies, the timing of taxation and dividend payments and consequently about franking credits.

We note that Lonergan's analysis does not provide any indication of which form of CAPM had been adopted in the expert reports he reviewed, however, the list of conceptual grounds cited for not adjusting for imputation credits (which effectively implies a gamma of zero) did not include "use of an international form of CAPM" as a reason. This suggests that the reports reviewed by Lonergan employed a domestic form of CAPM.

More recently, one of the most topical issues in unregulated markets at the moment that relates to valuation and thus the cost of capital has been the recent takeover activity surrounding Western Mining Corporation, as is discussed in Section 5.3.2.

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[116] Lonergan does not state which form of CAPM was used in each of the expert reports he reviewed. Based on our experience, however, market practitioners tend to utilise the domestic form of the CAPM. This is evident from their approach to estimating parameters such as the risk free rate, beta and the market risk premium.
[117] Lonergan, W., Autumn 2001, "The disappearing returns, why dividend imputation has not reduced the cost of capital", JASSA, page 13.
[118] Lonergan, W., Autumn 2001, op cit, page 14.

For example, Grant Samuel's expert report suggests that WMC's assets are likely to be priced on the basis of costs of capital established in international capital markets. It therefore uses a US risk free rate for the US dollar denominated businesses of Western Mining but also uses its judgement to derive a value based on a mix of 10 and 30 year securities to address the problems associated with prevailing risk free rate for 10 year securities.

Most importantly, it makes no adjustment for the value of imputation credits and uses a market risk premium of 6%, which as discussed below is an important issue in terms of the consistency of the parameters underpinning cost of capital estimation.

6.6.5 Consistency between franking credits and the market risk premium

More recent analysis draws into question the internal consistency in regulators assuming a gamma of 0.5 and a market risk premium of 6%. Indeed, it shows that these parameters are internally inconsistent.

Recent work by Prof. Stephen Gray outlines the issue in the following terms:

> In a dividend imputation tax system, equity investors have three potential sources of return: dividends, capital gains, and franking (tax) credits. However, the standard procedures for estimating the market risk premium (MRP) for use in the CAPM, ignore the value of franking credits. Officer (1994) notes that if franking credits do affect the corporate cost of capital, their value must be added to the standard estimates of MRP. In this paper, we explicitly derive the relationship between the value of franking credits (gamma) and the MRP. We show that the standard parameter estimates that have been adopted in practice (especially by Australian regulators) violate this deterministic mathematical relationship.

Prof Gray shows that on the basis of a mathematically deterministic relationship and the available empirical evidence that:

- An MRP of 6% is consistent with a value of 0 for franking credits; and
- An MRP of 8.5% is necessary for a value of 0.5 for franking credits;

It argues that an MRP of 6% and a franking credit value of 0.5 are "are dramatically inconsistent with observed market data."[119] This is because it can be shown that this implicitly assumes dividend yields well in excess of the empirical evidence. Prof Gray therefore concludes that:

> Thus, however we interpret the MRP estimate of 6%, the standard set of parameter values produce results that are demonstrably inconsistent with each other and with observed data on dividend yields.

It suggests that there are two primarily means by which consistency can be restored based on the results of empirical evidence. This includes:

- Adjusting gamma – setting γ to equal zero as well as being consistent with recent empirical evidence, also implies a MRP of 6%; or

[119] Ibid., page 15

- Adjusting the market risk premium – setting γ to equal 50%, requires the application of a MRP in the order of 8.5% to achieve internal consistency in the WACC calculation.

6.6.6 Conclusion

A considerable degree of uncertainty surrounds the estimation of the appropriate value for γ. KPMG believes that it is appropriate to err on the side of conservatism by adopting a lower rather than higher value for γ.

Notwithstanding these uncertainties, there are several major problems with the regulators' approach. The key problems are:

- There would be appear to be some internal consistencies in the regulators' assumptions in regard to the estimation of the MRP and the value of franking credits;

- The "average Australian investor" concept that has formed the basis for regulators' assumptions on γ is a poorly defined concept. Furthermore, it is difficult to support such a concept when the existing empirical evidence on the value of imputation credits reflects the value of imputation credits from the perspective of the marginal investor. This is necessarily the case since empirical studies utilise share price data as the basis for estimating the value of γ and share prices are set by the marginal investor;

  The identity of the marginal investor is difficult to determine in practice. However, for many large companies, particularly those with a significant proportion of foreign investors, there is evidence to support the view that the marginal investor is a foreign investor, who is largely unable to extract any value from imputation tax credits.

- The way in which the market says it values franking credits is inconsistent with the regulators' assumptions; and

- Even applying the regulators' preferred approach, there are problems with the empirical data used to support it.

However, even if all these issues are put aside, it is clear that the most recent data using the ERA's preferred approach do not support a value of 0.5 for franking credits either.

We note in this respect that the ERA has paid particular regard to the evidence previously provided Hathaway and Officer in setting gamma. Their most recent work estimated a γ value of 0.35 (and lower after taking into account recent changes in the taxation system).

KPMG considers that a value of zero is likely to be a more valid assumption for γ than a value of 50%. We consider that it is reasonable to adopt a value for gamma that lies in the feasible range of **0% to 50%** for the purposes of incorporating the uncertainties into the estimate the cost of capital.

7 Selecting a point estimate of WACC

7.1 Introduction

As highlighted in Section 1 of this report, Western Power has appointed:

- KPMG to provide advice and recommendations on the values that should be adopted for each of the underlying parameters as part of the process for estimating a reasonable point estimate for the WACC for its electricity distribution system; and
- SFG to undertake a separate analysis on how to translate the parameter estimates recommended by KPMG into a point estimate using a probabilistic framework that takes into account the uncertainty surrounding the WACC parameter estimates recommended by KPMG.

In this section we:

- Outline our conclusions; and
- Provide a brief overview of the approach undertaken by SFG to derive a point estimate for WACC. Further details are contained in SFG's report.

7.2 Conclusions

Based on our review, KPMG considers that the rate of return for Western Power's electricity distribution system should be set by reference to the values / ranges for the relevant underlying parameters as set out in Table 13 below.

Table 13: Pre-tax real WACC – parameter estimates

	Feasible range	
Parameter	**Low**	**High**
Real risk free rate *	2.69%	2.69%
Equity beta	0.90	1.10
Market risk premium	6.0%	8.0%
Equity proportion	40%	40%
Debt proportion	60%	60%
Real pre-tax cost of debt	4.18%	4.37%
Debt margin *	1.49%	1.68%
Value of imputation credits	50%	0%

** estimate will be subject to movements in interest rates at the time of ERA's final authorisation*

7.3 A framework for quantifying estimation error in regulatory WACC

SFG has developed a framework that is intended to quantify the uncertainty surrounding the estimated WACC. The rationale underlying such a framework is the recognition that estimates of a firm's cost of capital using the CAPM are highly imprecise. As SFG has noted, there is substantial measurement error associated particularly with the estimate of the MRP and beta.

Regulators around Australia are well aware of the uncertainties surrounding the estimate of WACC. Regulators such as IPART have attempted to take into account the uncertainties by adopting low-high ranges for various underlying parameters, aggregating the parameter range into a WACC range and by exercising their discretion to select a point estimate within the WACC range. Other regulators have acknowledged the uncertainties involved in estimating WACC but then relied upon their judgement to select a point estimate for every parameter. The problem with these approaches is that there is no explicit framework to guide regulators in how select the appropriate WACC. The process is not transparent and there is no way for regulators (and other stakeholders) to quantify the confidence they have in the reasonableness of the WACC estimate adopted.

Given the Code objective to promote economically efficient investment in and operation of and use of the SWIS an approach that facilitates the quantification of the estimation error in WACC is a useful tool. This is also consistent with the widespread acceptance of the importance attached to providing incentives for future investment in essential infrastructure facilities – as emphasised in the PC's review of the national access regime.

The approach that has been developed by SFG is intended to assist in the WACC selection process. SFG's methodology uses standard Monte Carlo simulation techniques to construct a full probability distribution around the WACC estimate. By adopting the assumptions set out in Table 14 below, SFG estimates that the true WACC for Western Power lies within a probability distribution with the following characteristics:

- A mean value of 7.3%;
- A standard deviation of 0.8%;
- A 90% chance the true value falls between 6.0% and 8.6%;
- A 75th percentile value of 7.8%; and
- An 80th percentile value of 8.0%.

Table 14: Assumptions adopted in SFG's Monte Carlo simulation

Parameter	Symbol	Source	Estimate	Distribution
Real risk free rate of return	Rf	Yield on 10 year Government bond (20 day average)	2.69%	None
Capital structure	D/V	Comparables and regulatory decisions	60%	None
Debt margin		BBB and BBB+ spreads from CBA Spectrum, and other allowances	1.49% – 1.68%	Uniform
Equity beta	βe	Comparables and regulatory decisions	0.9 – 1.1	Uniform
Market risk premium	MRP	Historical stock returns and 10 year government yields; Regulatory decisions	Mean = 6% Std dev = 1.8%	Normal
Value of franking credits	γ	Empirical evidence and regulatory decisions	0.0 – 0.5	Uniform

Full explanations of SFG's choice of values and / or distributions for each parameter are contained in their detailed report.

SFG concludes that given the uncertainty surrounding estimates of key WACC parameters, and the interaction between parameters, a real pre-tax WACC of between 7.8% and 8.0% would provide Western Power with a return that is sufficiently likely to meet the cost of funds so as not to threaten the long-term viability of the business or to provide a disincentive for future investment.

SFG reached a 75% to 80% probability based on the asymmetry in the consequences of erring on this matter. That is the consequences of failing to at least recover the full cost of capital is the curtailment of future investment.

Recent judicial and regulatory precedent suggest that significant weight should be given to providing appropriate investment incentives.