

The Allen Consulting Group

AlintaGas Networks Revised Access Arrangement:

Proposed Rate of Return

May 2004

Report to Economic Regulation Authority

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Contents

Chapter 1	1
<i>Introduction and Summary</i>	<i>1</i>
Chapter 2	4
<i>Judicial/Merit Reviews and the PC Draft Report</i>	<i>4</i>
2.1 Putting the Cost of Capital into Context	4
2.2 The Productivity Commission's Draft Report	8
2.3 Conclusion	9
Chapter 3	10
<i>General Methodology</i>	<i>10</i>
3.1 WACC formula	10
3.2 Taxation and transformation issues in deriving a pre-tax WACC	10
Chapter 4	12
<i>The Risk Free Rate of Return and Inflation</i>	<i>12</i>
Chapter 5	13
<i>Market Risk Premium</i>	<i>13</i>
5.1 Proposed Market Risk Premium	13
5.2 Empirical evidence – long term historical averages	13
5.3 Views of Australian academics	16
5.4 The Dividend Growth Model	17
5.5 Inter-country comparisons	18
5.6 Other evidence on the market risk premium	19
5.7 Conclusion	20
Chapter 6	21
<i>Beta</i>	<i>21</i>
Chapter 7	24
<i>Gearing</i>	<i>24</i>
Chapter 8	25
<i>Debt Margin</i>	<i>25</i>
Chapter 9	27
<i>Valuation of Imputation Credits</i>	<i>27</i>

Chapter 1

Introduction and Summary

The Western Australian Economic Regulation Authority has engaged The Allen Consulting Group to undertake an analysis of the rate of return proposed by AlintaGas Networks (“Alinta”) in proposed revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems under the National Third Party Access Code for Natural Gas Pipeline Systems (“Code”).

Alinta has taken advice from KPMG on the calculation of the rate of return and adopted a rate of return of 8.5 percent, calculated as a real pre-tax weighted average cost of capital (WACC) using the capital asset pricing model (CAPM). This compares with a pre-tax real WACC of 7.5 percent that was used in the determination of Reference Tariffs for the Access Arrangement approved in 2000 and currently in place.

For ease of comparison, The Allen Consulting Group’s analysis of Alinta’s proposed rate of return is documented in a manner that aligns with the analysis of KPMG, as set out in its March 2004 paper titled, *Alinta Networks: The Weighted Average Cost of Capital for Gas Distribution* and appended to Alinta’s Access Arrangement Information.

The conclusion of The Allen Consulting Group is that some assumptions made by KPMG in estimating a WACC for the Mid-West and South-West Gas Distribution Systems are unsupported by available empirical evidence and that the estimate of the WACC made by KPMG and proposed as the rate of return by Alinta therefore fails to meet the requirement of the Code to be a best estimate of the forecast cost of capital for the next access arrangement period. The Allen Consulting Group recommends that changes be made to a number of assumptions employed by KPMG in using the CAPM to estimate the WACC.

The key CAPM parameters and cost of capital outcomes relating to the current Alinta Access Arrangement proposal, and values recommended by The Allen Consulting Group, are set out in Table 1.1. Values of market variables recommended by The Allen Consulting Group (risk free rates of return, expected inflation) are average values for the 20 trading days to 29 April 2004, and the Group recognises that these values may be updated to a later date before the Authority issues a Draft Decision on the Access Arrangement proposal.

Table 1.1

ALINTA NETWORKS: PRE-TAX REAL WACC – PARAMETER ESTIMATES

CAPM Parameter	Notation	Alinta Submission	Recommended Value
Risk free rate of return	R_f	5.9%	5.75%
Market risk premium	MRP	7.00%	6.00%
Equity beta	β_e	1.0	1.0
Debt margin	DM	1.4% ->1.8%	1.20%
Corporate tax rate	t	30%	30%
Franking credit value	γ	0.3->0.5	0.50
Debt to total assets ratio	D/V	60%	60%
Equity to total assets ratio	E/V	40%	40%
Pre-tax cost of debt	$R_f + DM$	7.5% [#]	6.95%
Post-tax cost of debt	$K_d(1 - t(1 - \gamma))$	6.15% [#]	5.91%
Post-tax cost of equity	$R_f + \beta_e \times MRP$	12.9% [#]	11.75%
Expected inflation	π_e	2.2%	2.38%
Post-tax nominal WACC		7.55% [#]	6.79%
Pre-tax nominal WACC		10.79%	9.70%
Pre-tax real WACC		8.5%	7.2%

denotes implied values for parameters and WACC values not specified in the Alinta submission

The Allen Consulting Group considers that the indicative best estimate of the real pre-tax WACC to apply in deriving the Reference Tariffs for the next Access Arrangement Period is 7.2 percent (rounded up). This is 1.3 percentage points less than the 8.5 percent proposed by Alinta. The difference arises from changes in assumptions made for three key parameters of the CAPM, as follows.

- *Market Risk Premium (MRP)* – Alinta assumed a MRP of 7 percent, which is found not to be empirically sustainable, and is not consistent with other Australian regulatory decisions. There is a significant body of opinion, held by academics and practitioners, that in the US and Australia the realised historical MRP over the last century have exceeded expectations, and that the MRP required by investors has fallen over time. An MRP of 6 percent is recommended because it lies close to the midpoint of a range defined by the historical record of realised MRPs and the ex ante MRP based on current market parameters.
- *Debt margin (DM)* – Alinta has assumed a DM of 1.60 percent based on notional BBB credit rating for the AlintaGas Networks business, and added 20 to 50 basis points for CPI swap hedging costs. The Allen Consulting Groups considers that an assumed credit rating below BBB+ and provision for CPI swap hedging costs are not able to be justified. The appropriate debt margin for Alinta as a 60 percent geared BBB+ rated entity has been estimated at 1.20 percent based on recent market evidence, a CBA Spectrum value of 1.05 percent and the addition of 0.125 percent for debt issuance costs. Rounding up yields a value of 1.20 percent.

- *Franking credit value (γ)* – Alinta has proposed a gamma value of between 30 and 50 percent. A value of less than 50 percent is not considered justified. Adoption of Alinta’s assumption of a value less than 50 percent would create an inconsistency in application of the CAPM in that it would be necessary to assume that marginal investors are foreign residents, suggesting the need to apply an International CAPM, whilst the MRP and beta are estimated on the assumption of a domestic CAPM. A 50 percent gamma value is recommended, consistent with a domestically derived MRP of 6 percent and a beta that is measured against the domestic Australian market.

With respect to other key determinants of the WACC there is broad agreement with Alinta’s proposed Access Arrangement. For the risk free rate and expected inflation the same methodology used by KPMG has been applied, and differences are due only to changes in the underlying market parameters.

The recommended real pre-tax WACC of 7.2 percent is 30 basis points lower than that used in determination of Reference Tariffs for the current Access Arrangement. Around half of this 30 basis point difference is accounted for by reductions in the real risk free rate and the statutory tax rate from values used in derivation of the rate of return in 2000. The remainder difference is due to a reduction in the assumed equity beta from 1.08 to 1.0 as argued by KPMG in its advice to Alinta.

Chapter 2

Judicial/Merit Reviews and the PC Draft Report

2.1 Putting the Cost of Capital into Context

Another important aspect of the Alinta Access Arrangement and the supporting paper by KPMG, is the contention that recent judicial and merit reviews of regulatory decisions under the Code have changed the nature of the regulatory task facing the Authority in consideration of Alinta's proposed revisions to its Access Arrangement, including the rate of return.

It is submitted that the Western Australian Supreme Court's "Epic Energy Decision"¹ and recent Australian Competition Tribunal decisions² have meant that:

- the Authority's role under the National Gas Code is to pursue an outcome that mimics "workable competition", which is a lesser form of competition than "perfect competition"; and,
- the Authority's task is not to impose its own preferred rate of return for the purpose of establishing a Reference Tariff, but rather approve the rate of return proposed by the Service Provider as long as its proposal lies within a reasonable range.

Having reviewed the recent judicial and other findings, the KPMG Report proposes a set of six "guiding principles" that emerge from the discussion. Each of these principles is addressed in turn below.

The role of the regulator

The KPMG Report submits that a recent decision by the Australian Competition Tribunal (ACT) in the case of GasNet's appeal against the ACCC's final decision on its access arrangements has provided a principle that should be applied in the case of Alinta's proposed Access Arrangement. The ACT's decision states:³

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.

The KPMG Report (p.10) contends that this means it is "not open to the regulator to reject the service provider's proposed access arrangements and replace it with its own judgements 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."

¹ Re Dr Ken Michael AM; Ex Parte Epic Energy (WA) Nominees Pty Ltd & Anor [2002] WASCA 231

² Application by GasNet Australia (Operations) Pty Ltd [2003] AcompT 6 and Application by Epic Energy South Australia Pty Ltd [2003] AcompT 5

³ Application by GasNet Australia (Operations) Pty Ltd [2003] AcompT 6, 23 December 2003, paragraph 29.

This contention is not consistent with the requirements of the Code. Compliance with factors listed in section 2.24 of the Code is not a relevant matter. The factors listed in section 2.24 are not objectives or criteria to be complied with, but rather – in respect of Reference Tariffs – are factors that should guide the regulator in determining, if necessary, the manner in which the objectives in section 8.1(a) to (f) can best be reconciled or which of them should prevail.⁴

In addition to the objectives of section 8.1 and the factors of section 2.24, section 8.2 of the Code sets out a number of other factors about which the regulator must be satisfied in determining to approve a Reference Tariff and Reference Tariff Policy. The factors of section 8.2 include a requirement that the regulator be satisfied that the Total Revenue that a Reference Tariff is designed to recover is calculated consistently with the principles contained in section 8 of the Code, which include principles for determining the Rate of Return.

Workable competition

The KPMG Report submits that the Epic Energy Decision established a fundamental principle that the Code does not require a regulator to pursue the outcomes of a “theoretical concept of perfect competition” rather that “workable competition seems far more obviously to be what is contemplated.”⁵

The KPMG Report (p.4) argues that Epic Energy Decision and the Australian Competition Tribunal’s recent decisions require regulators “to give greater weight to investment incentives and provision of incentives consistent with those found in workably competitive markets.” However, it is not stated in the Epic Energy Decision that the Code requires regulators to promote future investment in gas pipelines any more than is required to meet demand in the market and, under Section 8.1(a) of the Code, provide an opportunity for the Service Provider to earn its cost of capital if forecast demand and efficiency levels are achieved.

Section 8.1(b) of the Code requires that the Reference Tariff and the Reference Tariff Policy should be designed with a view to the objective of “replicating the outcome of a competitive market.” Whilst the Code does not explicitly define the meaning of the term “competitive market”, when considered in conjunction with the other objectives for a Reference Tariff and Reference Tariff Policy listed in Section 8.1, the Court in the Epic Energy Decision has determined that the meaning of the Code is not to replicate the outcomes of a “perfectly competitive market” as defined in textbooks.

Alinta submits that the implication of the Epic Energy Decision is that with reference to the cost of capital, “the lowest possible figure should not be selected but rather one consistent with the workable competition principle.”⁶ However, other than submitting that the lowest possible figure should not be applied, Alinta does not expand on what is meant by a cost of capital that is consistent with workable competition.

⁴ Re Dr Ken Michael AM; Ex parte Epic Energy (WA) Nominees Pty Ltd [2002] WASCA 231, para. 29.

⁵ Re Dr Ken Michael AM; Ex parte Epic Energy (WA) Nominees Pty Ltd [2002] WASCA 231, para. 124.

⁶ Access Arrangement Information, p49

The concept of workable competition has no established standing or special significance in the context of finance theory or practice. A cost of capital is simply the discount rate that is applied to a set of future expected cash flows in order to derive the value of an asset, irrespective of the nature of competition. It is the risk characteristics of the cash flow stream that are important in determining the cost of capital, and these are determined by the nature of the product, the cost structure, the level and tenor of contracting and a host of other factors.

The characteristics of workable competition are not relevant to the cost of capital, but may be relevant to the nature of cost and demand targets, and framework of incentives that are set for the Service Provider over a regulatory period. Workable competition refers to a situation in which firms do not have significant market power, and there is rivalry among firms for temporary super-normal profits. Through innovation and cost efficiency, successful firms in workably competitive markets may be able to earn above their cost of capital for a period – possibly even an extended period of time. Unsuccessful firms in a workably competitive market will earn less than their cost of capital.

Hence, the operation of workable competition does not of itself imply that firms, on average, will make more or less than their cost of capital, nor imply that regulators should approve rates of return for regulated firms at more or less than their cost of capital.

The values of underlying parameters

The KPMG Report quotes from the Tribunal’s decision in relation to the Moomba to Adelaide Pipeline to support its case that regulators should not establish reference tariffs based on the lowest value of any underlying parameters.⁷

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.

It is the nature of merit reviews to deal with the specifics of particular decisions. In the MAP Decision the ACT decided that the ACCC’s use of lowest estimates of unit costs for pipeline components (in establishing a replacement cost and thence an initial capital base) exposed the owners to asymmetric risk. This was not a case that referred to all parameters associated with the establishment of reference tariffs, including cost of capital parameters.

The Code provides guidance on the determination of the Rate of Return to be applied in establishing Reference Tariffs. Sections 8.30 and 8.31 of the Code require the return (Rate of Return) on the regulatory value of the Service Provider’s assets (the Capital Base) that is factored into Reference Tariffs to comply with the following principles:

8.30 The Rate of Return used in determining a Reference Tariff should provide a return which is commensurate with prevailing conditions in the market for funds and the risk involved in delivering the Reference Service (as reflected in the terms and conditions on which the Reference Service is offered and any other risk associated with the delivering the Reference Service).

⁷

Application by Epic Energy South Australia Pty Ltd [2003] AcomPT 5, 10 December, para. 92.

8.31 By way of example, the Rate of Return may be set on the basis of a weighted average of the return applicable to each source of funds (equity, debt and any other relevant source of funds). Such returns may be determined on the basis of a well-accepted financial model, such as the Capital Asset Pricing Model. In general, the weighted average of the return on funds should be calculated by reference to a financing structure that reflects standard industry structures for a going concern and best practice. However, other approaches may be adopted where the Relevant Regulator is satisfied that to do so would be consistent with the objectives contained in section 8.1.

While there is a degree of statistical uncertainty associated with estimation of the cost of capital for a business, there is only one unique, single or “true” cost of capital. Section 8.2(e) of the Code therefore requires the Rate of Return to reflect the *best* estimate of the true cost of capital, just as the forecasts of demand must reflect the best estimate of future demand. Such a “best estimate” is not necessarily at the bottom or top of a reasonable range but rather is likely to be at or near the middle of the range.⁸

Uncertainty inherent in setting reference tariffs

The KPMG Report (p.11) submits that due to uncertainty in the parameters required to set reference tariffs a range of parameter choices made by the Service Provider, as long as they have been made reasonably, could remain consistent with the Reference Tariff Principles. KPMG quotes the Australian Competition Tribunal:⁹

...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.

This is taken by KPMG to suggest that there may be a wide range of parameters and therefore, by implication, of alternative costs of capital that could be consistent with the Code. However, the Tribunal’s decision continues at Paragraph 29 to clarify this point.

Where the Reference Tariff Principles produce tension, the Relevant Regulator has an overriding discretion to resolve the tensions in a way which best reflects the statutory objectives of the Law.

Thus, the Tribunal confirms in this decision that the regulator is required by the Code to exercise discretion when there is a conflict between the Access Arrangement proposed by the Service Provider and the objectives under the Code. However, this discretion does not necessarily extend to all parameters in calculation of a Reference Tariff, as some of these parameters are forecasts for which best estimates are required (as discussed above).

⁸ There are a number of different technical criteria in statistics for defining the best value for an estimator. One definition is that the best value is that which has the lowest estimation error (variance) amongst the class of unbiased estimators (unbiased means that, if the experiment were run many times, the true value would be obtained on average). However, alternative criteria imply that the best measure should allow a degree of bias in the estimator if this achieves more than a compensating reduction in the variance of the estimator (mean square error is an example). In practice, however, the derivation of the best estimators for many of the inputs required to estimate a cost of capital require information from a number of sources to be taken into account, which cannot be undertaken with a mechanical algorithm, but rather requires judgement to be exercised.

⁹ Application by GasNet Australia (Operations) Pty Ltd [2003] AcomPT 6, 23 December, para. 29.

The regulator's preference for a different Access Arrangement

The KPMG Report's proposition that a regulator cannot reject a Service Provider's Access Arrangement simply because the regulator prefers a different access arrangement is also based on paragraph 29 of the Australian Competition Tribunal's decision in relation to GasNet Decision:

However, where there are no conflicts or tensions in the application of the Reference Tariff Principles, and 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.

KPMG's assertion is consistent with the Tribunal's decision, however it also follows that it is only in the event that there are no conflicts or tensions in the application of the Reference Tariff Principles, and that the proposed Access Arrangement falls within the range of choice reasonably open and consistent with Reference Tariff Principles, that a regulator must approve a proposed Access Arrangement. In practice, if there is a conflict and tension in the application of the Reference Tariff Principles, or the proposed Access Arrangement does not fall within the range of choice reasonably open and consistent with Reference Tariff Principles, then it is the role of the regulator to resolve that conflict or tension by, if necessary, rejecting a Service Provider's Access Arrangement and, under Section 2.13(b) of the Code, proposing appropriate amendments to the Access Arrangement.

2.2 The Productivity Commission's Draft Report

The Productivity Commission has recently issued its Draft Report on the National Gas Access Regime.¹⁰ The Commission's report makes the case that there is a potential for distortion of investment in the gas industry due to "regulatory truncation" of returns. It is argued that the prospective returns of regulated businesses are normally distributed, and regulators have a tendency to disallow high rates of return. As a result returns will be "truncated" and investment will not take place unless there is a compensating increase in the allowed cost of capital or a direct adjustment to cash flows.

The Commission's analysis of "regulatory truncation" has been responded to by the ACCC in a recent submission to the Commission:¹¹

Regulatory truncation requires an expectation that there will be ex post truncation of high return outcomes. However, regulatory practice to date has been to apply an incentive based framework in which the time path of regulatory tariffs are determined in advance so that the service provider has the ex ante expectation of achieving the benchmark CAPM rate of return.... The service provider may increase its rate of return by pursuing cost reductions and by stimulating market demand for its services

¹⁰ Productivity Commission (2004) *Review of the Gas Access Regime: Draft Report*.

¹¹ ACCC (17 March, 2004), *Submission to the Productivity Commission Draft Report: Review of the Gas Access Regime*, p.22.

Thus, it is argued that the nature of the CPI-X incentive-based regulatory framework practiced in Australia does not lend itself to “regulatory truncation”. The Commission’s Draft Report appears to have been heavily influenced by the arguments presented by Kolbe, Tye and Myers in the context of the US regulatory framework.¹² In 1991 Kolbe and Tye raised the potential for asymmetric regulatory risk under US regulation when a state statute was used to retrospectively deny retrospective recovery of asset value to the Duquesne Light Co. under a new “used and useful” test. In 1999, Kolbe, Tye and Myers raised a more detailed argument that US-style regulation opened up regulated firms to asymmetric risk because large potential losses could be incurred when a utility was disallowed recovery of costs for investments deemed by the regulator to be “imprudent” or not “used and useful”. Large positive returns, however, would be subject to claw-back by the regulator. This analysis is not applicable to the regulatory framework operating for gas networks in Western Australia.

2.3 Conclusion

The submissions made by Alinta and KPMG that the role of the regulator is not to set the terms and conditions of Alinta’s proposed Access Arrangement, but rather to assess whether the Access Arrangements falls within reasonable bounds is not well supported in respect of the rate of return. The Code requires that a best estimate of the rate of return be arrived at.

The considerations of the Productivity Commission in respect of “regulatory truncation” have been influenced by arguments formulated in the US in the context of a different regulatory framework, and are not applicable to the incentive-based framework operating under the Code.

¹² Kolbe, A. Lawrence and William B. Tye (1991), “The Duquesne Opinion: How Much ‘Hope’ is There for Investors in Regulated Firms?” *Yale Journal on Regulation*, Vol. 8, No.1, Winter, pp.159-165. Kolbe, A. Lawrence, William B. Tye, and Stewart C. Myers (1999), *Regulatory Risk: Economic Principles and Applications to Natural Gas Pipelines and Other Industries*, Kluwer Academic Publishers, Boston/Dordrecht/London.

Chapter 3

General Methodology

3.1 WACC formula

The WACC formula proposed by Alinta and the KPMG Report is the “Officer WACC”, which has been widely applied in Australia by regulators. The Officer WACC is expressed in post-tax nominal terms and applies a scaling factor (the gamma term) to account for a value attributable to imputation tax credits, which lowers the effective company tax rate.

The approach adopted by Alinta and KPMG is consistent with the approach that has been commonly applied in regulatory determinations under the Code throughout Australia.

3.2 Taxation and transformation issues in deriving a pre-tax WACC

The KPMG Report notes that the ACCC and the Essential Services Commission in Victoria have been concerned about the potential for use of a real pre-tax real WACC as a rate of return in determination of Reference Tariffs to over-compensate the owners of infrastructure assets due to tax benefits that are not considered in determination of the pre-tax WACC. The alternative approach is to model the tax effects explicitly in cash flows and apply a post-tax nominal analysis.

KPMG and Alinta have used a real pre-tax WACC. An issue, therefore, is how the transformation of a post-tax nominal WACC to a pre-tax real WACC should be undertaken.

KPMG and Alinta submit that the post-tax nominal WACC should be converted to a pre-tax real WACC by applying the “forward transformation” methodology. Under this methodology the Officer WACC is grossed up by one minus the statutory corporate tax rate to obtain the pre-tax nominal WACC, and this is then adjusted for inflation using the Fisher Relation. An alternative approach is the “reverse transformation”, under which the post-tax nominal WACC is first deflated to obtain a post-tax real WACC, and then converted to a pre-tax real WACC by grossing by a factor of one minus the tax rate. The reverse transformation would result in a lower current revenue stream to a Service Provider.

The KPMG Report argues strongly for application of the forward transformation approach on the grounds that changes to tax rules following the Ralph Taxation Review mean that over time the effective tax rate (taking account of tax depreciation) and regulatory tax rate should converge. As a result, the forward transformation has become a less biased estimate of the target post-tax nominal return (ie. where asset lives are aligned for regulatory and tax purposes).

The approach adopted by KPMG and Alinta to specify a rate of return as a pre-tax real WACC and to use the forward transformation approach to determination of the pre-tax real WACC from the Officer post-tax nominal WACC is consistent with the approach previously applied in Western Australia by the predecessor to the Economic Regulation Authority, for the same reasons as put forward by KPMG.

The KPMG Report submits that the corporate tax rate applied in determination of the WACC should be the statutory corporate tax rate. This is also consistent with past regulatory practice in Western Australia and elsewhere in Australia.

Chapter 4

The Risk Free Rate of Return and Inflation

The KPMG Report submits that the ten-year Commonwealth Government Bond is the proxy for the risk free rate that is commonly applied by regulators in Australia. The real risk free rate has been estimated by interpolating between the August 2010 and August 2015 Index Linked Government Bond Yields.

The KPMG Report submits that due to the potential volatility of market anomalies occurring on a single day, it is more appropriate to measure the risk free rate over a 20-day sampling period. This averaging approach has been applied extensively by other regulatory bodies in Australia, including the Essential Services Commission of Victoria, the Independent Pricing and Regulatory Tribunal of New South Wales, the Queensland Competition Authority and the predecessor to the Economic Regulation Authority in Western Australia.

The KPMG Report estimates an expected rate of future inflation by applying the Fisher Relation to solve for implied inflation after inputting the nominal and real risk free rates.

Alinta's (and KPMG's) proposed approach for determination of the risk free rate and inflation are in line with past regulatory practice in Australia and in Western Australia. It has been past practice in Western Australia to apply a 20-day averaging period and to use the ten year Indexed Linked Government Bond Yield as the proxy for the real risk-free rate.

The KPMG Report calculates a nominal risk free rate of 5.9 percent, averaging the implied returns on the benchmark May 2013 Commonwealth Government Bond over 20 days to 9 December 2003. A real risk free rate of 3.6 percent is estimated by KPMG by interpolating between the August 2010 and August 2015 Index Linked Government Bond yields and averaging over the 20 trading days to 9 December 2003. KPMG thus derives an estimated expected inflation rate of approximately 2.2 percent as at 9 December, 2003.

Applying the same methodology, averaging over the 20 business days to 29 April 2004, and interpolating between the August 2010 and August 2015 Index Linked Government Bond yields, nominal and real risk free rates of 5.75 percent and 3.29 percent respectively are derived with an implied expected inflation rate of 2.38 percent.

Chapter 5

Market Risk Premium

5.1 Proposed Market Risk Premium

Alinta has proposed a MRP of 7.0 percent, which is supported by the KPMG Report.

In its analysis for Alinta Networks, KPMG concludes:¹³

KPMG considers that the value of the MRP should be estimated by reference to the long term historical average MRP. The evidence reviewed in this report indicates that there is strong support for an MRP in the range of 6% to 8%.

It appears, however, that KPMG's views on the issue of the MRP have changed very recently. In its advice provided to AGL Gas Networks Ltd a month earlier than the report to Alinta, in February 2004, KPMG argued for a 6 percent MRP as follows:¹⁴

Based on the evidence reviewed, KPMG believes that 6% represents a reasonable point estimate for the MRP. The historical-based evidence we have reviewed in this report, particularly those [sic] spanning long time periods, supports this view. We believe that a point estimate of 6% – which is at the low end of the observed historical average range – would reflect a conservative estimate that takes into account the possibility that the current MRP may be lower than that indicated by long term historical averages. It is also consistent with regulatory precedents on this parameter.

5.2 Empirical evidence – long term historical averages

In recommending a MRP of 7 percent, the KPMG Report cites empirical evidence drawn from the Australian Graduate School of Management (AGSM), Professor Bob Officer and Dimson, Marsh and Staunton that the historical market risk has generally been in the range of 6 percent to 8 percent over various periods. In support of a MRP of 7 percent, Alinta further relies in part on an unpublished paper by Professor Robert Bowman, who claims that with respect to Australia, “much of the historical data on the market risk premium is of limited use.”¹⁵ Bowman argues that for most of the last 100 years Australia's market was not open to the world in the same way as the US market was, and suggests adding a subjective “risk premium” to a historical measure of the US MRP.¹⁶

High volatility of the market risk premium “in the recent past” is commented upon by the KPMG Report. In recent decades lower MRP averages have been observed, however, on a statistical analysis it is argued that it is not possible to determine that this is a permanent reduction. The KPMG Report submits that the “tech wreck” and “September 11th” have made it more difficult to assume that risk has fallen.

The submissions of KPMG highlight one of the major problems inherent in reliance on historical data to measure the MRP as explained below.

¹³ KPMG (March 2004), p. 26.

¹⁴ KPMG (February 2004), *AGL Gas Networks Ltd: Weighted Average Cost of Capital* p. 22.

¹⁵ Bowman, Robert (1999), “Estimating the Market Risk Premium: The difficulty with Historical Evidence and an Alternative Approach, Department of Accounting and Finance, University of Auckland, cited in Access Arrangement Information, p.53.

¹⁶ Bowman, Robert, (Spring, 2001), “Estimating Market Risk Premium,” *JASSA*, No.3.

Table 5.1 shown below summarises the Australian historical data on the realised historical MRP that has been compiled by Professor Robert Officer. The averages have a relatively large standard error of the mean. With a standard error of 1.55 percent, the 95 percent confidence interval for the realised MRP lies between 4.3 percent and 10.4 percent. It is apparent that more recent measurements of the realised MRP have been lower than in earlier periods.

Table 5.1

HISTORICAL REALISED MARKET RISK PREMIUM IN AUSTRALIA

Time Period	Equity Premium: Returns	Standard Deviation	Standard Error of the Mean
1882-2001	7.19%	16.97%	1.55%
Differing Ending Point			
1882-1950	8.00%	11.11%	1.34%
1882-1970	8.16%	13.70%	1.45%
1882-1990	76.40%	17.33%	1.66%
Different Beginning Point			
1900-2001	7.14%	17.94%	1.78%
1950-2001	6.51%	22.60%	3.13%
1970-2001	3.37%	24.38%	4.31%

Source: ESC (October 2002), p.324 (first three columns from R.R Officer)

If risks increase, or there is a stock market collapse, the consequent reduction in returns lowers the observed historical record, implying that the MRP has *fallen*, rather than risen. Also, if the tech-wreck and September 11th risk indicators pointed to by KPMG are given full weight, we should expect that the risk of the US economy has increased relative to Australia due to the much higher percentage of the US economy accounted for by the information technology sector. This, however, runs counter to the arguments presented by Alinta that the relative risk of the Australian stock market is higher than for the US stock market.¹⁷

There are several difficulties inherent in inferring the appropriate forward-looking MRP from historical data of stock market returns. First, at different times the stock market may be a better or worse proxy for the returns generally available in an economy. Second, the size of the MRP is dependent on the absolute level of risk represented by the stock market proxy, which will be determined in large measure by the industrial structure of stock market's composition. One hundred years ago the Australian stock market was much more highly dominated by resources stocks.

¹⁷ Access Arrangement Information, p53.

KPMG has relied in part on the empirical study by Dimson, Marsh and Staunton in using historical observations of the MRP as a basis for recommendations for Alinta. However, this study does not support the complete reliance on the historical MRP that is advocated by KPMG. The KPMG Report adjusts Dimson *et al*'s historical MRP over bills to an MRP over bonds to a number of 7.1 percent, which is adjusted downwards 'to reflect "today's best guesses about future equity market volatility levels."' KPMG (p.23) submits further that:

The authors [Dimson *et al*] then examine the historical risk premium over the first and second half of the century and note a decline in the second half. Based on this observation they postulate reasons and suggest that the premium may now be lower. Interestingly, however, they note that Australia was the exception – the market risk premium in the second half of the century was not lower.

This line of argument by KPMG, which suggests that while the MRP may be declining in the rest of the world Australia is an exception, misrepresents the approach taken by Dimson *et al*. An examination of the Dimson *et al* article referred to by KPMG reveals that the authors were making a point diametrically opposed to that attributed to them by KPMG. Dimson *et al* actually wrote the following:¹⁸

Over the first half-century the US equity risk premium had an arithmetic average of 6.5%, whereas the second half gave rise to a 9.0% risk premium relative to treasury bills. This pattern is common to most of the twelve countries we study in the Millennium Book. (The exceptions are Australia, Canada and Italy – and Germany because of its interwar hyperinflation.)

A similar point can be made with respect to KPMG's inferences drawn from the references of Dimson *et al* to a survey of 226 financial economists undertaken by Welch.¹⁹ The survey is said to have produced a forecast MRP for the next 30 years of approximately 7 percent. The KPMG Report concludes that, "by inference the market risk premium for Australia would be expected to be at least this level." According to the KPMG Report this estimate within the 6 percent to 8 percent range "does not signify a view by academics that the equity risk premium in the US has fallen to a range of 5 percent to 7%." The following quote from Dimson *et al* is made by KPMG to support this line of argument:

These survey figures represent what is being taught in the world's leading business schools and economics departments. As such they will also be widely used by finance professionals and corporate executives. Similarly they will be cited by regulators and used in rate-of-return regulation disputes.

However, this selective quotation does not represent the thrust of the argument presented by Dimson *et al*, who continue as follows:

Whether a mean of 7% is correct is quite another matter... Clearly, history can be no more than a starting point for predicting the equity risk premium. Financial economists may be reluctant to diverge markedly from the historical mean. Decision-makers, on the other hand, cannot rely merely on the average premium observed from past observations. They correctly wish to go beyond using only the past, and to identify the market's implicit expectation for future performance.

¹⁸ Dimson, Elroy, Marsh, Paul and Mike Staunton (2000), "Risk and Return in the 20th and 21st Centuries," *Business Strategy Review*, Vol. 11, Issue 2.

¹⁹ Welch, Ivo, (2000), "Views of Financial Economists on the Equity Risk Premium and Other Issues", *Journal of Business*, 17, pp. 501-537.

There can be no doubt as to the implications of the Dimson *et al* study. They conclude that, “the arguments above all lean in one direction, namely that the historical risk premium is likely to exaggerate investors’ current required equity risk premium.” There have been numerous factors suggesting a decline in the MRP over the past century. These factors are discussed at length in a recent study by The Allen Consulting Group commissioned by the ACCC.²⁰ Given the changing structure of Australian industry over the past century, the marked reductions in transaction costs and the globalisation of Australia’s financial sector in the past twenty years, it is not appropriate to rely simply on the historical record to estimate the current forward-looking MRP.

5.3 Views of Australian academics

The KPMG Report (pp.25-26) also provides the views of several Australian academics on the MRP, noting that they have recommended a range of 6 percent to 8 percent. Dr Neville Hathaway is quoted as recommending an expected MRP of 6.6-7.0 percent. Dr Garry Twite is quoted as recommending an average MRP, adjusted to exclude October 1987, of 6.4 percent. Professor Stephen Gray is quoted as supporting an MRP of 7.3 percent. However, these views are not shared by all Australian academics. The KPMG Report does not cite the views of Professor R.R. Officer, whose advice on behalf of SPI PowerNet notes:²¹

A figure of 6% is commonly used in Australia and the US by regulators and academics, although some market participants use more recent data and subjective measures to justify using a lower MRP figure.

Professor Kevin Davis, another Australian academic, has concluded that the ex ante MRP is “between 4.5 to 7 percent, with figures at the lower end of that range probably more applicable.”²² Clearly there is a divergence of opinion amongst Australian academics on the appropriate value of the MRP.

The KPMG Report refers to the findings of Professor Stephen Gray, who concluded that “there is no statistical basis for concluding that there has been a reduction in the market risk premium in recent years.”²³ Gray found that the historically realised MRP in Australia was 8.2 percent between 1883 and 1970, but only 4.8 percent between 1970 and 2000. Applying a T-test for statistical significance, Gray was unable to reject the null hypothesis of no difference in the means of the MRP over these two time periods.

²⁰ The Allen Consulting Group (March 2004), *Review of Studies Comparing International Regulatory Determinations*, Report to the Australian Competition and Consumer Commission.

²¹ Officer, R. R. (28 February, 2002), “A Weighted Average Cost of Capital for a Benchmark Australian Electricity Transmission Business,” A Report for SPI PowerNet.

²² Davis, Kevin (18 March 1998), *The Weighted Average Cost of Capital for the Gas Industry*, Report Prepared for: Australian Competition and Consumer Commission and Office of the Regulator General.

²³ Gray, Stephen (2001), *Issues in Cost of Capital Estimation*, submission to the Office of the Regulator General (Essential Services Commission of Victoria).

However, the test conducted by Professor Gray is flawed for two reasons. First, it is flawed because it compares two very different Australian industrial structures. During the earlier period the Australian stock market was much more dominated by resource stocks, whilst in the latter period it has become more diversified. By contrast, the US stock market around 1900 was dominated by railway stocks and over recent decades has been transformed by the growth of a large high risk Information Technology sector. In the first half of the century Australia's realised MRP was higher than that of the US, while in the second half of the century the realised MRP of the US was higher than Australia's.

The second flaw in Professor Gray's analysis lies in the fact that standard errors associated with measurement of the historically realised MRP are so high that it is likely that there is no statistical basis for concluding that there is any difference between the MRP of Australia and the US. Therefore, accepting the view that there is no statistical evidence to suggest that the MRP has fallen in the past three decades may be seen as equivalent to the proposition that there is no statistical evidence to suggest any difference between the Australian and US realised historical MRPs.

5.4 The Dividend Growth Model

Neither the KPMG Report nor the Alinta consider the alternative approach of deriving an estimate of the market risk premium from the dividend growth model. Alinta (p.52) only cites the argument made by Professor Stephen Gray that:

Historical estimates of the market risk premium are more precise than estimates based on the [dividend] growth model, which is the primary theoretical model entertained by Australian regulators.

Australian studies deriving point estimates of the MRP using the Dividend Growth Model have been undertaken by Professor Kevin Davis (4.5 percent to 7 percent), Associate Professor Martin Lally (5.7 percent) and Professor Stephen Gray (5.63 percent to 5.93 percent). However, these studies all assume that real dividend per share growth can be proxied by the real GDP growth rate. Each study assumes that the average forward-looking GDP growth rate for Australia will be around 3.5 percent. It is likely that due to the issue of new shares required to fund GDP growth, the real growth rate of dividends per share will be considerably lower than the real GDP rate. Hence the average values obtained in these studies could be over-estimates of the forward-looking MRP applying the dividend growth model approach.

In the US, Fama and French applied a related methodology to estimate the expected capital gain in the US over a 129 year period using historical data found MRP estimates of 4.4 percent and 3.8 percent for the periods 1872-2000 and 1951-2000 respectively. They concluded as follows:

Our main message is that the unconditional expected equity premium of the last 50 years is probably far below the realized premium.²⁴

²⁴ Fama, Eugene F. and Kenneth R. French (April 2002), "The Equity Premium," *Journal of Finance*, Vol. LVII, No. 2, pp. 658.

5.5 Inter-country comparisons

Alinta refers to a submission from Professor Stephen Gray to the Productivity Commission²⁵ that cites a paper by Professor Robert Bowman, which argues that the historical data in Australia is of limited use because until recently the Australian stock market was not integrated with international markets. According to Bowman, “the common practice of basing an estimate of MRP in Australia on historical MRP outcomes is fundamentally flawed.”²⁶ Therefore, Bowman argues, the “forward-looking US MRP ... point estimate of 7.5 percent” should be adopted as a proxy, with the addition of a margin of 0.3 percent to reflect additional “market risk” due to Australia’s higher composition of high-risk resources stocks.²⁷ However, this approach, as noted by Gray, “is based primarily on conjecture and qualitative arguments rather than firm empirical evidence.”

International comparisons of historical MRPs highlight the problem of adopting the historical MRP as an indicator of the forward-looking MRP. Canada’s stock market has roughly the same composition of resources stocks as Australia, and its historically realised MRP over the last 101 years has been lower than that of Australia and the US. Canada also has a sizeable information technology sector, which would tend to make it a still riskier stock market.

Alinta quotes Professor Stephen Gray, who concludes that:

“To adopt a market risk premium less than 6%-7% is to ignore the equilibrium outcome that reflects the collective wisdom of the market over the past 100 years.”

However, the historical outcome does not necessarily reflect expectations. It is doubtful that, at the beginning of 1900, investors in Denmark expected that the realised MRP of in the Danish market over the next 101 years would be only 3.3%, or that having realised such an MRP, Danish investors today expect to earn only 3.3% on their investments.

With the changing structure of the Australian stock market, we should expect to see different levels of expected returns on average over time. In recent decades the Australian stock market has become more diversified, with a relatively lower dependence on the resources sector.

Table 5.2 below is drawn from further work of Dimson *et al.*,²⁸ which contains the most comprehensive international comparison of long-term realised historical MRPs. The record shows that historical performances of economies vary considerably over time. During the first half of the century both Australia and Canada, which were relatively more dependent on resources at the time, outperformed both the US and the UK. During the second half of the century the UK and US both outperformed Australia and Canada. Thus, in the US and UK, where leading academics, business practitioners and regulators have argued that the prospective MRP has fallen over recent decades, the realised historical MRP has been rising. In fact, one reason for the rising realised MRP is precisely that the forward-looking MRP (and therefore the equity discount rate) has been falling.

²⁵ SFG Consulting (5 September 2003), *Issues in Cost of Capital Estimation*. Attachment to Allgas submission to the Productivity Commission Inquiry into the National Gas Code.

²⁶ Bowman, Robert (Spring, 2001), “Estimating the Market Risk Premium”, *JASSA*, 3, p.13.

²⁷ Bowman, Robert (2001), p.13.

²⁸ Dimson, Elroy, Paul Marsh and Mike Staunton (2002), “Triumph of the Optimists: 101 Years of Global Investment Returns”, Princeton University Press, Princeton New Jersey and Oxford.

Table 5.2

HISTORICAL EQUITY PREMIUM OVER BONDS (GEOMETRIC)

	Australia		United States		United Kingdom		Canada	
From	1900	1950	1900	1950	1900	1950	1900	1950
To								
1909	11.3		7.5		2.0		6.1	
1919	10.1		4.7		5.3		7.3	
1929	10.1		5.5		3.8		7.4	
1939	7.5		2.8		2.0		4.4	
1949	6.6		3.4		2.1		4.5	
1959	8.1	16.3	5.8	18.3	4.3	16.4	6.1	14.8
1969	8.4	12.9	5.9	12.4	4.9	12.2	6.3	10.4
1979	7.4	8.8	5.3	8.5	4.6	9.1	6.0	8.5
1989	7.2	8.1	5.1	7.2	4.9	8.6	5.2	6.1
2000	6.3	6.1	5.0	6.6	4.4	6.8	4.5	4.5

Source: Dimson, Marsh and Staunton (2002)

5.6 Other evidence on the market risk premium***Views of practitioners and market participants***

What is most important for the pricing of equity in the market is what practitioners and the market participants, including institutional investors, believe the MRP to be and factor into investment decisions. However, it may be difficult to derive what MRP is factored into analyses undertaken in the market as the vast majority of this work is confidential. Professor Officer cites a Jardine Capital Partners survey of professional market participants' MRP views.²⁹ The average of participants' views on the historical MRP was 5.87 percent, with expectations about the future MRP about 1 percent below this level.

International evidence

Alinta submits that support for a higher regulatory MRP in Australia has been provided by a recent analysis of international rates of return conducted by NECG.³⁰ The main finding of the NECG Report can be summarised by the following passage:³¹

There is no evidence of excessively generous returns in the electricity distribution and transmission sectors, nor in the gas distribution sector – particularly against the U.S. Across all sectors where there are US comparators US decisions provide higher margins above the risk free rate than those in Australia and other countries.

²⁹ Jardine Fleming Capital Partners Limited, (September, 2001) *The Equity Risk Premium – An Australian Perspective*, Trinity Best Practice Committee.

³⁰ Access Arrangement Information submission, p.54.

³¹ NECG (September 2003), *International Comparison of WACC Decisions*, Submission to the Productivity Commission Review of the Gas Access Regime.

The results of the NECG Report have been questioned in an ACG study that found numerous methodological flaws and use of some potentially biased data.³² For example, the US comparators employed by NECG were predominantly drawn from the short period after the collapse of the S&P 500 index in 2000 when the equity margin over government bonds was temporarily high. During this period the cost of capital did not fall as far as indicated by the equity margin, and this was recognised by regulators. In comparing Australian with UK regulatory determinations, the NECG Report made an arbitrary adjustment of up to 2.5% to the MRP actually allowed in the UK without making a concomitant downward adjustment to the beta used by UK regulators. Such methodological flaws undermine the comparisons undertaken by the NECG Report.

International comparisons of the kind attempted by NECG are fraught with difficulty. The more important question for regulated utilities is whether the rate of return promised under regulation is adequate to sustain and attract new investment. The report by The Allen Consulting Group demonstrates that in the context of a 6 percent MRP applied by regulators, Australia's energy infrastructure companies and the utilities index have strong investment fundamentals, indicating that a lack of investment attraction is not an issue.

5.7 Conclusion

There is a divergence of opinions among academics and market practitioners about the appropriate level of the forward-looking MRP. Historical evidence on the MRP varies over time, and between countries. From the analysis of Dimson *et al*, who present the most comprehensive study of MRPs across 16 countries for 101 years, it is apparent that Australia's relatively large historically *realised* MRP, like that of the US, is a result of past successes that may not be repeated. During the first half of the 20th century Australia's market was dominated by successful resources stocks, and its realised MRP has fallen during the last 50 years. The successful performance of the US market during the last 50 years has been driven by technology stocks and branded capital and consumer goods. The past exceptional performances of the US and Australia cannot be construed to indicate that forward-looking required returns in these economies should be much higher than in the bulk of the other 16 countries analysed by Dimson *et al* (eg Denmark's realised MRP of 3.3%). For example, Dimson *et al* propose a current forward-looking MRP of 3.7 percent for the UK and 5.4 percent for the US, which are lower than their respective historical MRPs.

There are numerous factors indicating that the MRP should have fallen over time. This suggests that application of MRPs historically experienced in Australia and the US are likely to over-estimate the forward-looking MRP. On the other hand, there is insufficient robust market evidence to conclude that the MRP is significantly below 6 percent, as suggested by alternative models such as the Dividend Growth Model. It is concluded that adopting an MRP of 6 percent is consistent with existing regulatory practice in Australia, and is at a level that, other things being equal, will continue to attract investment to Alinta. Currently, there is no firm justification for applying an MRP that is different from 6 percent.

³² The Allen Consulting Group (March, 2004), *Review of Studies Comparing International Regulatory Determinations*, Report to the Australian Competition and Consumer Commission.

Chapter 6

Beta

The KPMG Report notes the difficulties associated with estimating equity betas for companies, particularly if they are not listed on the stock market. If a company is not listed, it is necessary to infer the appropriate beta based on proxies, i.e. companies in the same or similar lines of business. In 2000, regulatory decisions had to rely almost exclusively on international proxies when considering Australian gas pipeline companies. However, there are difficulties in making international comparisons of beta estimates, due to differences in market composition and market gearing.

A review of recent Australian regulatory decisions in the gas pipeline sector by KPMG indicates an average equity beta of 1.04. KPMG's review of recent regulatory equity betas for electricity networks also derives an average of around 1.0.

The KPMG Report also provides recent market evidence on betas for 39 "comparable companies", from several countries: Australia (4 companies), the US (22 companies), Canada (4 companies) and the UK (3 companies). Whilst KPMG does not provide information to support the comparability of companies in the sample, from a cursory examination it is apparent that a number of the companies included as comparables in the KPMG sample are not appropriate proxies for Alinta's gas distribution activities. For example, El Paso Corporation is included by KPMG and has an equity beta of 2.32 against the US market. Each of El Paso's major operations, pipelines, gas and oil exploration and production, and energy commodity trading contributed about a third of the company's earnings before interest and tax (EBIT) in 2001.³³ The overall beta estimate of El Paso can be expected to be much higher than its pipeline operations due to its significant higher risk, non-pipeline operations. Therefore, limited reliance can be placed on KPMG's methodology and empirical results in the absence of a more thorough review of the actual comparability of the companies.

Table 6.1 below displays equity beta estimates for Australian gas pipeline operators reported in the KPMG Report and more recent estimates derived from Bloomberg Financial Services. Equity beta estimates are generally variable over time. The KPMG Report's reported equity betas for comparable Australian gas pipeline companies are on average considerably lower than those recently sourced from Bloomberg and published in a recent report by Deloitte Touche Tohmatsu in connection with the United Energy Limited Scheme of Arrangement.³⁴ The higher estimates achieved by Bloomberg are partly due to the fact that they use more recent data than the AGSM data relied upon by KPMG, and partly to the adjustment procedure that is followed by Bloomberg.³⁵

³³ ACG (July 2002), *Appendix A: Company Descriptions*, p. 17.

³⁴ Deloitte Touche Tohmatsu (27 May 2003), *United Energy Limited – Independent Expert's Report in Relation to Proposed Scheme of Arrangement*.

³⁵ Bloomberg achieves its adjustment by a 33% weighting for 1.00 and a 67% weighting for the raw beta. In its analysis of proxy betas ACG (July 2002) recommends against the use of such adjustments.

Table 6.1

BETA ESTIMATES FOR AUSTRALIAN GAS PIPELINE COMPANIES

Company	Equity Beta vs. ASX^a	Equity Beta^b
Estimation Date	March 2003	May 2003
Australian Gas Light	0.06	0.25
Alinta	0.20	0.52
Australian Pipeline Trust	0.77	0.64
Envestra	0.34	0.41
GasNet		0.58

Source: a) KPMG AGSM Risk Measurement Service, March 2003; b) Deloitte Touche Tohmatsu, May 2003, Bloomberg

The KPMG Report also references a report by The Allen Consulting Group on proxy betas for gas transmission businesses.³⁶ This report concluded that on the basis of evidence available in 2002, a regulatory beta of 0.70 could be justified assuming debt gearing of 60 percent. However, due to the fact that estimates drawn from several markets at the time appeared to be below those experienced in the longer term, the report expressed the view that caution should be exercised. Hence, it was recommended that the equity beta not be reduced below 1.0 as sufficient quality of evidence did not exist at the time.³⁷

The events of the “tech stock” boom and bust have had an influence on utility stock betas in most major markets. As discussed in the report of The Allen Consulting Group on proxy betas, recent empirical evidence is of an uncertain quality due to proximity to a major stock market disruption. In the future, it is expected that empirically determined beta estimates will be more reliable. Currently, however, it is not clear that empirical estimates demonstrate the desired level of robustness to apply them explicitly in the derivation of a regulatory beta for Alinta’s gas network operations.

There is some evidence that market practice appears to be guided by currently observed levels of equity betas. A recent example was provided in the Expert’s Report on United Energy furnished by Deloitte Touche Tohmatsu. Based on the Bloomberg evidence and industry experience, Deloitte concluded that for valuation purposes an appropriate asset beta is 0.35 to 0.40, resulting in a levered equity beta estimate of 0.55 to 0.60 for United Energy. It should be noted, however, that United Energy, as well as the other comparables, had non-regulated activities which serve to distort the implications for Alinta’s gas network operations.

³⁶ The Allen Consulting Group, (July 2002), *Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities*, Report for the Australian Competition and Consumer Commission.

³⁷ The Allen Consulting Group, (July 2002), p.42.

The KPMG Report develops its case for adopting an equity beta of 1.0 on the basis of regulatory stability and practice, rather than on empirical evidence. Part of KPMG's reasoning in adopting a recommended equity beta of 1.00 for Alinta is the fact that in 2002 the Essential Services Commission in Victoria estimated a 1.00 equity beta for the Victorian gas distribution businesses that recognised both the current empirical evidence for a lower equity beta value, but also the limited robustness of this evidence and a cautionary approach to reducing assumed beta values in the light of this evidence.

In support of a regulatory equity beta of 1.0 for Alinta's Access Arrangement, the KPMG Report (pp.35-36) submits that whilst an equity beta of 1.0 may appear high since it is equal by definition to the average level of beta risk of the market, this is not the case. It is explained that gas utilities such as Alinta are generally more highly geared than the average company in the market. It is the higher gearing of utilities relative to non-utilities that increases their relative equity beta, even though their asset beta can be expected to be lower than that of the average company.

The Allen Consulting Group considers this to be a well-founded general proposition, but one that needs to be reviewed empirically given the potential for levels of market gearing to change over time.

In conclusion, the empirical evidence in support of an equity beta of 1.0 as provided by the KPMG Report is not strong. KPMG's evidence is based on some data observations that are not comparable with the gas network operations of Alinta. Whilst some more recent empirical evidence for Australian gas pipeline companies sourced from Bloomberg by Deloitte provides more consistent estimates which are still significantly less than 1.0.

However, while market evidence continues to suggest that the equity beta of traded comparable companies could be substantially less than 1.0, The Allen Consulting Group agrees with KPMG that an equity beta of 1.0 is reasonable at this time in the absence of rigorous evidence indicating another value is more appropriate.

Chapter 7

Gearing

The KPMG Report (pp.37-38) recommends an assumption of a 60 percent regulatory gearing level for Alinta, reflecting a combination of empirical evidence and regulatory precedent. The regulatory precedent from decisions under the Code by Regulator's Australia wide is an assumption of 60 percent gearing. KPMG provides a table, sourced from Aspect Financial Ratio analysis that indicates an average gearing level of around 55 percent for the years 2000-2003 for five Australian gas pipeline operating companies including Alinta. Table 7.1 below provides more recent data sourced from Bloomberg Financial Services, which corroborates the results reported by KPMG.

Table 7.1

AUSTRALIAN GAS PIPELINE COMPANIES: TOTAL DEBT/ENTERPRISE VALUE

Company	2000	2001	2002	2003	Current (2004)
AGL	36.0%	46.0%	38.7%	28.5%	
Alinta		39.1%	33.8%		22.1%
APT		55.0%	57.6%	51.8%	53.7%
Envestra	84.4%	81.6%	78.0%	72.8%	72.6%
GasNet		73.1%	71.1%		66.7%
Average	60.2%	59.0%	55.8%	51.0%	53.8%

Source: Bloomberg Financial Services

Companies with unregulated assets will generally have lower gearing due to the higher volatility of cash flows. Since some of the companies shown in the table have significant unregulated assets, it is reasonable to expect the gearing relating to regulated activities to be higher than observed for the whole company. Hence, it would appear that based on the evidence, KPMG's recommended gearing assumption of 60 percent debt to assets is reasonable.

Chapter 8

Debt Margin

The KPMG Report (p.38-39) submits that a debt margin of 1.4 percent to 1.8 percent over the risk free rate is appropriate, yielding a mid-point estimate of 1.6 percent. This rate is derived by the sum of three components:

- the raw debt margin of 105 to 116 basis points based on the average over 20 days of CBA Spectrum rates for bonds rated BBB+ and BBB respectively;
- an allowance of 20 to 50 basis points for CPI swap hedging costs; and
- an allowance of 12.5 basis points for debt raising costs.

A number of issues may be raised with respect to KPMG's approach.

Firstly, the range of bond ratings from BBB+ to BBB is not appropriate since a regulated utility with 60 percent gearing is most likely to be rated at BBB+. This is corroborated by advice obtained by SPI PowerNet from investment bank UBS Warburg.³⁸

The second issue is that KPMG relies on data obtained from the CBA Spectrum service provided by the Commonwealth Bank. KPMG submits that over the 20 days to 9 December 2003, the CBA Spectrum rate for 10 year BBB+ rated bonds was 105 basis points.

Caution must be exercised in relying upon the CBA Spectrum indicator rates, which are not actual market observations but rather a prediction of yields based on an econometric model. The market observations upon which the predictions are based are very thin. Currently, only three corporate bonds in the CBA Spectrum database are rated BBB+ and only one of these has a term in excess of 4 years. Since 1998, the 10 year rate for BBB+ has fluctuated widely from over 250 basis points to around 100 basis points, and is currently near a 5 year low. Since it is based on a statistical model, it is not clear that taking a point estimate is appropriate for setting terms on 10-year debt securities.

However, KPMG's derivation from CBA Spectrum indicator rates of a raw debt margin of 105 basis points is supported by other evidence. The margin of 105 basis points is close to margins for the same security class observed at the end of April 2004. It is also consistent with some recent transactions in the market. In September 2003 the Australian Pipeline Trust completed an issue of US and Australian bonds at an average tenor of 11 years at an "all in" cost of BBSW+94 basis points.³⁹ Currently, the longest tenor BBB+ rated bond is Snowy Hydro, with a 9 year maturity, trading at BBSW+89 at 3 May 2004. With BBSW currently at 5.63 percent, this is around 60 basis points above the current 10 government bond rate, or around 80 basis points above the average 10 year government bond rate calculated over the 20 business days to 29 April 2004.

³⁸ Letter from Nick Wade, Director, Credit Research, UBS Warburg to Jim Lamborn, Treasurer, SPI PowerNet, 28 November 2001.

³⁹ See APT (September 10, 2003) *Press Release – Australian Pipeline Trust completes US \$325 million placement.*

The third issue is KPMG's submission that 20 to 50 basis points should be added for CPI swap hedging costs. It should be noted that a proposal for such an allowance was raised in connection with the Victorian Electricity Price Determination, 2001-05. The proposition was rejected by the Victorian ESC, whose position was subsequently upheld in an appeal against the decision.⁴⁰ A large part of the logic of the appeal decision was that such hedging would impart to the Service Provider benefits that were not netted off elsewhere by the regulator. Hence, KPMG's submission to include CPI swap hedging costs as part of the cost of raising debt is not considered sustainable.

The fourth issue relates to debt issuance costs. The KPMG Report refers to a recent regulatory decision by the ACCC on GasNet to justify a debt issuance cost allowance of 12.5 basis points. This component of the KPMG Report's submission on the debt margin is accepted as reasonable at the current time.

It is concluded that a reasonable estimation of the long run cost of debt is provided by the current margin for BBB+ bonds estimated using the CBA Spectrum service. KPMG's submission of a 105 basis points margin for a BBB+ rated entity is found to be sustainable. On the other hand, KPMG's contention that a range should include the rate for BBB bonds is not sustainable, since a 60 percent geared utility would not be rated as low as BBB. To the base rate of 1.05 percent can be added a 0.125 percent additional charge to reflect debt issuance costs. Therefore, a debt margin of 1.20 percent (rounded up from 1.175 percent) is considered a reasonable estimate of future debt raising costs. A debt margin of 1.20 percent is consistent with a number of regulatory decisions in Australia, is consistent with the DBNGP Decision, and is sustainable in view of CBA Spectrum projections and current market evidence.

⁴⁰ Office of the Regulator-General, (2000), *Electricity Distribution Price Determination 2001-05*, Vol. 1, pp.293-297.

Chapter 9

Valuation of Imputation Credits

“Gamma” measures the value of a dollar of imputation tax credit to shareholders. Within the Officer Model employed by Authority, “gamma” is an important driver of the Reference Tariff required to provide an adequate rate of return to investors. A low gamma implies that shareholders do not obtain much relief from corporate taxation through imputation and therefore require higher pre-tax income to earn a sufficient return to justify investment. In this case the Reference Tariff would therefore need to be higher. On the other hand, other things being equal, a lower pre-tax income (and therefore lower Reference Tariff) would be adequate to attract investment if gamma was higher.

The KPMG Report (pp.42-44) discusses a number of empirical studies that have estimated the value attributed to imputation credits in Australia employing several research methodologies.

The KPMG Report submits that in Australia, regulators have generally adopted a gamma of 50 percent, although the ESC in Victoria and the ACCC have both argued that this represents a minimum value given that most of the empirical research supports values in excess of 50 percent. Regulators have in the past referred to results of studies have provided widely varying estimates of gamma ranging from zero to close to 1, but based decisions on the most commonly cited study of Hathaway and Officer that used the dividend drop-off methodology to derive an estimate of gamma at close to 0.50.⁴¹

The KPMG Report argues that the most important issue with respect to the valuation of franking credits is the identity of the marginal investor who sets the stock price. If the marginal investor is a foreigner, they cannot utilise franking credits, which will therefore have a value of zero to them. Therefore, KPMG (p. 49) holds that “the value of γ is likely to be closer to zero than the 50 percent that is currently being used in regulatory decisions.”

The KPMG Report devotes considerable space to explaining the results of one of the more recent studies of the value of imputation credits undertaken by Cannavan, Finn and Gray.⁴² Cannavan *et al*'s methodology was to derive the value of imputation credits from trading valuations of individual share futures (“ISF”) and Low Exercise Price Options (“LEPOs”) relative to the valuation of their underlying shares. This methodology has the advantage of analysing numerous observations (trades), which allows for statistically more robust results for individual stocks. The results derived by Cannavan *et al* allowed them to conclude that, “for large companies with substantial foreign investment the market value of these tax credits is close to zero.”

⁴¹ Hathaway N. and R.R. Officer (1999), *The Value of Imputation Tax Credits*, Unpublished Manuscript, Graduate School of Management, University of Melbourne.

⁴² Cannavan, D, F. Finn, and S. Gray (2002), *The value of imputation tax credits*, working paper, University of Queensland and Duke University.

In consideration of KPMG's (and thus Alinta's) position on the assumed value of the gamma term, attention needs to be given to the interdependency of the gamma value with assumptions as to the MRP and beta values. As discussed by Associate Professor Martin Lally in a recent paper on the cost of capital and dividend imputation, there needs to be a consistency between the assumptions made about gamma, the MRP and beta.⁴³ With an assumption of segregated capital markets, Lally argues that a domestic model such as the Officer Model should be applied with a domestic MRP of 6 percent, a beta measured against the Australian market index and a gamma value of close to unity.

If internationally integrated markets are assumed, Lally proposes that gamma should be set at zero as the marginal investor will not be able to utilise imputation credits. An international CAPM (ICAPM) model would be appropriate. In this case a world MRP would need to be applied and the beta would need to be estimated against the world index rather than a domestic index. Lally estimates a world MRP of around 4 percent and, a potential reduction in Australia's average beta from 1.00 to around 0.70 measured against the world market. Hence, Lally estimates that the cost of capital under a pure segregated markets assumption would be considerably higher than under an integrated capital markets assumption.

The findings of Lally are supported by other research. Academics and practitioners have found evidence that globalisation has significantly reduced the cost of capital. For example, applying a case study approach, Stulz concludes that, "the overstatement of cost of capital from using the local CAPM for Nestle instead of the global CAPM is on the order of 150 basis points."⁴⁴ For a sample of 126 firms drawn from 32 countries, Vihang and Miller record a 42 percent decline in the cost of capital associated with internationalisation of capital markets, proxied by the introduction of American Depositary Receipts (ADRs).⁴⁵ These results suggest that the difference between the cost of capital based on the domestic CAPM and ICAPM can be significant, so that application of inconsistent assumptions is not appropriate.

The KPMG Report (p.51) acknowledges that the notion of the marginal investor being foreign raises the question that the "domestic CAPM is arguably inconsistent". However, KPMG relies upon the arguments of Associate Professor Stephen Gray to justify continued use of the domestic CAPM in this ostensibly internally inconsistent situation. KPMG cites Gray's contention that "existing empirical research ... suggests that the performance of ICAPM models is superior to that of the domestic CAPM." On the other hand, Gray believes that the ICAPM should be avoided because of the complexity and diversity of such models. Since the choice is great and some ICAPM approaches require a larger number of inputs, debate would escalate. Furthermore, the degree of error that could arise from the use of the "wrong" domestic CAPM (instead of the "right" ICAPM) is about the same as that normally experienced in applying the domestic CAPM.

⁴³ Lally, Martin (June 2002), *The Cost of Capital Under Dividend Imputation*, Report to the Australian Competition and Consumer Commission.

⁴⁴ Stulz, Rene M., (Fall, 1995), "Globalization of Capital Markets and the Cost of Capital," *Journal of Applied Corporate Finance*, 8, No. 3, p.37.

⁴⁵ Vihang, R. Errunza and Darius P Miller, (December 2000), "Market segmentation and the cost of capital in international equity markets", *Journal of Financial and Quantitative Analysis*, 35, Iss. 4, pp.577-601.

Another argument presented in the KPMG Report, which is based on empirical evidence from Expert's Reports, is that common market practice is "to assume that imputation credits are not fully valued or not valued at all."⁴⁶ The main evidence presented to justify this claim is the study by Mr. Wayne Lonergan, which examined 122 expert's reports. Of the 48 reports that indicated how they had derived the WACC, 88 percent used the classical CAPM model, making no explicit adjustment for dividend imputation. However, the KPMG Report does not report the average MRP applied in independent expert's reports or the growth assumptions they made in deriving a "terminal value". Without these data a conclusion cannot be reached about the actual cost of capital assumptions made by practitioners in the market.

As an example, a recent expert's report by Deloitte Touche Tohmatsu valuing United Energy, applied an MRP of 6.25 percent, rejected including gamma, but nevertheless derived an valuation considerably in excess of the regulated asset base, indicating that the actual cost of capital it had derived was less than that applied by the Victorian ORG when it set the Reference Tariff.⁴⁷

In conclusion, The Allen Consulting Group considers that if a domestic Australian CAPM is used to estimate the WACC, then the most appropriate assumption for the gamma value is 50 percent. A value lower than this can be considered internally inconsistent in the context of a domestic CAPM model.

⁴⁶ Lonergan, W. (Autumn, 2001), "The disappearing returns, why dividend imputation has not reduced the cost of capital," *JASSA*.

⁴⁷ Deloitte Touche Tohmatsu (May 2003) *United Energy Limited – Independent Expert's Report in Relation to Proposed Scheme of Arrangement*.