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THE WEIGHTED AVERAGE COST OF CAPITAL FOR GAS TRANSMISSION SERVICES

BENCHMARKING REGULATED AUSTRALIAN AND UK "VANILLA" WACC COMPONENTS

COMMENT ON WACC PROPOSALS BY GASNET AUSTRALIA

FOR BHP-BILLITON

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(Final Version)

EXECUTIVE SUMMARY

The material presented in this report provides a comparison of estimates for the cost of debt and the return on equity indicated by decisions of regulators in the UK and Australia for monopoly utility services in the gas, electricity and water industries. These estimates have been derived using formulae from the simple, "Vanilla" form of the Capital Asset Pricing Model (CAPM) and values judged by each regulator as being appropriate for individual CAPM parameters. All estimates are expressed in common "apples-for-apples" real, post-tax terms.

The comparisons show conclusively that Australian and UK regulators are able to form judgements on the values for estimates of the cost of debt that are, on the whole, both consistent and comparable between regulated industries and countries. That is, regulators judge that debt markets see regulated utilities in the UK and Australia in comparable terms – both between industries and between countries.

However, there is substantial divergence between judgements on values for the return on equity. UK regulators judge that equity markets see regulated utilities in the gas, electricity and water industries in (generally) comparable terms – and come down with estimates for the return on equity that are very close for all three industries. This has not been the case in Australia. The judgement of Australian regulators is that equity is more costly than in the UK, and substantially different for different utilities. We were not able to identify evidence that supports the need for this disparity. It is our view that financial markets would be expected to see regulated utilities in (generally) consistent terms regardless of geographical location.

Given the degree of judgement required in selecting values for the parameters used to estimate return on equity, we believe this is something the ACCC must examine closely. This is particularly the case given the openness of the Australian economy to international financial markets – and the liquidity of those markets.

We conclude that, compared to the UK, Australian regulators are over-reliant on information from regulated companies. Australian regulators also face additional difficulties, compared to the UK, because of a relative paucity of independently collated data that has existed over a sufficiently long period that can be used as a reliable source for informing judgements on values for CAPM parameters.

It is clear that the major cause of the differences for estimates of the return on equity between the UK and Australian regulatory decisions is that Australian regulators have accepted higher values for the market risk premium than do UK regulators; and higher – and much more varied - values of equity beta.

We believe this is an issue that the ACCC must address in its deliberations. Further, we suggest the ACCC can do this by:

- following as closely as possible the precedents set by the UK water industry regulator Ofwat[1] – particularly by seeking input on key financial indicators from widely diverse sources and stakeholders ***not closely aligned with regulated industries***;

[1] We note that there is very little difference in the way Ofwat and OFGEM assess values for CAPM parameters. However, Ofwat provides better explanation of the process it adopts than does OFGEM.

- using an approach similar to that adopted by Port Jackson Partners Ltd[2] to compare judgements on WACC with different forms of information from competitive markets, as this would provide a form of independent "reality check" of judgements made about CAPM parameter values; and

- following up suggestions and recommendations made by NERA[3] in its report to the ACCC on international comparison of utilities' regulated post tax rates of return in North America, the UK, and Australia.

Finally, we suggest the ACCC should review all available material to inform its judgement on these two crucial parameters.

It is our view that the ACCC ***must*** be able to demonstrate that its decision on this matter mimics the outcomes of an effectively competitive market. That is, the ACCC ***must*** demonstrate that WACC is set at the minimum level necessary - ***and no more than this*** - for voluntary commitment from financial markets to the long-term sustainability of ***efficient, well-managed firms*** in a ***single regulated gas transmission industry*** in Australia.

[2] Sims' approach could be more usefully applied by using financial data derived from ***outcomes*** from the incentives in the regulatory regimes. However, we note that only ORG (now the Essential Services Commission) publishes annual performance reports that examine financial matters.

[3] *International Comparison of Utilities' Regulated Post Tax Rates of Return In: North America, the UK, and Australia* , A Report Prepared by NERA, March 2001.

PREFACE

The determination made by the UK Office of Water Services (Ofwat) in 1999 is referred to frequently in this report for a number of reasons.

- Ofwat judged that the relative size of the 10 large Water and Sewerage Companies (W&SCos) justified a significantly lower WACC than other regulated monopoly companies in the UK. This set a new benchmark for WACC in UK-style "incentive" regulatory regimes.
- Ofwat uses the "Vanilla" version of the Capital Asset Pricing Model (CAPM) to estimate real, post-tax weighted average cost of capital (WACC). This version of CAPM (now preferred by the ACCC) avoids the need for complex treatment of tax within CAPM. On the other hand, the UK energy regulator OFGEM uses a version of CAPM with Tax Wedges to estimate real pre-tax WACCs. However, there are few differences between the way OFGEM and Ofwat determine values for parameters required for estimating WACC.
- NECG specifically targeted criticism of Ofwat's 1999 decision in its response to NERA's paper on WACC comparisons prepared for the ACCC. We took NECG's criticisms seriously and have included a (limited) response to those criticisms in this report. We have checked all available material relating to Ofwat's decision and the subsequent appeal to the UK Competition Commission by two of the small WoCs (including material on regulated company and industry websites).
- Ofwat's decision has generated expressions of concern in the UK and in Australia. However, we note that none of the large W&SCos companies appealed the decision. This is strong *prima facie* evidence that Ofwat still left opportunities for these companies to outperform the WACC benchmark.
- Finally, Ofwat's approach to incentive regulation provides useful precedents for promoting acceptance of regulatory outcomes by stakeholders. These include:
  - Seeking information on cost of capital issues from the widest possible range of non-company sources; including a Panel of Industrialists.
  - Publishing regular reports on financial and operational performance of regulated companies that provide particularly useful information for regulators and end-users. Only ORG/ESC does something similar in Australia. We believe all Australian regulators should publish these reports in common format so that they have a better quality resource for making judgements on regulatory issues.

We have not referred to regulatory determinations from the US. The Administrative Court/cost-of-service approach still dominates regulation of monopoly energy utilities in the US. The mechanics of this form of regulation are different to that adopted in the UK and Australia; and the US approach has been extensively criticised in Australia and the UK because it reduces the incentive for regulated companies to reduce their costs. However, we note that NERA did look at outcomes from US regulatory decisions in its report to the ACCC.

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1 INTRODUCTION

This paper provides an end-user focused commentary on the proposal by GasNet Australia (GasNet) that the Australian Competition and Consumer Commission (ACCC) endorse a weighted average cost of capital (WACC) of 9.86% ("Vanilla" nominal post-tax) or 7.19% ("Vanilla" real post-tax).[4] WACC at this level is significantly higher than that endorsed by all Australian regulators since the initial authorisation of the Victorian gas transmission access regime in 1998; and substantially above levels endorsed by UK regulators (see Table 1 below).

Table 1: Comparison of Weighted Average Cost of Capital

WACC PARAMETER		Pre-tax WACC		Post-tax WACC (Vanilla)	
		Nom	**Real**	**Nom**	**Real**
TPA Proposal 1998	Gas Trans	13.02%	9.73%	*10.9%*	*7.7%*
ACCC 1998		*10.4%*	**7.75%**	*9.6%*	*6.9%*
IPART 2000	Gas Dist (mid-range)	*10.8%*	**7.75%**	*9.3%*	*6.2%*
OFFGAR 2000	Gas Dist	10.5%	**7.5%**	9.6%	6.6%
IPART 1999	Elec Dist (mid-range)	*10.7%*	**7.50%**	*9.1%*	*6.1%*
ORG 2000	Elec Dist	*9.8%*	6.8-7.2%	*9.6%*	**6.8%**
QCA 2000	Elec Dist		n/a	**8.05%**	*5.9%*
IPART 2000	Water (mid-range)	*10.0%*	**7.0%**	*8.8%*	*5.8%*
OFGEM 2001	Transco Gas Trans	*8.8%*	**6.25%**	*7.7%*	*5.1%*
OFGEM 2002	Indep Gas Trans	*10.1%*	**6.4-8.5%**	*8.1%*	*5.5%*
OFGEM 1999	Elec Dist	*9.2%*	**6.5%**	*7.7%*	*5.1%*
OFGEM 2000	NGC Elec Trans	*8.9%*	**6.25%**	*7.7%*	*5.1%*
OFWAT 1999	W&S		n/a	*6.9-8.7%*	**4.75%-5.50%**
Monopoly Service Provider Proposals 2002	GasNet/NECG	*10.9%*	8.22%	9.86%	7.19%
	ElectraNet SA/NECG	*11.0%*	8.46%	10.03%	*7.3%*
	SPI PowerNet/Officer		n/a	9.50%	6.89%

1. Figures in **Bold** are used in regulators' decisions. Figures shown in plain text have been taken from regulators' reports.
2. Figures in *Plain Italics* are estimated using CAPM parameter values proposed by regulators and the formula adopted by the Office of the Regulator General in the 2001 Victorian electricity distribution price review. Estimated figures are mid-range values where ranges are quoted in source documents.
3. Ofwat lower-range figures applied to "large" Water & Sewerage Companies (W&SCo); upper-range values applied to "small" Water Only Companies (WoC).[5] The three largest WoCs were assigned WACCs of 5.15%. The smallest "large" W&SCo has a regulated asset base of approximately $3.2 billion. The largest "small" WoC has a regulated asset base of approximately $415 million.
4. GasNet, with a regulated asset base of $540 million in 2002, fits between Ofwat's "large" W&SCo and "small" WoC – but with a very much smaller proposed CAPEX program, has lesser need for access to capital.

The Victorian Office of the Regulator-General (ORG – now the Essential Service Commission) moved to the use of a simple form of the Capital Asset Pricing Model (CAPM) to estimate "Vanilla" real, post-tax values for WACC in the 2001 Victorian electricity distribution pricing review. ORG did this to avoid complications (and confusion) that arise

[4] It is not explicitly clear from the GasNet application that the figures quoted for WACC are post-tax. However, GasNet acknowledges this is the approach preferred by the ACCC. Accordingly, we have assumed that the figures quoted by GasNet are post-tax.

[5] To qualify for the small company premium, the companies were required to amend their licence conditions to guarantee that they are ring-fenced from the rest of the group (p157, *Final Determinations, Future water and sewerage charges 2000–05*, Ofwat, 25 November 1999). Ofwat also included a premium to reflect companies' embedded fixed rate debt which could not be efficiently refinanced in the short term. The premium was company specific, was added to the post-tax cost of capital, applied to existing assets only and ranged up to 0.4%. (p156)

when attempting to account for the cost of tax in the CAPM.[6] This allowed ORG to account for the cost of tax separately, and in a much more transparent manner. Most other Australian regulators have retained a form of CAPM that derives a pre-tax WACC, and model taxation impacts using forward or reverse transformations or "tax wedges" with CAPM.

We understand that the ACCC intends using the "Vanilla" real, post-tax form of WACC in the GasNet access application decision. Accordingly, we have referred to comparisons of WACC and CAPM parameters in terms consistent with that application. Where WACC values in this form have not been provided in regulators' source documents, we have estimated relevant values using the same approach as ORG with input of values for the parameters taken from the regulators' source documents.

ORG's papers show that "Vanilla" WACC (real, post-tax) is estimated using the form of *Equation (1)* below.

$$WACC = R_e \frac{E}{V} + R_d \frac{D}{V} \qquad (1)$$

where: R_e is the (real) required after-tax return on equity, R_d is the (real) cost of debt, E, D and V are the market values of equity, debt and assets respectively (and $V=E+D$).

Alternatively, the "Vanilla" WACC (real, post-tax) can be estimated using nominal values for the cost of equity and debt with *Equations (2)* and then adjusting for the effects of inflation using *Equation (3)* below -

$$WACC_{nom} = R_{e-nom} \frac{E}{V} + R_{d-nom} \frac{D}{V} \qquad (2)$$

where: $R_{e\text{-}nom}$ is the (nominal) required after-tax return on equity, $R_{d\text{-}nom}$ is the (nominal) cost of debt.

$$WACC = \frac{(1+WACC_{nom})}{(1+f)} - 1 \qquad (3)$$

where: f is the expected rate of inflation.

In either case, it is necessary to use the CAPM to estimate a value for the return on equity (or cost of equity). This is done using *Equation (4*) to estimate the nominal, after-tax return on equity, and *Equation (5)* to adjust for inflation –

$$R_{e-nom} = R_f + \beta_e (R_m - R_f) \qquad (4)$$

where: R_f is the (nominal) risk free rate.

β_e is an estimate of the non-diversifiable risk of the equity portion of the regulated assets relative to a well-diversified portfolio of investments capable of eliminating that type of risk.

[6] *Consultation Paper No 4, 2001 electricity distribution price review, Cost of Capital Financing,* Office of the Regulator-General, May 1999. *Electricity Distribution Price Determination 2001-2005, Volume I Statement of Purpose and Reasons,* Office of the Regulator-General, September 2000.

- ***(R_m-R_f)*** is an estimate of the (nominal) market risk premium (or equity risk premium); this is the "cost incurred" (or "reward expected") from holding a well-diversified portfolio of assets compared to holding risk-free investments.

$$R_e = \frac{(1 + R_{e-nom})}{(1 + f)} - 1 \qquad (5)$$

We note that it is not possible to determine the value for the parameters used to estimate the return on equity or WACC by direct observation of financial markets. This is a key issue for regulators. Values adopted by regulators, and regulated companies, for the parameters required for estimating the return on equity are obtained by observing activities in financial markets ***that approximate the theoretical assumptions underpinning CAPM***.

Almost universally, the risk free rate is estimated using information derived from government bond markets – on the basis that government guaranteed bonds are the closet available proxy for risk free investments. Differences between costs/returns offered for inflation-indexed bonds and ordinary bonds are used, typically, to estimate a comparable inflation rate. The cost of debt is then estimated using information derived from observation of debt markets to obtain a "debt margin". The debt margin represents the cost above government bond rates that commercial borrowers must pay to access debt markets.

Generally, the equity beta and the market risk premia are estimated from observation of the performance of listed companies – preferably of similar type and risk – on stock markets. The equity beta is the closest available proxy for an asset beta. We note that ORG says that, *by definition, the well-diversified portfolio of assets has an asset beta of one, relatively more risky assets have an asset beta of more than one, and less risky assets have an asset beta of less than one*.[7] By extension, the proxy for the asset beta (the equity beta) has the same characteristics.

There is a relative paucity in Australia of independent and reliable data that can be used for estimating equity beta (that is, there are very few companies listed on the Australian Stock Exchange that are closely comparable to (purely) regulated utilities). This makes judgement on this aspect of the application of CAPM very important – ***and relatively difficult (compared to the UK where there are a number of utility companies with (predominantly) regulated assets listed on the London Stock Exchange)***.

The data presented in this report shows conclusively that Australian and UK regulators are able to form judgements on the values required to estimate the cost of debt that are, generally, consistent and comparable between regulated industries and countries. That is, regulators judge that debt markets see regulated utilities in the UK and Australia in similar terms – both between industries and between countries.

However, there is substantial divergence between judgements on the cost of equity. UK regulators judge that equity markets see regulated utilities in the gas, electricity and water industries in (generally) comparable terms. Their judgements on values for the CAPM yield similar estimates for the cost of equity for all three industries. Australian regulators on the other hand, have come down with judgements that suggest:

[7] p27, *Consultation Paper No 4, Cost of Capital Financing, 2001 Electricity Distribution Price Review, ORG, May 1999.*

- equity markets see regulated utilities in Australia as being very different to – and much more costly than - similar utilities in the UK; and
- different regulators in Australia see the same types of utilities as being very different (in comparison to the degree of difference seen by UK regulators).

We are not aware of any evidence that supports this outcome. Accordingly, we have formed the view that regulators need to look much more closely at evidence in Australia and overseas before making further judgements on this matter.

We believe the information presented in this report provides sufficient justification to conclude that this is an issue that the ACCC must address in its deliberations. Further, we have some initial suggestions about how the ACCC might do this.

2 THE STRUCTURE OF THIS SUBMISSION

This paper does not attempt to repeat in any detail material that compares assumptions and outcomes of regulatory decisions on the values assigned to individual parameters for the CAPM used to estimate WACC. The ACCC already has access to material that does this in recent submissions made by GasNet, ElectraNet SA[8] and SPI PowerNet.[9]

Almost all of this material relates to discussion about what values should be assigned to the individual parameters required to "plug" into the CAPM. There is relatively little effort put into independent "reality checks" of these values. Nor is any effort made to convert these data into directly comparable "apples-for-apples" terms. Where validation of estimates is attempted, it is done primarily by comparisons between different regulators' decisions – and reference to the same, very limited data from (supposedly comparable) listed companies. These same sources are, in turn (in the source documents from which the results are taken), validated by comparisons with those same regulators' decisions – and the same limited listed company data.

There is a logical weakness in this circular process that contrasts to the more diverse information sources used to inform judgements that UK regulators make on these matters.[10] In also contrasts with the approach adopted by Sims of comparing regulated returns (using return on equity implied by the regulators' decisions)[11] with outcomes for the top 100 firms listed on the ASX over the decade from 1990.

However, we note that the material already provided to the ACCC confirms three main points:

- Each submitter proposes different values for most of the parameters used for estimating WACC (as shown in Table 2 below)[12] even where the same consultants are engaged to assist in this process - as is the case for GasNet and ElectraNet SA.[13] ***This alone makes it obvious that judgement is required to derive the parameter values.***
- Each submitter proposes final estimates of WACC that are substantially higher than values established by the ACCC in its 1998 decision on the Victorian gas transmission access regime – which, in turn, is higher than values adopted subsequently by other Australian regulators (see Table 1 above) – ***and all of which have been substantially higher than values determined by UK regulators in recent decisions***.
- None of the submitters presents any evidence of difficulty in financing its operations during the initial regulatory period. Indeed, each claims to have achieved substantial efficiencies in the first regulatory period – allowing the companies to exceed the benchmark WACCs (and returns on equity) set by regulators (or governments). This

[8] *Analysis of the weighted average cost of capital for ElectraNet SA*, Submission to the ACCC by Network Economics Consulting Group, April 11, 2002.
[9] Section 8 and Appendix F to SPI PowerNet's *Revenue Cap Application for the period 1 January 2003 to 31 March 2008*.
[10] p152, *Final Determinations, Future water and sewerage charges 2000–05*, Ofwat, 25 November 1999.
[11] *Creating Value From Energy Networks*, Rod Sims, Port Jackson Partners Ltd, 6th International Transmission and Distribution Conference and Exhibition Brisbane, 11-14 November 2001.
[12] The information in this table has been extracted from the applications by ElectraNet SA (p49) and SPI PowerNet (Table 8.1, p 64) referenced above as well as the *Victorian Gas Transmission Access Arrangements Final Decision*, ACCC, 6 October 1998.(Table 3.2, p47 and pp 62-63), and p5, s3.2 of GasNet's current application; and Appendix C, pp151-157, *Final Determinations Future water and sewerage charges 2000-05*, Office of Water Services, 25 November 1999.
[13] We also note that PowerNet's consultant Officer quotes slightly different figures for many of the parameters in PowerNet 's submission (in Table 13, p 40 of Appendix F to SPI PowerNet's application) and slightly different figures again for return on equity (11.7%) and inflation (2.5%) in the text of Appendix F.

suggests the WACC established by the ACCC for GasNet in the initial regulatory period was more than adequate to satisfy the reasonable expectations of the financial markets.

Rather than focussing on discussion of CAPM parameter values and arguing that these should be set so as to produce an estimate of WACC lower than previously endorsed by the ACCC – ***which we believe is entirely appropriate*** - this submission draws to the attention of the ACCC the following issues:

- Comparison of the main parameters in *Equation (1)* above that estimates "Vanilla" WACC shows that Australian regulators have accepted a very substantially lesser difference in the cost of debt (in real terms) between the UK and Australia than is the case for return on equity (or cost of equity).

  That is, the judgement of Australian regulators is that the debt market sees a (very much) smaller difference between Australian and UK utilities than does the equity market. This judgement may be sound, but the magnitude of the difference – and the spread of values for estimated return on equity by Australian regulators - is substantial. This difference has not been identified in any Australian regulatory decisions; nor can it be adequately explained.

  Given the degree of judgement required in selecting values for discrete parameters that are used to estimate the return on equity, we believe this is something the ACCC must examine closely. This is particularly the case given the openness of the Australian economy to international financial markets – and the liquidity of those markets.

- In the February 2000 edition of *Network - A publication of the Utility Regulators Forum*, the ACCC Chairman acknowledges that the research by Sims indicated that *regulation is providing more than healthy returns compared with unregulated companies.*

  Sims' paper presents data showing the implied return on equity ***used by regulators*** in Australia sits just below the average return achieved by non-regulated, ASX listed companies that existed in the top 100 in 1990 and ***still existed*** in 2000.[14] Sims also demonstrates how regulated companies access the "incentives" in the regulatory regimes to leverage actual returns on equity to ***well above*** those achieved by ***still successful*** unregulated companies through the 1990s.

  We note that Sims' data ignores the impact on his results of failure of any "Top 100" that existed in 1990. This suggests Sims' interpretation is biased to some degree because average returns for ASX companies would be lower if failed companies could (somehow) be included in the data.

[14] Port Jackson Partners has provided Pareto with a clarification of the estimates for "regulated" return on equity in this paper. PJPL says (t)he cost of equity of 8.5% is in nominal, post tax terms … and … is calculated as the risk free rate plus the risk premium (4.9%+ 6% = 10.9%) divided by the imputation effect (1.3). … A key assumption in our model is an inflation rate of 1.3%. We used this figure because our analysis was based on data from 1997 to 2000, when inflation rates were very low. As a result, our post tax, nominal cost of equity is lower than you expect. If the inflation rate were 3%, the risk free rate would increase to 6.6%. This would increase the cost of equity to 9.8%. An inflation rate of 3% (and therefore a cost of equity of 9.8%) is more realistic in today's environment.

Table 2: Comparison of WACC parameter values

WACC Parameter	Victorian Gas Transmission 1998		Monopoly Service Provider Proposals 2002			UK Water & Sewerage 1999
	TPA Proposal	ACCC Decision	GasNet	ElectraNet SA	SPI PowerNet	Ofwat Decision
Real risk-free interest rate	4.85%	3.43%	3.20%	*3.5%*	2.80%	2.5-3.0%
Nominal risk-free interest rate	8.0%	6.0%	5.78%	5.90%	5.99%	*5.1-6.1%*
Bond Maturity Period	10 years	5 years	10 years	10 years	10 years	Blend of maturities of company debt.
Prevailing Bond Rates Selection Method	12 month average	8 week average	To be agreed with ACCC	40 day average	Last observed	Judgement based on current market rates.
Expected Inflation	3.0%	2.5%	2.5%	2.34%	3.10%	2.5-3.0%
Debt margin	0.75%	1.2%	1.2%	1.72%	1.85%	1.5-2.0%
Cost of Debt (Nominal)	8.75%	7.2%	6.98%	7.62%	7.84%	*6.6-8.1%*
Cost of Debt (Real)	5.58%	4.6%	*4.4%*	*5.2%*	*4.6%*	2.8-3.5%
Market risk premium	6.5%	6.0%	6.0%	6.5%	6.0%	3.0-4.0%
Gearing Ratio	60%	60%	60%	60%	60%	Around 50%
Tax rate	36%	36%	30%	30%	n/a	Up to 17% by 2005
Value of Imputation Credits	25%	50%	50%	50%	50%	
Asset beta	0.45	0.55	0.6	0.45	0.585	
Debt beta	0.12	0.12	0.06	0.0	0.31	
Equity beta	0.95	1.2	1.4	1.12	1.0	0.7-0.8
Return to Equity (Nominal)	14.19%	13.2%	14.19%	13.66%	11.99%	*7.2-9.3%*
Return to Equity (Real)	10.9%	10.4%	*11.4%*	*10.6%*	*8.6%*	4.6-6.2%
Post-Tax Nominal WACC (Vanilla)	*10.9%*	*9.6%*	9.86%	10.03%	9.50%	*6.9-8.7%*
Post-Tax Real WACC (Vanilla)	*7.7%*	*6.9%*	7.19%	*7.3%*	6.89%	**4.75%-5.50%**
Pre-Tax Nominal WACC	13.02%	*10.4%*	*10.9%*	8.46%		
Pre tax real WACC	9.73%	**7.75%**	8.22%	8.46%		

1. Figures in **Bold** are used in regulators' decisions. Figures shown in plain text have been taken from regulators' reports.
2. Figures in *Plain Italics* are estimated using CAPM parameter values proposed by regulators and the Vanilla WACC formula adopted by the Office of the Regulator General in the 2001 Victorian electricity distribution price review.

Given the relatively low risk faced by regulated monopoly utility companies, it is incongruous that those companies should have access to ***higher returns*** than those achieved by ***successful*** companies in competitive markets.

In this regard we note specifically that each of the regulated companies' submissions propose values for asset betas much greater than 1.0; and values for the market risk premium that are almost double those adopted by UK regulators (6.0-6.5% compared to 3.0-4.0%). That is, the companies see their activities as facing far greater risk than the share market overall and their shareholders expecting far greater rewards than they would if they invested in similar assets in the UK.

This is not a view that UK regulators accept for gas, electricity or water companies. OFGEM and Ofwat judge that regulated monopolies face no greater risk than the share market as a whole. UK regulators have also accepted advice that market risk premia (or equity risk premia) and investor expectations have decreased relative to rates determined by analysis of past trends. We see no fundamental reason why the Australian economy should be different to the UK in these respects.

- The report from NERA – commissioned by the ACCC - on comparisons of rates of return for regulated companies in Australia, the UK and the US concludes *that it appears a strong case can be made from the statistics in …*(its) *… survey for the view that Australian energy regulators are providing incentives to invest that are* ***at least*** *commensurate with those offered in North America and the United Kingdom* (emphasis added).[15]

  Our analysis and comparison of return on equity implied in decisions by UK and Australian regulators clearly supports this finding.

  NERA raises a number of questions that suggests this is a matter that the ACCC must address further. We agree. Australia's financial markets have been fully open to overseas funds since the early 1980s, and international capital is highly mobile. If, as NERA posits, international integration has reduced the forward looking Australian equity premium below long-term historical survey averages then this should be taken into account by the ACCC in estimating WACC.

  In supporting NERA's view on this, we note that UK regulators have reached similar conclusions about the downward movement or equity risk premia in the UK market.

Each of these points raises concerns that Australian regulators may be unnecessarily conservative in the judgements they make on the value of CAPM parameters. The balance of this paper provides support for the contention that the ACCC must consider this issue seriously before making its decision on the GasNet access application.

It is our view that the ACCC ***must*** be able to demonstrate that its decision on this matter mimics the outcomes of an effectively competitive market. That is, the ACCC ***must*** demonstrate that WACC is set at the minimum level necessary - ***and no more than this*** - for voluntary commitment from financial markets to the long-term sustainability of ***efficient, well-managed firms*** in a ***single regulated gas transmission (and distribution) industry*** in Australia.

[15] p2, NERA, *Op. Cit.*

3 THE FUNDAMENTAL PURPOSE OF ECONOMIC REGULATION – AN END-USER VIEW

GasNet's WACC proposal relies on a very "conservative"[16] (i.e. favouring GasNet) interpretation of data and equally "conservative" judgement on value for parameters in the CAPM.

GasNet seeks to boost the acceptability of its proposal by promoting the concern[17] that capital investment in utility infrastructure by monopoly service providers requires very clear (profit) incentives. This is consistent with the view expressed by infrastructure industry lobbyists. However, this view ignores that fact that competitive market firms face far greater risks than regulated monopolies providing essential services to end-users dependent on those services.

We note that Sims suggests actual return on equity for regulated utilities under Australia's incentive regimes can be similar to those achieved by only the best and most efficient firms operating in competitive markets.

We also compare this situation to Ofwat's decision[18] to cut WACC substantially in 1999 to as low as 4.75% (from 6.0-6.2% in 1994) for the large Water & Sewerage Companies.[19] While this may appear to have been a courageous decision, we note that the value adopted by Ofwat in 1999 is – at the most – only 50 basis points below values indicated for real, post-tax "Vanilla" WACCs reflected in recent decisions by OFGEM. We also note that OFGEM and Ofwat have formed very similar judgements on values for WACC (in comparable "Vanilla" form) for companies with similar asset values to GasNet.

Ofwat's decision on WACC was based on the observation (and judgement) that financial markets see regulated monopoly utilities as comparatively attractive investments given:

- their relative certainty of stable revenue streams,
- their relatively low risk of financial failure, and
- that end-users are not likely to stop wanting the services being provided by the monopoly utilities within the projected life of the regulated assets (to paraphrase the arguments put by Ofwat in support of its decision).

To avoid doubt about whether the paraphrase above is accurate or not, what Ofwat actually said was:

> *Despite its significant capital investment requirements, the water industry is perceived by investors as relatively low risk and certainly presents lower risk*

[16] The ACCC should be aware of the possibility that the interpretation by GasNet and its consultants NECG of values for CAPM/WACC parameters may be biased or contain an element of regulatory "gaming". This behaviour is clearly recognised by UK regulators as a real, but negative, feature of the "incentives" in the UK regulatory regimes. There is no reason why such behaviour should be absent from Australian regulatory regimes.

[17] The susceptibility of regulators and policy makers to this line of arguments is highlighted in the Productivity Commissions report Review of the National Access Regime, Position Paper, March 2001 – a paper quoted extensively by GasNet (and its consultants NECG).

[18] *Final Determinations, Future water and sewerage charges 2000–05*, Office of Water Services, 25 November 1999 (see: http://www.ofwat.gov.uk/final_determinations.htm)

[19] Appendix A presents a summary of relevant financial data taken from Ofwat's latest industry performance report. We note specifically that the 10 Water & Sewerage Companies in the UK are very much larger than any regulated Australian utility. The smallest of the W&SCos has regulated assets valued at over $3.2 billion, an annual revenue of $660 million, and a planned CAPEX program requiring average annual investment of around $340 million. It is entirely reasonable to expect that such large companies would achieve efficiencies due simply to the scale of their activities.

> *than the UK stock market as a whole. Compared with companies in other industries, water companies are distinguished by the predictability of their revenues and earnings. Changes in their markets and operating environments tend to occur in a comparatively slow and gradual manner. This view is supported by the Director's panel of senior industrialists* (emphasis added).[20]

By and large, regulated energy companies also benefit from predictability of revenues and earnings – more so than most, if not all, competitive market firms. In the UK (and the US), ***regulated*** energy companies are seen as representing lower risk than the stock market as a whole.[21]

As should be expected from a regulated monopoly seeking to influence its regulator, the introductory section of GasNet's dissertation on "rate of return"[22] includes a claim of dubious credibility:

> *GasNet submits that in determining the WACC, the Commission should err on the side of favouring a higher return. GasNet submits that this is required both from an economic and legal perspective.*
>
> *As discussed …, it is misleading to characterise this tension as a battle between investors and consumers. Rather, the tension is between the short run benefits to consumers from lower access prices and the long run benefits to consumers in encouraging investments in infrastructure by approving higher prices. As both approaches can be characterised as "pro-consumer", GasNet submits that a better characterisation is that of "anti-infrastructure" or "pro-infrastructure" approaches.*
>
> *Gasnet submits that the "pro-infrastructure" approach is clearly preferable as the welfare benefits of the long run objectives far outweigh the short run benefits of lower prices.*[23]

We do not believe any end-users would accept this view. On the contrary, we submit that there is no evidence at all to support the assertions in this statement. Indeed, we agree with Sims' conclusions that Australia's regulated utilities already achieve returns on equity at or above those of the best performing Australian firms in competitive markets. We believe that the outcomes flowing from the decision by UK regulators to cut returns for regulated monopolies to "competitive" levels suggest very strongly that Australian regulators have been approving WACCs (and, therefore, return on equity) well above levels that would be supported by international financial markets.

GasNet's assertion represents no more than a claim that inadequately constrained monopoly behaviour is good for end-users. Nothing could be further from the truth.[24] History shows that

[20] p132, Ofwat, *Op. Cit.*

[21] We note the US energy companies (including GPU) have received a solid pounding on the New York Stock Exchange in recent years. This, however, appears to relate more to attempts to diversify into "unregulated" activities like overseas acquisitions and energy trading than any negative sentiment directed at their regulated status.

[22] We note that GasNet says it uses the terms WACC and "rate of return" interchangeably.

[23] p48, *GasNet Australia Access Arrangement – Submission*, 27 March 2002.

[24] We also note that there is no evidence in Australia that regulated WACCs have any impact on investment in assets. We are not aware of any energy project being cancelled due to concern at the return for a transport element. To the contrary we have seen these being built (Directlink, Murraylink, EGP, Tasmania pipeline, SeaGas pipeline). What was needed to provide the incentive for investment was a supplier and an end user. For example, investment in transport infrastructure for PNG gas needs Townsville PS and Comalco, onshore gas from

monopolies are lazy and greedy. Unless regulators focus on the genuine long-term interests of end-users and adequately ***challenge*** monopoly service providers, the monopolists will always pay themselves too much; much more so than most efficient competitive market service providers.

A fundamental purpose of ***effective*** regulation of monopolies is to deliver outcomes similar to those that would be delivered if ***effective*** competition were possible. It is axiomatic that, if competition is effective, ***successful firms*** manage to do three things:

- reduce ***all*** their costs, including financing costs, to a ***minimum sustainable level;***
- provide services that ***end-users value***, and
- allow ***end-users to capture benefits*** through prices that are related to the efficient cost of production (or supply) – at the same time as the quality of the goods and services provided is improved by ongoing investment in capacity.

If they can do these things, firms in competitive markets will be profitable, they will have satisfied customers ***and*** financial markets will voluntarily support them.

It is our view that monopolies should[25] *be not afraid of greatness: if they are not born great, or cannot achieve greatness* (as unconstrained monopolies)*, they should have greatness thrust upon them* (by regulators). In other words: in the absence of competition, ***effective*** regulation should ensure these outcomes are achieved by monopoly service providers through challenges created by regulators clearly focussed on the long-term interests of end-users.

We contend that the ACCC (and all other Australian regulators) should follow as closely as possible the precedent set by Ofwat, which in respect of WACC is encapsulated in the Director-General's statement that:

> *Overall, the Director has sought to pass on to customers immediately the benefits of efficiency improvements and a lower cost of capital, while ensuring that the … companies continue to be able to raise funds efficiently in the capital markets.*[26]
>
> and …
>
> *The cost of capital … is not, however, intended to provide a floor on returns. Actual returns for any one company could potentially fall below the cost of capital as a result of poor management. Conversely, … companies may earn returns above the cost of capital. However, this should only be the result of superior service or because a company has outperformed the* ***challenging*** *assumptions underpinning its price limits* (emphasis added).[27]

We believe that regulators ***must*** aim to ensure that all costs – including financing costs - are set at the lowest levels ***necessary*** to sustain the viability of ***an efficient regulated industry***. This means that WACC should be set at the ***minimum*** level necessary for ***financial markets***

Timor needed Methanex in NT, Minerva needed Pelican Point, etc. Increasing the cost of the gas transmission industry by allowing higher WACCs than would be generally acceptable to the financial markets simply acts as a disincentive for investment in down-stream industries that ***would justify*** investment in the infrastructure.

[25] To misquote from *Twelfth Night*, Act II, scene v, William Shakespeare, written around 1601, first published 1623.

[26] p 128, Ofwat, *Op Cit.*

[27] p 129, *Ibid.*

to voluntarily continue support for ***efficient, well-managed firms.*** If an individual regulated firm is not able to meet ***challenging, realistic benchmarks for an efficient, regulated industry,*** its assets should taken over by shareholders who are capable of meeting the benchmarks.

End-users get most benefit from the most efficient service provider. End-users have no interest in protecting any less efficient firm – or of protecting the interests of shareholders whose expectations exceed those of the general financial markets. Nor should regulators.

In contrast to NECG, we contend that the outcomes from Ofwat's 1999 decision provides a clear example of ***effective*** regulation:

- Only two companies (out of 27) appealed the Director-General's decision to the UK Competition Commission (UKCC). These companies, Mid-Kent Water plc and Sutton & East Surrey Water plc, are two of the smaller UK water-only companies with regulated asset values about half of GasNet's, similar total revenue to GasNet's', and about double GasNet's annual CAPEX commitments[28] (See Appendix A). This is strong *prima facie* evidence that Ofwat still left opportunities for companies to outperform the WACC benchmark.
- While both Mid-Kent and Sutton & East Surrey gained some concessions from the UKCC (including the high costs of the appeal process), the magnitude of the concessions were relatively small compared to the companies' initial proposals to Ofwat. For example –
  - The UKCC concluded from its independent analysis of Mid Kent's circumstances that WACC could be slightly higher (in the range 5.6% to 5.9% compared to Ofwat's 5.5%);[29] and along with some other minor changes reduced the price adjustment factor *K* to achieve a "notional P_0" (or effective price reduction over the five-year period) of 15.3% compared to a "notional P_0" of 19.5% based on Ofwat's proposed price path.[30]
  - The UKCC determined the same WACC for Sutton & East Surrey, but (based on slightly different considerations to those applying to Mid Kent) reduced "notional P_0" from 21.3% to 13.5%.
  - In the appeal decisions, the UKCC confirmed Ofwat's approach to setting WACC and confirmed a substantial real ***decrease*** in price over the 5 year regulatory period to Mid Kent and Sutton & East Surrey's customers.
- Three other small companies - Essex & Suffolk Water, North Surrey, York Waterworks merged with (or were taken over by) other larger (and more efficient) companies during 2000. This continued a process of consolidation and efficiency improvement through mergers that commenced after the 1994 price review – with further benefits (generally) delivered to the smaller companies' customers by Ofwat as a condition of the mergers.

[28] GasNet's application proposes forecast revenue for 2003 of $93.9M, and asset base of $539.7M and CAPEX (average over the five years) of $17M.

[29] p 137, *Chapter 8 Cost of Capital and financial projections*, UKCC decision on appeal by Mid-Kent Water plc (See: http://www.competition-commission.org.uk/inquiries/archive.htm)

[30] p4, Chapter 1, *Summary*, UKCC decision on appeal by Mid-Kent Water plc (See: http://www.competition-commission.org.uk/inquiries/archive.htm)

- In December 2000, Mid Kent's Board announced *plans for a restructuring of the business to enable it to better meet its efficiency targets … following the Determination of Prices for 2000-2005 by the Competition Commission.*[31] The fact that the Board referred specifically to the price review/appeal outcome as a driver for the restructure raises the question of whether it would have bothered had Ofwat not set challenging benchmarks for the company.

- During 2000 and 2001, six (6) further companies (Anglian, Tendring Hundred, D^wr Cymru (Welsh), Bournemouth, Dee Valley and South West) all made submissions seeking an Interim Determination from Ofwat (to increase revenue) based on a "material change" in circumstance.[32] Ofwat rejected the request from Anglian as trivial.[33] and amended the price adjustment factor *K* between +1% to +2.4% for from 1 year to 4 years for the other five companies (compared to downward initial P_0 adjustments of between 3.0% and 12.2%). In general, Ofwat only approved increased costs incurred because of greater than anticipated take up of meters (a voluntary option for small water consumers in the UK that is largely beyond the control of the companies), and increased obligations for water quality testing not anticipated during the price review.

- Despite the obvious pressure applied to the industry by Ofwat's decision, rates of capital investment have been maintained at the exceptionally high levels required by the UK government's implementation of EU water and sewage discharge quality obligations in 1989-90. Ofwat's latest industry performance report shows CAPEX spending in 2000-01 (the first year of the new price controls) of £2.7 billion (~AU$7 billion).[34] This level is slightly below that anticipated by Ofwat in the price review (~£3.1 billion); but is within the range of historical CAPEX efficiency "achievements" of the two previous regulatory periods.

We can understand that regulated utilities in Australia (and their consultants) would see this outcome as undesirable. No monopoly utility industry would voluntarily forego a substantial reduction in revenue each year of a five-year period, which is what Ofwat achieved with this decision. However, it would not be an unexpected outcome in an effectively competitive market[35] – ***and more importantly*** – it delivered clear benefits to end-users without discouraging continued voluntary support of the industry ***by financial markets.***

We cannot pass onto other more directly relevant issues before commenting on one significant aspect of the debate on this decision. We note that NECG, in its comment on NERA's report to the ACCC on international comparison of utilities' regulated post tax rates of return in North America, the UK, and Australia,[36] says – in reference to outcomes in the UK - that *(s)ubsequently, it has become apparent that the industry is facing serious difficulties in raising finance for (substantial) new investment programmes*.[37] NECG presents no evidence

[31] *Mid Kent Water Restructures to boost efficiency*, Mid Kent Water plc News Release, December 2000 (see: http://www.midkentwater.co.uk/)
[32] As permitted by Part IV of Condition D of the UK water licences.
[33] *Annex A, Anglian Water Services Limited Interim Determination*, Office of Water Services, 19 December 2000. (see: http://www.ofwat.gov.uk/pubslist/pubsalphalisting.htm#I)
[34] *Financial performance and expenditure of the water companies in England & Wales 2000-2001*, Ofwat, July 2001
[35] Sims presents some examples in his paper of declining price paths in other major Australian industries, and any major end-user could provide the ACCC with similar evidence.
[36] NERA, *Op. Cit.*.
[37] p6, *International comparisons of rates of return, Comment on NERA report*, Network Economics Consulting Group Pty Ltd (NECG), 18 July 2001

to support this assertion that outweighs the compelling finding in Ofwat's performance reports that the UK water and sewerage industry is continuing to meet its ***clear, explicit and legally enforceable*** obligations to improve drinking water quality and sewage effluent discharges through a massive capital investment program.[38] NECG is doing little more than repeating the (so-far ineffective) special interest pleading of UK water industry lobbyists.

In particular, we note that NECG's view ***is not*** supported by comments from the UKCC following the Mid Kent and Sutton & East Surrey appeals.[39] Nor is it a view that is accepted by Ofwat's Director-General. NECG refers to a comment made by Phillip Fletcher (Ofwat's D-G) in February 2001 that he *takes … seriously (*the concerns) *expressed by companies and others that there may be difficulty in raising funds from public markets, citing poor investment sentiment, depressed share prices and widening bond spreads,*[40] as though this recognition has swayed, or will sway, Ofwat from its commitments to protect the long-term interests of end-users.

At a later conference in January 2002,[41] Fletcher again referred to this concern saying that Ofwat's approach to the cost of capital *has been an issue that companies, investors and rating agencies have focussed on.* But Fletcher went on to say (in relation future periodic reviews (PR)) that *Ofwat expects to use (*the*) same general approach to determining cost of capital (*in*) PR04 as used in PR99 (MD166).*[42] *That is it will be forward looking and will be set for the industry as a whole …* and *Ofwat had … not seen anything at present better than CAPM.* These comments were made in the context that the UK water and sewerage industry faces future needs for even more capital investment – not less - to meet new EU Directives for control of dispersed pollution that are expected to be implemented around 2004-5.

Despite indicating very strong endorsement for Ofwat's approach, we are not opposed to regulators providing enhanced (profit) incentives to regulated companies. However, we believe this should only occur where the additional incentives focus on delivering enhanced services that end-users value – and from which end-users derive clear and unequivocal economic, financial, social or environmental benefit (in the relevant regulatory period). And, even then, the incentives should be based on "efficient" cost of delivery and clear mechanisms

[38] *Levels of service for the water industry in England & Wales 2000 - 2001*, Ofwat, September 2001.
Financial performance and expenditure of the water companies in England & Wales 2000-2001, Ofwat, July 2001.

[39] We note that this is not the only unsupported assertion in NECG's response to NERA's report. For example, NECG asserts that:

- *UK regulators have not been setting the WACC as low as the report claims*; but provides comparisons with the telecommunications, aviation and rail industries without establishing is these are comparable in terms of risk, revenue certainty and future competition.
- *Where there is a differential, it is largely explained by differences in country-specific market condition;* without providing any evidence to support the degree of difference between return on equity between Australia and the UK (in particular) so far as return on equity is concerned.
- *NERA also fail to give sufficient weight to differences in the three countries' regulatory regimes*; but claims that possible re-optimisation of regulatory assets exposes Australian investors to undiversifiable and asymmetric risks that are not apparent, or if apparent not as marked, in the US and UK regimes.
  This claim cannot be taken seriously. No Australian regulator has re-optimised asset values downwards. In fact, the ORG explicitly assumed that the incentives in the regulatory regime were more likely that not to ensure efficient investment (in the absence of any truly independent method of assessing this). By contrast, UK regulators have imposed a much more rigorous process for evaluating the investment and operating "efficiency" of UK companies.
  It appears there is a greater risk to end-users that Australian regulators would accept a "gaming" premium in companies' submissions than either their UK or US counterparts – and less likely to re-optimise asset values downwards.
  As an example, SPI PowerNet has chosen to re-optimise its asset values upwards (by nearly 10%) in its current submission to the ACCC. If NECG's claim had any logical basis, the ACCC should apply a ***discount*** for asymmetric risk to account for this behaviour.

[40] p8, NECG, *Op. Cit.*

[41] *The Periodic Review in Context*, Water UK City Conference 2002, 22 January 2002

[42] MD166 refers to a letter sent to all water industry Managing Directors by Ofwat's Director-General that outlines the approach that Ofwat will adopt for the next periodic review. This letter can be found on Ofwat's website (see: http://www.ofwat.gov.uk/lettersmd/mdlist.htm).

to ensure end-users get the enhanced benefits - preferably in the form of clear and equitable "negative" (profit) incentives if the enhanced standards are not delivered.

That is, if monopoly service providers are seeking "better" incentives to invest, they should investigate ways of delivering to end-users ***new or improved*** services from which ***end-users*** derive a clear benefit ***above*** that of an efficient operator providing a basic monopoly service. If that is not possible, then regulators should focus on approving arrangements that provide effective incentives to reduce costs to end-users that are sustainable – and pass these benefits on to end-users as quickly as possible.

4 THE CAPITAL ASSET PRICING MODEL – ITS ROLE IN REGULATION

Economic regulators use the CAPM extensively for estimating WACC. Indeed, regulators in Australia and the UK use it as the primary means for estimating the revenue required to reward sunk investment in regulated assets. Accordingly, some comment on its use is relevant.

The greatest challenge for regulators in using the CAPM for estimating WACC is to make sound judgements on values that are appropriate for the equity beta ($ß_e$) and the market risk premium. This is particularly challenging in Australia where there is a relative paucity of independently collated data that has existed over a sufficiently long period that can be used as a reliable source of information.

In the UK (and the US) there are many companies with (predominantly) regulated assets listed on stock exchanges. In Australia, regulators have access to a very limited amount of data – possibly far too little of which is suitable for the purpose intended. We believe this is one reason, probably the major reason, why Australian regulators have difficulty in coming down with uniform judgements on the cost of equity (return on equity) required for a ***fair & reasonable*** application of the CAPM.

We note that ORG, in discussing estimation of equity betas, says:

> *It is common practice, however, to take the estimate of the equity beta for one firm and to use this as a proxy for the equity beta of another firm in order to estimate the WACC for the latter firm. The use of a proxy beta is particularly common where it is not possible to estimate the equity beta of a firm directly.*[43]

In the absence of independently collated data that has existed over a sufficiently long period, and with the relative paucity of data in Australia on listed companies with (predominantly) regulated assets and similar risks, the use of proxy betas is demonstrably – as we discuss in later sections of this report – prone to error. A similar comment may also apply to sources of data suitable for estimating the market risk premium.

4.1 CAPM is only a useful tool – no more than that.

Despite the widespread use of the CAPM to estimate WACC, we do not believe that any conclusive argument can be made to support the notion that CAPM always provides an accurate or appropriate estimate for WACC. Indeed we note that most regulators make this exact point. For example, in its 1998 decision on the Victorian gas transmission access regime, the ACCC said:

> *While the CAPM/WACC framework provides a well recognised theoretical framework to establish the cost of capital, there is less than full agreement on the precise magnitude of the various financial parameters which need to be applied (as evidenced by the range of parameter values suggested by different commentators). … The Commission has given careful consideration to the value that should be assigned to TPA given the nature of its business and*

[43] p28, *Consultation Paper No 4, 2001 electricity distribution price review, Cost of Capital Financing,* Office of the Regulator-General, May 1999.

> *current financial circumstances. Accordingly, the parameter values used are those considered most appropriate. Mostly these fall near the middle of a narrow range based on the information available, however a few, such as the equity beta and the margin on debt, have been chosen to give TPA the benefit of associated uncertainty* (emphasis added).[44]

Similarly in its 1999 determination of water and sewerage charges, Ofwat says quite clearly:

> … *Assessing* (the cost of capital) *is not a mechanical process, in part because it concerns market perceptions about the future. Although modern finance theory provides useful tools, there are still many judgements to be made. …*
>
> *The Director's assessment relies primarily on the Capital Asset Pricing Model (CAPM), supplemented by the Dividend Growth Model (DGM). The DGM primarily provides a check on the results of the CAPM. … The CAPM is simple and widely used, both in the UK and the US financial markets, by other utility regulators and by the Competition Commission. Other more sophisticated models, such as the Arbitrage Pricing Theory, exist but are not yet widely used or understood. Also, because they rely on input variables for which independently collated data do not exist over a sufficiently long period, they would be likely to prove impractical and of dubious robustness* (emphasis added).[45]

Also, IPART says in its 1999 determination on electricity distribution pricing:

> *Given the inherent conversion problems and the arbitrariness of the combined effects of different inputs to CAPM, the Tribunal has adopted a feasible range for the cost of capital* (emphasis added).[46]

And finally, it its review of electricity distribution pricing in Victoria in 2000, ORG says:

> *… the use of CAPM to estimate a WACC for the Victorian electricity distribution licensees involves some degree of imprecision. Accordingly, this would appear to be a further issue upon which informed judgement needs to be exercised.*[47]

and

> *… one of the main attractions of the CAPM is that it is widely used and understood by both the finance community and industry, and is consistent with the methodology used by every other regulator in Australia and the UK. The use of the simple CAPM has also had the support of most of the interested parties to this matter* (emphasis added).[48]

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[44] p63, *Victorian Gas Transmission Access Arrangements Final Decision*, ACCC, 6 October 1998.
[45] p152, *Final Determinations Future water and sewerage charges 2000–05*, Office of Water Services, 25 November 1999.
[46] p45, *Regulation of New South Wales Electricity Distribution Networks, Determination and Rules Under the National Electricity Code*, IPART, December 1999
[47] p29, *Consultation Paper No 4, Cost of Capital Financing*, 2001 Electricity Distribution Pricing Review, Office of the Regulator-General, May 1999.
[48] p154, *Electricity Distribution Price Determination 2001-2005, Volume I Statement of Purpose and Reasons*, Office of the Regulator-General, September 2000.
Despite ORG's suggestion that it used a "simple" form of CAPM that avoided controversy on the "correct" treatment of tax – and produced an estimate of post-tax "Vanilla" WACC, ORG's final decision dedicated several pages to discussion of "errors" in establishing values for CAPM parameters that were identified following release of its Draft Determination.

It is quite clear that the overall sentiment expressed by regulators is that CAPM is a simple, useful tool, widely used by other regulators and financial markets, the use of which ***requires many judgements*** to be made on the value of parameters using (preferably) ***independently collated data that exists over a sufficiently long period***.

In reality, the benefit of using CAPM is that it provides a repeatable mechanism for estimating comparable values of WACC over consecutive regulatory periods. Perhaps more importantly, the use of CAPM assists regulators by constraining the extent to which they are required to exercise arbitrary judgement on crucial issues. It is our view that the judgements required in the use of CAPM are best made by competent, well-informed, independent regulators clearly focussed on the long-term interests of end-users – and who are clearly aware that self-interest provides an incentive for regulated monopolies to inflate the values of parameters used in CAPM.

It is abundantly clear to end-users that, where judgement clearly influences the outcome, the ACCC ***must*** exercise care in making its determination on this critical aspect of regulation. In doing so, we submit the ACCC ***must*** focus on the long-term interests of end-users and not be swayed by the self-interest demonstrated in submissions from regulated companies.

4.2 Regulators must be wary of excessive conservatism – intentional or otherwise

The possibility that regulators could be excessively conservative must also be carefully considered. In saying this, we are not suggesting that regulators would intend to harm or diminish the interests of end-users by being conservative. However, there are indications that Australian regulators go beyond ***a fundamental need*** to ensure regulated utilities are able to adequately discharge their obligations ***with voluntary support from financial markets***.

4.2.1 An open mind and great care is essential to avoid excessive conservatism

The discussion in the ACCC's 1998 decision on the TPA access regime suggests an example where regulators need to keep an open mind to ensure they avoid being too conservative. Notwithstanding the acknowledgement that application of CAPM to determine WACC requires judgement; and the admission that values for key parameters *have been chosen to give TPA the benefit of associated uncertainty*, the ACCC concludes that

> *Since the WACC has been established on the basis of a CAPM framework, the regulatory return, by definition, does not incorporate any significant level of monopoly rents* (emphasis added).[49]

We do not accept this statement, and illustrate this with just one example. The range of values discussed by the ACCC for equity beta varied from 0.4-0.6 (UKCC for Transco appeal) to 1.20 – a value that was revised upwards from 0.85 by the ACCC between its Draft Determination and Final Determination.

- Without any changes to other parameters, this range of values represents a variation in estimates of the implied cost of equity (real, post-tax) using CAPM (*Equations (4)* and

[49] p65, *Victorian Gas Transmission Access Arrangements Final Decision*, ACCC, 6 October 1998.

(5) above) between 5.8% (at the low end of the range of UKCC values) and 10.6% (for the ACCC's final decision); with a mid-range estimate of 8.2%.

- Again without any change in other parameters, this range of values represents a variation in estimates of the real, post-tax (Vanilla) WACC using CAPM (*Equation (1)* above) between 5.7% (at the low end of the UKCC values) and 7.6% (for the ACCC's final decision); with a mid-range estimate of 6.6%.

That is, WACC estimated using CAPM could ***legitimately*** range over nearly 200 basis points as a result of regulators forming different judgements on the value of the equity beta. In the 1998 decision, the ACCC ***increased*** WACC by nearly 100 basis points by changing its judgement on equity beta between its Draft Determination and its Final Determination. On that basis, it is simply not credible to say that WACC determined using CPM *by definition*, does not incorporate any significant level of monopoly rents.

The CAPM framework might allow estimates of WACC to be derived that do not contain any monopoly rent. However, judgements made by regulators on the values of parameters for CAPM - based on data that is not ***independently collated and existing over a sufficiently long period*** - could most certainly create quite substantial levels of monopoly rent.

We contend that an approach similar to that adopted by Sims provides one clear way to assess whether monopoly rent exists or not in the estimates of return on equity and WACC made by regulators. This is something the ACCC should repeat to satisfy itself that its judgements are ***fair & reasonable*** to all stakeholders.

4.2.2 Too much caution or conservatism is not in the interests of end-users.

All regulatory decisions from competent regulators contain some form of expression similar to that made by the ACCC (in the 1998 TPA decision) that - values for key parameters *have been chosen to give TPA the benefit of associated uncertainty.* Even Ofwat has stated:

> *Although there is some market evidence for a cost of capital that is slightly lower than the middle of the Director's range, in his assessment he has taken account of the need to ensure that companies retain solid investment grade ratings in order to be able to finance the £15.6 billion investment programme.*[50]

However, some Australian regulators have, perhaps, exercised more caution than might be required to satisfy the reasonable expectation of financial markets generally. For example, in its draft determination on electricity distribution pricing in Victoria, ORG consistently took what it called a "conservative" or "cautious" (i.e. high consumer cost) approach to almost every aspect of the review. End-users might reasonably have expected ORG to decide in their favour on 50% of cases where it was required to exercise its discretionary power. In fact, it favoured end-users hardly at all when it came to making judgements about costs that they were expected to bear.

The impact of this "caution" and "conservatism" is reflected in the fact that ORG endorsed a value for WACC ("Vanilla") significantly above that indicated for other regulators in Australia (except in the 1998 ACCC decision which was marginally higher again).

[50] p151, Ofwat, *Op.Cit.*

ORG recognised there was concern that it was being too cautious or conservative but elected not to make any material change in its final decisions in areas where it had expressed that view. It is disturbing to end-users that regulators tend to err on the side of "caution" or decide on "conservative" values of parameters that affect each component of the regulated revenue. In doing so, Australian regulators seem to ignore the strong incentive in the regulatory regimes for utilities to "game" their proposals. They also reduce the opportunities to "challenge" regulated industries as much as they are challenged in the UK.

OFFER, OFGEM and Ofwat in the UK have explicitly referred to the consequences of regulatory "gaming" in their determinations. For example, in regard to behaviour of the UK electricity transmission company NGC through the last review in 2000-01, OFGEM said:

> *It is a source of continuing concern that NGC appears to have an incentive to misforecast key elements of information which affect price controls, including cost levels, capital expenditure requirements and levels of demand and customer numbers. There does not appear to be a straightforward way to devise a set of arrangements to prevent this. Ofgem is currently conducting the information and incentives project to improve incentives on information for the PESs. … Ofgem intends to do so as it seems appropriate that regulated companies should not be able to benefit from forecasting inaccuracy.*[51]

We believe it is essential that Australian regulators follow the UK regulators' initiative in this area to ensure that they do not continue to face a position of possible "regulatory capture" or unintentional bias in favour of regulated companies.

4.3 Cost of Debt Comparisons

The ACCC has indicated a preference for using the same "simple CAPM" approach adopted by ORG to estimate a "Vanilla" real, post-tax WACC (based on *Equation (1)* above). This requires an estimate of two key parameters R_d (the (real) cost of debt) and R_e (the (real) cost of equity). It also requires a judgement on a "prudent" gearing ratio for assets with an investment grade rating.[52]

Figure 1 below shows values for the (real, post-tax) cost of debt estimated by reference to the judgements by Australian and UK regulators on values for CAPM parameters for the range of decisions included in Table 1 above (numerical values are shown in Appendix B). As can be seen, real (post-tax) values for the cost of debt generally lie within a band between 4.3% (OFGEM 1999 – electrical distribution) and 5.0% (ORG 2000 – electrical distribution). It is notable that estimates for the cost of debt proposed by GasNet and PowerNet are also within this same range. It is also notable that estimates accepted by ORG and QCA are higher than accepted by other Australian regulators.

The highest values relate to ElectraNet's proposals (based on advice from NECG which appear to include a premium for asymmetric risk similar to that rejected by ORG in its 2000

[51] p65, *The transmission price control Review of the National Grid Company from 2001, Draft proposals*, June 2000, OFGEM.

[52] We note that " gearing" does not greatly influence estimates of WACC – within the range of gearing ratios adopted by regulators. This is because regulators always assume gearing that enables prudent, well-managed companies to maintain an Investment Grade rating. Lower gearing could increase WACC because the cost of equity is always be higher than the cost of debt (within the Investment Grade rating). On the other hand, if regulators assumed gearing that dropped a company's rating below Investment Grade, the cost of debt would go up.

decision on electricity distribution), and that suggested by OFGEM in a preliminary consultation paper dealing with regulation of Independent (i.e. non-Transco) gas transportation in the UK.[53] The range of values suggested by OFGEM in this case is 4.75-5.75% (Figure 1 shows the mid-range value of 5.25%). However, OFGEM gives no indication of where it will come down eventually – and may well decide to settle on values closer to previous decisions (4.25-4.65%); or even at lower values in much the same way as Ofwat did in 1999.

This data shows that UK regulators generally adopt slightly lower values for the cost of debt than Australian regulators for the same industry sector – but not by much. There is generally greater difference between Australian regulators than there is between UK and Australian regulators (excluding, of course, Ofwat). QCA, OFFGAR and ORG (and ElectraNet/NECG) have judged higher values to be appropriate than has the ACCC and IPART (and GasNet/NECG and PowerNet/Officer) with a difference in cost of debt of around 70 basis points. By comparison OFGEM has come down on values less than 30 basis points lower than values adopted by the ACCC and IPART in its final decisions on gas and electricity.

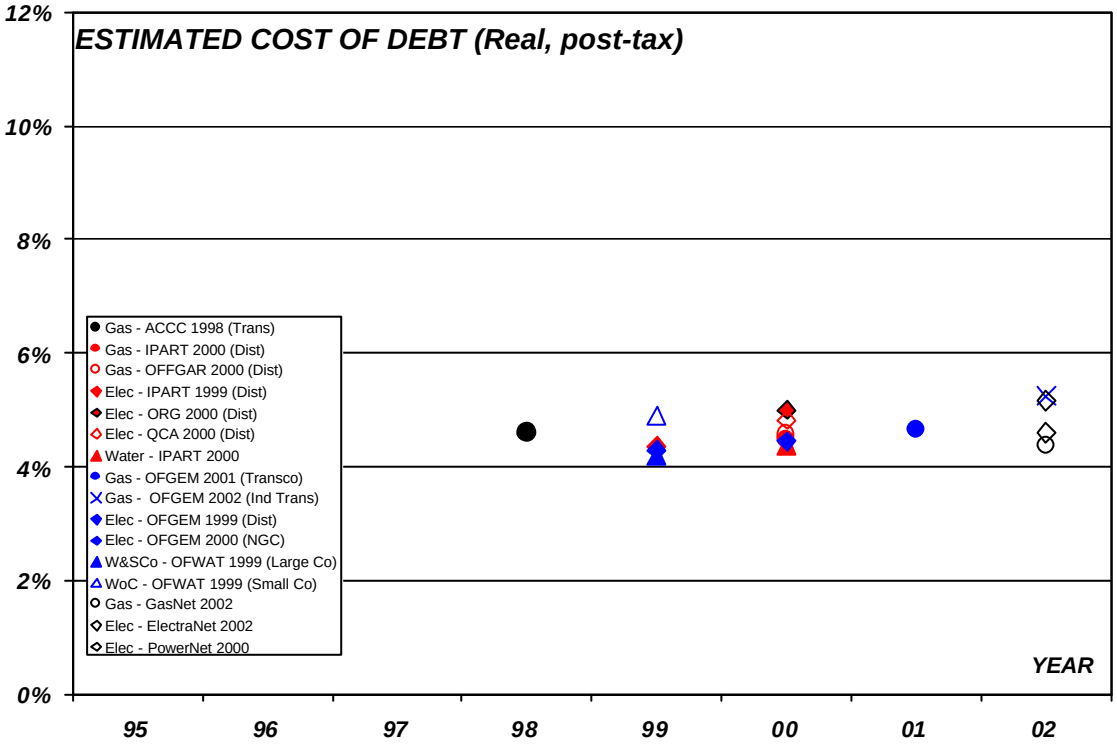

Figure 1: Comparison of estimated cost of debt from UK and Australian regulators' decisions

The exception is the value for cost of debt estimated for the UK water and sewerage industry by Ofwat for its 1999 decision. Ofwat did not state explicitly that lower-range figures apply to "large" Water & Sewerage Companies (W&SCo), or that upper-range values applied to "small" Water Only Companies (WoC). Indeed if one adopts that assumption, the estimates of

[53] *Independent Gas Transporter Charges and Cost of Capital, Consultation*, OFGEM, February 2002

WACC are too low for all companies compared to Ofwat's final decisions. Using all the lower range CAPM parameters values quoted by Ofwat gives an estimate of the "Vanilla" real, post-tax WACC of only 3.67% - and all the upper range values a WACC of 4.80% - compared to values of 4.75% and 5.50% respectively adopted by Ofwat for the largest and smallest companies. However, we note that Ofwat also included a premium above the basic value of WACC to *reflect each company's embedded fixed rate debt which could not be efficiently refinanced in the short term. The premium was company specific, was added to the post-tax cost of capital, applied to existing assets only and ranged up to 0.4%*.[54]

Accordingly, we have made the following assumptions in estimating the values for cost of debt for the UK water industry shown on Figure 1 (the same assumptions for cost of debt been used in estimating the values for return on equity in Figure 2 below):

- For "large" W&SCos we have adopted Ofwat's mid-range values for all CAPM parameters except cost of debt and back-calculated the indicated cost of debt that gives the WACC value adopted by Ofwat of 4.75%. This gives an indicated cost of debt of 4.2%.
- For "small" WoCs we have adopted Ofwat's upper-range values for all CAPM parameters except cost of debt and back-calculated the indicated cost of debt that gives the WACC value adopted by Ofwat of 5.5%. This gives an indicated cost of debt of 4.9%.

We note, however, that Ofwat estimated the cost of debt based on index-linked gilts using the blend of maturities of water company debt, plus a debt premium based on observed market rates for companies' debt of solid investment grade quality. That is, the estimate is based on reasonable and (then) current expectations of financial market support for the UK water industry.[55] This is, essentially, the same process adopted by all UK and Australian regulators.

4.4 Comparison of the Cost of Equity.

Figure 2 below shows values for the (real, post-tax) return on equity (cost of equity) estimated by reference to the judgements by Australian and UK regulators on values for the CAPM parameters for the range of decisions included in Table 1 above (numerical values are shown in Appendix B). As can be seen, the values adopted by UK regulators lie in a relatively narrow range between 6.0% (OFGEM 1999 – electrical distribution) and 6.25% (OFGEM 2001 – Transco gas transmission). This shows clearly that UK regulators judge that equity markets see monopoly utilities in the gas, electricity and water industries in similar terms.

We note that the value estimated for "large" W&SCos using the assumptions stated above is 5.30%; and 6.11% for the "small" WoCs. Ofwat's documents refer to a range for cost of equity of 4.6-6.2% without stating explicitly how these relate to its decision to vary WACC to account for company size.

The similarity of view across industries and sectors is not a feature when it comes to judgements made by Australian regulators on the value for parameters required to estimate the return on equity. As can be seen, there is far greater difference between Australian regulators'

[54] p156, Ofwat, *Op. Cit.*
[55] pp154-155, Ofwat, *Ibid.*

judgements on the cost of equity for different industries and even for the same sectors of the same industries than is the case in the UK. For example:

- The CAPM parameter values adopted by QCA for Queensland electricity distributors gives an estimate for the cost of equity of 7.4%, while ORG's values give an estimate of 9.5% for Victorian distributors.[56]
- IPART's CAPM parameter values give an estimate of 8.9% for gas distribution in NSW, and OFFGAR's 9.7% for WA; while the ACCC's values give 10.4% for Victorian gas transmission.

What is even more noticeable is that the CAPM parameter values suggested by PowerNet/Officer give an estimate for cost of equity of 8.6% which is ***lower*** than that for all regulators' decisions except IPART (2000 – water) and QCA (2000 – electricity distribution). In addition, the cost of equity estimated for values proposed by GasNet (at 11.4%) are the highest, even higher than that for ElectraNet – when the advice for both came from NECG.

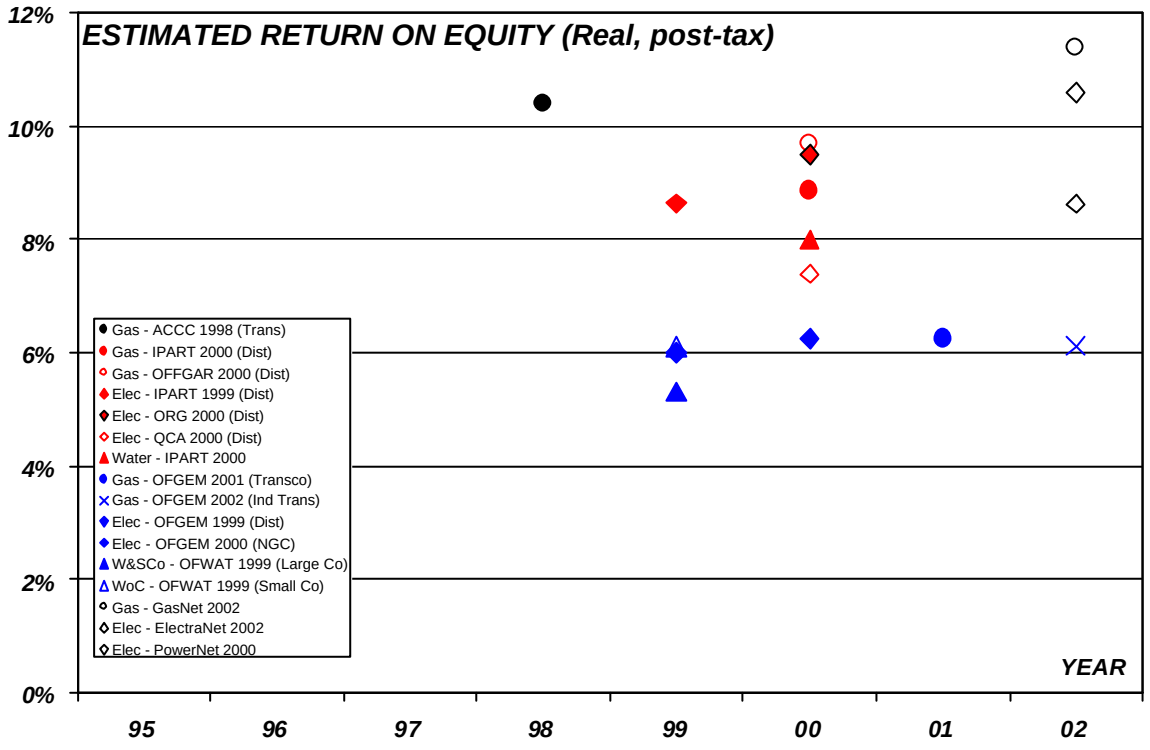

Figure 2 Comparison of estimated cost of equity from UK and Australian regulators' decisions.

These differences are almost certainly due the difficulty that all regulators (and regulated companies and their consultants) have in developing a consistent view on equity beta values and market risk premia. In our view, this is caused by three factors:

[56] We note that QCA referred to "the benefits" of government ownership when deciding on both debt and equity issues in its decision. This may be realistic, and it has delivered some benefit to end-users in Queensland, but we doubt it is consistent with competitive neutrality principles of Competition Policy.

- The first is the lack of clear focus on affordability and on protection of the optimum long-term interests of end-users - particularly in comparison to those clear objectives for UK regulators.
- The second, and perhaps the most important, is that Australian regulators place much more emphasis on information provided by regulated companies, their consultants and financial market participants who have a commercial interest in the regulatory outcome. This is a noticeably different to the UK, where (for example) Ofwat's Director General said in his 1999 decision that he had *placed considerable emphasis on consultation in the financial markets. This has involved discussions with institutional shareholders, City analysts, finance academics, banks, bond investors, credit rating agencies and other regulators. He is also aware of the considerable academic literature on the subject. He has received advice from Singer & Friedlander, his financial advisers, as well as his advisory panel of senior industrialists. He has also had regard to the results of surveys 34 of institutional investors ….*[57]

  That is, Ofwat focuses very clearly on obtaining advice from a broad range of interests and stakeholders – and is far less reliant on input from the regulated industry and its consultants than Australian regulators appear to be.
- The third, and perhaps equally important, is that UK regulators have the "luxury" of being able to observe directly the performance of a significant of number of water companies (with predominantly regulated assets) on the London Stock Exchange. This greatly improves the clarity of data with which the regulators are able to inform their judgment on these matters.

[57] p152, Ofwat, *Ibid.*

5 CONCLUSIONS

The material presented above provides a comparison of estimates for the cost of debt and the return on equity indicated by decisions of regulators in the UK and Australia that deal with regulated monopoly utility services. These estimates have been derived using values judged by each regulator as being appropriate for individual parameters required for use of the simple, "Vanilla" form of the CAPM. All estimates are expressed in common "apples-for-apples" real, post-tax terms.

Analysis of this material clearly shows that Australian regulators have accepted a significantly lesser difference in the cost of debt (in real terms) between the UK and Australia than is the case for cost of equity (or return on equity). That is, the judgement of Australian regulators is that the debt market sees a (very much) smaller difference between Australian and UK utilities than does the equity market. This judgement may be sound, but the magnitude of the difference – and the spread of values for estimated return on equity by Australian regulators - is substantial. This difference has not been identified in any Australian regulatory decisions; nor has it ever been adequately explained.

Given the degree of judgement required in selecting values for discrete parameters that are used to estimate the return on equity, we believe this is something the ACCC must examine closely. This is particularly the case given the openness of the Australian economy to international financial markets – and the liquidity of those markets.

It is our view that international financial markets would be expected to see similar regulated utilities in consistent terms. Financial markets may see a difference between similar utilities in the UK and Australia. But we would have expected that debt markets would have a view that is generally consistent to equity markets. If the debt markets see similar UK and Australian regulated utilities as comparable, we believe it is reasonable to expect that equity markets would do the same.

This raises the possibility that Australian regulators are making decisions and judgements on this crucial aspect of regulation that are excessively conservative. We do not suggest this conservatism is ***intended*** to harm or diminish the interests of end-users. We do, however, contend that, compared to the UK, Australian regulators are over-reliant on information from regulated companies. Australian regulators also face difficulties because of a relative paucity of independently collated data that has existed over a sufficiently long period that can be used as a reliable source for informing judgements on parameters for the CAPM.

We believe this is an issue that the ACCC must address in its deliberations. Further, we suggest the ACCC can do this by:

- following as closely as possible the precedents set by the UK water industry regulator Ofwat – particularly by seeking input on key financial indicators from widely diverse sources and stakeholders ***not closely aligned with regulated industries***;[58]

- using an approach similar to that adopted by Port Jackson Partners Ltd[59] to compare judgements on WACC with different forms of information on the outcomes in

[58] See section 10.3 and Appendix C, *Final Determinations, Future water and sewerage charges 2000–05*, Office of Water Services, 25 November 1999.

competitive markets; this would provide a form of independent "reality check" of judgements made about CAPM parameter values; and

- following up on suggestions and recommendations made by NERA[60] in its report to the ACCC on international comparison of utilities' regulated post tax rates of return in North America, the UK, and Australia.

It is clear that the major cause of the differences between estimates for the cost of equity between the UK and Australian regulatory judgements is that Australian regulators have accepted higher values for the market risk premium than do UK regulators; and higher – and much more varied - values of equity beta. This appears to be related to the relative paucity of independently collated data that has existed over a sufficiently long period that can be used as a reliable source for informing judgements on parameters for the CAPM.

In regard to the values judged appropriate for equity beta, we note particularly that UK regulators have accepted that:

> *(a)fter adjusting for gearing, the underlying betas have … decreased. This is despite the fact that the period (being analysed) includes times when the … industry was subject to risks that may no longer be applicable: for example, the general election in 1997 and the uncertainty of a Labour government, the windfall tax, and the government's reviews of regulation, including proposals for profit sharing and error correction mechanisms, and for the methods of charging.*[61]

A similar comment may also apply to sources of data suitable for estimating the market risk premium. We note also that Australian regulators (and regulated companies) have relied on historical assessments as a basis for judging values for the market risk premium (or equity risk premium) whereas UK regulators have accepted:

> *the consensus of opinion among the investment community that the widely ranging historical estimates are of questionable relevance* (to estimating forward-looking WACC).[62]

and

> *The size of the equity risk premium and the most appropriate methodology for calculating it has been the subject of considerable debate amongst analysts, academics, regulators and the regulated companies. There is, however, broad*

[59] Sims' approach could be more usefully applied by using financial data derived from ***outcomes*** from the incentives in the regulatory regimes. However, we note that only ORG (now the Essential Services Commission) publishes annual performance reports that examine financial matters.
[60] *International Comparison of Utilities' Regulated Post Tax Rates of Return In: North America, the UK, and Australia* , A Report Prepared by NERA, March 2001.
[61] p154, Ofwat, *Op. Cit.*
[62] p132, Ofwat, *Ibid.*

> *agreement that the wide range of historical estimates of the premium are of questionable relevance and all significantly overstate the current expectations of actual equity investors.*[63]

This suggests the ACCC should review all available material to informs its judgement on these two crucial parameters.

[63] p153, Ofwat, *Ibid.*

APPENDIX A: SUMMARY OF COMPANY COMPARISONS – UK REGULATED INDUSTRIES.

	Properties connected (M)	Average annual (£/property)		Turnover (£M)	CC operating profit (£M)	Average Capital Value (£M)	CAPEX 2000-01 (£M)			Return on Capital employed (%)	WACC 1999 (Real, post-tax)
Water & Sewerage Companies		**Water**	**Sewerage**				**Water**	**Sewerage**	**Total**		
Anglian[64]	2.688	65	66	687.4	209.1	3566.1	100.3	162.9	263.2	5.9%	4.75%
D^wr Cymru (Welsh)	1.441	87	64	437.5	100.3	1948.7	80	127.5	207.5	5.1%	4.75%
Northumbrian[65]	1.207	57	51	405.1	120.5	1913.3	79.8	135.5	215.3	6.3%	4.75%
Severn Trent	3.898	64	50	884.4	282.1	4037.5	137.4	192.5	329.9	7.0%	4.75%
South West	0.724	55	51	243.4	93.8	1427.4	62	92.4	154.4	6.6%	4.75%
Southern	1.86	65	67	416.1	151.2	2047.3	48.6	241.1	289.7	7.4%	4.75%
Thames	5.491	47	45	1002.2	305.4	4394.6	206	149.1	355.1	6.9%	4.75%
United Utilities[66]	3.143	68	40	945.2	276.5	4581.8	172	197.6	369.6	6.0%	4.75%
Wessex	1.115	58	43	251.5	102.1	1218.8	34.9	93.1	128.0	8.4%	4.75%
Yorkshire[67]	2.218	56	47	543.6	163.0	2479.4	115	147.3	262.3	6.6%	4.75%
Total				**5816.4**	**1804.0**	**27614.9**			**2575.0**		

1. Sources:
   - Table 5, p12, Levels of service for the water industry in England & Wales 2000 - 2001, Ofwat, September 2001.
   - Table 4, p14, Financial performance and expenditure of the water companies in England & Wales 2000-2001, Ofwat, July 2001.
   - Table 9, p21, Financial performance and expenditure of the water companies in England & Wales 2000-2001, Ofwat, July 2001.

[64] Hartlepool Water plc merged with Anglian Water Service Ltd in 2000.
[65] Northumbrian Water Ltd merged with North East Water plc in 1996 and Essex & Suffolk Water plc in 2000.
[66] Renamed from North West Water plc in 1996.
[67] York Waterworks merged with Yorkshire Water plc in 2000.

Water Only Companies	Properties connected (M)	Average annual (£/property)		Turnover (£M)	CC operating profit (£M)	Average Capital Value (£M)	CAPEX 2000-01 (£M)			Return on Capital employed (%)	WACC 1999 (Real, post-tax)
		Water	Sewerage				Water	Sewerage	Total		
Bournemouth & W Hants	0.185	77		26.5	6.1	88.7	7.1		7.1	6.9%	5.50%
Bristol	0.481	69		63.3	12.8	158.6	20.5		20.5	8.0%	5.50%
Cambridge	0.125	64		13.6	3.2	40.0	3		3.0	8.1%	5.50%
Cholderton & District Water		*Very small company*									n/a
Dee Valley[68]	0.115	71		16.3	4.6	41.3	3.6		3.6	11.2%	5.50%
Essex & Suffolk Water	0.753	*Merged with Northumbrian Water 2000*									5.15%
Folkstone & Dover	0.072	86		12.1	3.9	34.4	3.5		3.5	11.4%	5.50%
Hartlepool	*0.04*										
Mid Kent	**0.239**	**78**		**33.8**	**8.0**	**126.7**	**20.4**		**20.4**	**6.3%**	**5.50%**
North Surrey	*0.284*	*Merged with Three Valleys 2000*									5.50%
Portsmouth	0.287	50		28.4	8.9	79.3	7		7.0	11.3%	5.50%
South East (Mid Southern merged 1999)	0.582	67		85.0	29.8	380.2	24.4		24.4	7.8%	5.15%
South Staffordshire	0.542	66		58.3	11.7	121.1	19.6		19.6	9.6%	5.50%
Sutton & East Surrey[69]	**0.268**	**67**		**35.3**	**7.9**	**95.4**	**12.3**		**12.3**	**8.2%**	**5.50%**
Tendring Hundred	0.069	71		10.9	3.9	47.7	3.6		3.6	8.2%	5.50%
Three Valleys[70]	1.215	66		157.4	37.6	495.7	43.6		43.6	7.6%	5.15%
York Waterworks	*0.079*	*Merged with Yorkshire Water 2000*									5.50%
Total				**540.9**	**138.4**	**1620.4**			**168.6**		

2. Source: As for W&SCos above. Property connected figures in *Italics* are for 1997-98. Mid Kent and Sutton & East Surrey appealed Ofwat's 1999 decision to the UK Competition Commission.

[68] Chester Waterworks and Wrexham Water plc combined as Dee Valley Water plc following their merger in 1998.
[69] Sutton District Water plc and East Surrey Water plc combined as Sutton & East Surrey Water plc following their merger in 1996.
[70] North Surrey Water plc merged with Three Valleys plc in 2000.

Public Electricity Suppliers (distribution Companies)	Turnover (£M)	Average Capital Value (£M)	Net Capital Investment (£M)	WACC 1999 (Real, post-tax)
Eastern	272	1071	115	*5.1%*
East Midlands	227	895	64	*5.1%*
London	210	862	76	*5.1%*
Manweb	151	617	61	*5.1%*
Midlands	230	845	74	*5.1%*
Northern	144	501	52	*5.1%*
Norweb	199	719	81	*5.1%*
Seeboard	153	481	58	*5.1%*
Southern	281	1328	104	*5.1%*
Swalec	121	497	39	*5.1%*
South Western	163	636	62	*5.1%*
Yorkshire	203	780	57	*5.1%*
Scottish power	245	1233	55	*5.1%*
Hydro-electric	112	708	51	*5.1%*
Total	**2711**	**11173**	**949**	
NGC – Electricity Transmission	800	4606	305	*5.1%*
Transco – Gas Transmission	2940	12700	820	*5.1%*

1. Source: PES, *Annex 2, Reviews of Public Electricity Suppliers 1998 to 2000 Distribution Price Control Review, Final Proposals*, OFGEM, December 1999. All values shown are OFGEM projections for 2000-01 at 1997/98 prices.
2. Source: NGC, Table A6.1, p65, *The transmission price control review of the National Grid Company from 2001 Transmission asset owner, Final proposals*, OFGEM, September 2000. All values shown are OFGEM projections for 2000-01 at 2000/01 prices.
3. Source: TRANCSO, *Table 6.1: Review of Transco's Price Control from 2002, Final Proposals*, OFGEM, September 2001. All values shown are OFGEM projections at 2000 prices.
4. Real, post-tax WACCs have been estimated using CAPM parameter values proposed by OFGEM and the Vanilla WACC formula adopted by the Office of the Regulator General in the 2001 Victorian electricity distribution price review.

APPENDIX B: SUMMARY OF WACC PARAMETER COMPARISONS – AUSTRALIAN & UK REGULATED INDUSTRIES.

WACC PARAMETER		Cost of debt		Market risk premium	Equity beta	Post-tax Return on equity		Pre-tax WACC		Post-tax WACC (Vanilla)	
		Nom	Real	Nom		Nom	Real	Nom	Real	Nom	Real
TPA Proposal 1998	Gas Trans	8.75%	5.58%	6.5%	0.95	14.19%	10.90%	13.02%	9.73%	*10.9%*	*7.7%*
ACCC 1998		7.2%	4.6%	6.0%	1.2	13.2%	10.4%	*10.4%*	**7.75%**	*9.6%*	*6.9%*
IPART 2000	Gas Dist (mid-range)	7.44%	*4.5%*	5.5%	1.0	12.0%	*8.9%*	*10.8%*	**7.75%**	*9.3%*	*6.2%*
OFFGAR 2000	Gas Dist	*7.5%*	*4.6%*	6.0%	1.08	12.7%	9.7%	10.5%	**7.5%**	9.6%	6.6%
IPART 1999	Elec Dist (mid-range)	7.5%	*4.4%*	5.5%	1.0	12.0%	*8.6%*	*10.7%*	**7.50%**	*9.1%*	*6.1%*
ORG 2000	Elec Dist	*7.7%*	5.0%	6.0%	1.0	*12.4%*	9.5%	*9.8%*	6.8-7.2%	*9.6%*	**6.8%**
QCA 2000	Elec Dist	7.01%	*4.8%*	6.0%	0.71	9.62%	*7.4%*		n/a	**8.05%**	*5.9%*
IPART 2000	Water (mid-range)	7.30%	*4.4%*	5.5%	0.835	11.1%	*8.0%*	*10.0%*	**7.0%**	*8.8%*	*5.8%*
OFGEM 2001	Transco Gas Trans	*7.0%*	4.25-4.65%	3.5%	1.0	*8.8%*	6.25%	*8.8%*	**6.25%**	*7.7%*	*5.1%*
OFGEM 2002	Indep Gas Trans	*7.8%*	4.75-5.75%	3.5%	0.7-1.0	*8.3%*	5.2-7.05%	*10.1%*	**6.4-8.5%**	*8.1%*	*5.5%*
OFGEM 1999	Elec Dist	*6.9%*	4.3%	3.5%	1.0	*8.6%*	6.0%	*9.2%*	**6.5%**	*7.7%*	*5.1%*
OFGEM 2000	NGC Elec Trans	*7.0%*	4.45%	3.5%	1.0	*8.8%*	6.25%	*8.9%*	**6.25%**	*7.7%*	*5.1%*
OFWAT 1999	W&S	*6.6-8.1%*	2.8-3.5%	3.0-4.0%	0.7-0.8	*7.2-9.3%*	4.6-6.2%		n/a	*6.9-8.7%*	**4.75%-5.50%**
Monopoly Service Provider Proposals 2002	GasNet/NECG	6.98%	*4.4%*	6.0%	1.4	14.19%	*11.4%*	*10.9%*	8.22%	9.86%	7.19%
	ElectraNet SA/NECG	7.62%	*5.2%*	6.5%	1.12	13.66%	*10.6%*	*11.0%*	8.46%	10.03%	*7.3%*
	SPI PowerNet/Officer	7.84%	*4.6%*	6.0%	1.0	11.99%	*8.6%*		n/a	9.50%	6.89%

1. Figures in **Bold** are used in regulators' decisions. Figures shown in plain text have been taken from regulators' reports.
2. Figures in *Plain Italics* are estimated using CAPM parameter values proposed by regulators and the formula adopted by the Office of the Regulator General in the 2001 Victorian electricity distribution price review.
3. Estimated figures are mid-range values where ranges are quoted in source documents.