

# Appendix 1

## KPMG'S Report on Weighted Average Cost of Capital for the Regulated Gas Distribution



Revised Access Arrangement for Country Energy Gas Network  
Draft Decision  
30 September 2005





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## 1. Introduction

The Independent Pricing and Regulatory Tribunal's (the 'Tribunal') draft decision states that it is not satisfied that CEG's proposed rate of return meets the Code requirements. On this basis, the Tribunal has proposed to amend CEG's access arrangement. The table below sets out the Tribunal's proposed changes and the resulting pre-tax real WACC.

Parameter	CEG's proposed value	Tribunal's proposed amendment
Nominal risk free rate	5.7%	5.2%
Real risk free rate	3.4%	2.6%
Debt margin (inclusive of allowance for debt raising costs)	1.3% - 1.7%	1.2% - 1.3%
Equity beta	1.00 – 1.24	0.8 – 1.0
Pre-tax real WACC range	7.8% - 8.3%	5.9% - 6.9%
Pre-tax real WACC – point estimate	8.0%	6.7%

Our response to the Tribunal's proposed amendments is set out below. In addition, we have also presented updated research in relation to the value of imputation credits (as denoted by "gamma"), including the relationship between the value of gamma and the market risk premium ("MRP").

## 2. Real and nominal risk free rate

CEG understands that the proposed amendments to the nominal and real risk free rates reflect movements in market interest rates since the time CEG's access arrangement was submitted to the Tribunal. As such, we understand that these rates are likely to be subject to a further amendment upon the release of the Tribunal's final decision to reflect market interest rates at that time.

CEG has reviewed quoted market interest rates for the 20 days to 3 August 2005. We note that the benchmark 10 year Capital Indexed Bond ("CIB") yield is currently represented by the 20 August 2015 CIB. As the yields quoted by the Reserve Bank of Australia ("RBA") for this instrument are quarterly yields, it is necessary to convert the quoted yields into effective annual yields<sup>1</sup>. Based on our calculations, the real 10 year government bond yield for the 20 days to 3 August 2005 is therefore 2.64%.

In reviewing the market data on interest rates, CEG is concerned about the magnitude of the proposed reduction in the real risk free rate of return, and in particular, the low levels to which real yields have declined during August 2005. The chart below illustrates the recent trend in the real 10 year government bond yield.

<sup>1</sup> The formula for converting the yield is  $(1 + \text{periodic yield}/\text{no. of periods})^{(\text{no of periods})} - 1$ . For example, if the semi-annual yield is 2.5%, the effective annual yield is 2.516%.

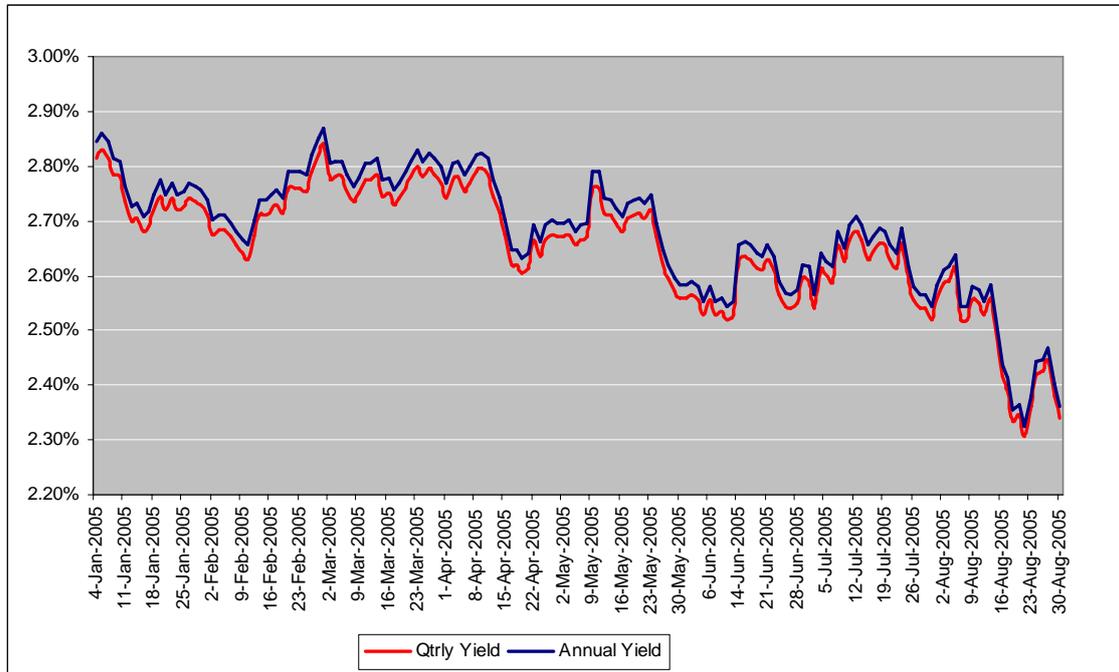
**Figure 1: Yield on August 2015 Capital Indexed Bonds**

Figure 1 indicates that real 10 year bond yields dipped to very low levels around 20 August 2005. This movement coincides with the maturity of the 20 August 2005 Capital Index Bond, of which there were \$532 million on issue at the time, with a total indexed capital value of \$1.135 billion.

Inquiries with Westpac Bank indicates that the maturity of the 20 August 2005 bond had two impacts:

- Firstly, it delivers cash into the hands of existing holders; and
- Secondly, it results in the buying of longer dated CPI Bonds as benchmark investors re-balance the duration of their portfolios.

Westpac has predicted that beyond 20 August, one would expect that an amount of unsatisfied demand is likely to still exist, and this may put downward pressure on real yields for a number of weeks.

Whilst the 20 day averaging period used by the Tribunal in its draft decision is likely to have preceded the recent decline in yields, CEG wishes to draw the Tribunal's attention to the potential for short-term or transitory market factors to impact on yields. Given that such factors can have a material impact on market yields, we seek a commitment from the Tribunal that it will take into consideration such factors at the time the final decision for CEG is issued to ensure that the rate of return that will apply to CEG for the next access arrangement period is set on the basis of appropriate data. This is particularly so, in view of the fact that the Tribunal's

approval of CEG's access arrangement has been delayed as result of factors beyond CEG's control.

CEG understands that the ACCC recently faced a similar situation in respect of its approval of EnergyAustralia's revenue cap decision in May 2005. This led the ACCC to estimate the risk free rate of return by reference to a sampling period prior to the start of the regulatory period. The ACCC noted that:

*"In previous revenue cap decisions, the WACC was updated for bond rates that were based on a moving average period from the date of the final decision ... The ACCC notes that the WACC for EnergyAustralia was set on the same principle of a forward looking basis at the time of the draft decision. Therefore under normal circumstances the ACCC would update the WACC for prevailing bond rates at the time of the originally scheduled final revenue cap decision in mid 2004.*

*However, this decision has been delayed due to the application of the incentive framework for capex as set out in the SRP ... This is a unique circumstance and the ACCC does not envisage that future revenue cap decisions will be made part way through a regulatory period.*

*Given the price for 2004-05 has already been set, the ACCC considers that it would be inappropriate to retrospectively adjust the forecast WACC for current bond rates in the market. Instead the ACCC will finalise its estimate of the WACC for EnergyAustralia with bond rates as at 28 April 2004."*<sup>2</sup>

Whilst we have highlighted the ACCC's approach to dealing with the delay in its decision process, CEG does not propose that the Tribunal adopt a similar approach. However, we request that the Tribunal take into account the unanticipated delay in approving our access arrangement and ensure that this delay in timing does not affect the measurement of any WACC parameters in a way that unfairly disadvantages CEG.

For the purposes of providing an updated calculation of WACC, CEG has updated the 20 day average yields on the nominal and real risk free rates. Our calculations indicate that for the 20 days ending 27 September 2005:

- the nominal risk free rate averaged 5.25%; and
- the real risk free rate averaged 2.39%.

These figures are measured as effective annual yields.

### **3. Debt margin**

#### ***Data measurement issues with credit margin***

CEG's proposed a debt margin of 1.3% to 1.7% in its access arrangement. This margin included a component for a credit margin for BBB to BBB+ rated 10 year corporate bonds in the range of 95 to 109 basis points. In estimating the appropriate credit margin, CEG based its estimates from data provided by CBA Spectrum.

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<sup>2</sup> ACCC, May 2005, ACT and NSW transmission revenue cap, Energy Australia 2004-05 to 2008-09, page 73.

The Tribunal has stated that whilst it agrees with the credit rating benchmark adopted by CEG, the credit margins proposed are no longer valid due to the passage of time. Using data from CBA Spectrum, the Tribunal has estimated that the current credit margin ranges from 104 basis points to 114 basis points.

CEG agrees with the Tribunal's decision for amending the credit margin. However, CEG is also aware of new research (which was not available at the time CEG submitted its proposed access arrangement) that indicates that the credit spread data provided by CBA Spectrum is under-stated by approximately 25 basis points for long dated bonds.<sup>3</sup>

The research we refer to was commissioned by the Energy Networks Association ("ENA") and undertaken by NERA. NERA's review concluded that:

*"The CBA Spectrum estimation procedure is such that CBA Spectrum estimated yields are expected to be, and in practice are, on average, less than actual yields for long dated, low rated bonds. Between 30 June 2003 and 10 May 2005, actual yields on Australian bonds with more than 6 years to maturity and ratings of A or below averaged 17.1 basis points higher than CBA Spectrum estimated yields on such bonds. For bonds with more than 8 years to maturity and ratings of A or below, the difference has averaged 22.2 basis points.*

*On this basis we consider that the minimum reasonable adjustment to CBA Spectrum estimates by regulators seeking to estimate the cost of debt on 10 year low rated debt is 22.2 basis points. Using only data from CBA Spectrum, our best estimate of the appropriate adjustment to CBA Spectrum estimates of yields on 10 year debt rated A or below is to add 25.6 basis points."*<sup>4</sup>

In submitting the research to the Victorian Essential Services Commission ("ESC"), the ENA noted that a copy of NERA's report was provided to and discussed with representatives of CBA Spectrum, and that CBA Spectrum has not identified any factual error in the report.

CEG notes that in its recent draft decision on the 2005-2010 electricity distribution price review, the ESC undertook its own research on this matter and confirmed that the degree of under-statement in CBA Spectrum data claimed by the Victorian distribution businesses was true. This work was undertaken given that NERA's report had not been completed prior to the issue of the draft decision. Based on its own research, the ESC allowed an additional margin of 25 basis points to correct for this data measurement error in its draft decision.

CEG proposes that the Tribunal acknowledge the data issues with CBA Spectrum and provide an additional margin of 25 basis points above the credit spreads obtained from CBA Spectrum. Using a 20 day average to 27 September 2005, inclusion of this margin would result in an all-inclusive debt margin in the range of 136 basis points to 145 basis points<sup>5</sup>.

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<sup>3</sup> NERA, Critique of available estimates of the credit spread on corporate bonds, A report for the ENA, May 2005.

<sup>4</sup> NERA, op cit. page 2.

<sup>5</sup> Inclusive of 12.5bp margin for debt establishment costs.

## 4. Equity beta

### *Measurement issues*

The Tribunal has proposed to adopt an equity beta range of 0.8 to 1.0 in estimating a WACC for CEG. This equity beta range corresponds with an asset beta range of 0.3 to 0.4, assuming a zero value for the debt beta. The draft decision suggests that this adjustment is conservative given that observed asset betas for comparable Australian businesses are currently no higher than 0.30. Nevertheless, the Tribunal has adopted this range to reflect its emphasis on providing CEG with a rate of return that is sufficient to attract investment.

CEG concurs with the Tribunal's decision to allow a rate of return that provides continued incentives for investment. However, CEG considers that the Tribunal has under-stated the extent of the problems that are inherent with the measurement of the equity beta in its choice of values for this parameter, and as a result, has incorrectly concluded that the equity beta to apply for the next access arrangement period should be below the equity beta applied in the current access arrangement period.

The Tribunal's draft decision notes that its examination of the trend in the equity betas of Australian comparable companies suggests that the estimates have been volatile. However, the important implication of the observed volatility in estimates of the equity beta is that the estimates are statistically unreliable.

For example, CEG questions whether the observed equity beta of zero for AGL quoted in Table 8.4 of the Tribunal's draft decision makes any sense. The estimate implies that investors require a return from investing in AGL that is equivalent to the return they would obtain by investing in risk free government bonds. This interpretation of the equity beta for AGL defies commercial common sense and goes against one of the fundamental principles of finance theory, which is that investors require a premium for investing in equity versus risk free bonds.

Furthermore, CEG observes that the equity betas for the five comparable companies utilised by the Tribunal, even after being re-levered to 60% gearing, are vastly different. The values range from 0.14 (for GasNet) to 0.74 (for APT). If these firms have been chosen on the basis of their comparability with each other and with CEG, we question why the beta estimates should not exhibit some degree of consistency with each other, or equivalently, less variation between the estimates. In our view, it is possible that these firms are – at least to some extent - comparable to each other and to CEG, but the explanation as to why the re-levered beta estimates are so different may lie in the possibility that the *estimates* of beta are statistically unreliable. The alternative is that they are not in fact comparable to each other or to CEG, in which case, they do not provide a credible basis upon which to establish an equity beta for CEG.

Comprehensive research and analysis on the estimation of the equity beta for Australian energy distribution businesses has recently been undertaken by SFG (2005a)<sup>6</sup>. The key points made in SFG (2005) are:

- estimates of beta obtained from commercial data service providers such the Risk Measurement Service (RMS) provided by the AGSM are typically measured mechanically.

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<sup>6</sup> SFG Consulting & Officer, 17 April 2005, The Equity Beta of an Electricity Distribution Business, Report prepared for ETSA Utilities.

That is, they are estimated by applying the Ordinary Least Squares ("OLS") technique without any adjustment for statistical outliers, non-representative data points, or market episodes such as crashes or bubbles. Without such adjustments, the statistical precision of estimates of beta is often very low:

- 95% confidence intervals constructed around the December 2004 AGSM estimates of the equity betas for AGL, Alinta, Envestra and APT (re-levered to 60% gearing), indicates that the range is so broad that the estimates are virtually meaningless. In most cases it is impossible to reject the hypothesis that the equity beta is well above 1.0, just as it is impossible to reject the hypothesis that it is below 0;<sup>7</sup> and
- The R<sup>2</sup> statistic, which is a measure of the proportion of variation in stock returns that is explained by variation in market returns, is also typically low for unadjusted beta estimates. Reference is made to Bowman and Bush (2004)<sup>8</sup> which recommend that beta estimates for comparable firms should be used only if the R<sup>2</sup> statistic is above 10%. Where more than 90% of the variation is caused by firm-specific diversifiable risk factors, estimates of systematic risk (beta) are too unreliable to be of any use. CEG notes that of the comparable companies quoted by the Tribunal in Table 8.4 of its Draft Decision, only the Australian Pipeline Trust has an R<sup>2</sup> statistic above 10%.<sup>9</sup>
- Estimates of beta derived mechanically often may not make any sense. It was noted that:
 

*"...for example, in the most recent beta report from the Risk Measurement Service at the AGSM (December 2004) more than 10% of the reported OLS beta estimates are negative. This implies that one in ten Australian firms can raise equity capital by promising returns lower than the yield on risk-free government bonds. Clearly, this is more a reflection of statistical problems in the mechanical analysis than prevailing market conditions. For this reason, OLS equity beta estimates from commercial data services should only ever be the starting point when determining a forward-looking equity beta and should always be subjected to and compared with the results of a much broader analysis."*<sup>10</sup>
- In an earlier report, SFG (2004) noted that there was substantial time variation in beta estimates. In particular, *"...it is not uncommon for beta estimates to change by more than 0.3 from one quarter to the next, even though the samples differ by only three observations. This further illustrates how fickle and unreliable standard beta estimates are."*<sup>11</sup> In that report, SFG goes on to conclude that the time series variation is most likely reflective of the statistical imprecision and unreliability of the equity beta estimates rather than any fundamental change in the structure of the businesses or the relationship between the businesses and the broad Australian market. This conclusion was preferred because:
  - the degree of time series variation was so large that it could not possibly have been driven by changes in the risk of the businesses – adopting that interpretation would

<sup>7</sup> SFG (2005a), op cit. para 4.3.14.

<sup>8</sup> Bowman, R.J. and S.R. Bush (2004), "A Test of the Usefulness of Comparable Company Analysis", Department of Accounting and Finance, University of Auckland.

<sup>9</sup> The R<sup>2</sup> of the Australian Pipeline Trust was 12%, just marginally above the recommended threshold in Bowman and Bush (2004).

<sup>10</sup> SFG (2005a), op cit., para. 4.3.8.

<sup>11</sup> SFG (2004), 12 October 2004, The Equity Beta of an Electricity Distribution Business, Draft report prepared for ETSA Utilities. p.14.

imply that investors change their required return on these stocks by up to 3% from quarter to quarter; and

- there were several instances where the change from one quarter to the next saw the estimated betas of different firms move in substantially different directions. This is more consistent with firm-specific estimation errors rather than the risk of the businesses having changed;
- there are a number of statistical techniques that could be used to improve simple OLS beta estimates. These are:
  - removal of unrepresentative outliers. Outlier observations can often have a significant impact on an estimate of beta. AGSM beta estimates are based on a maximum of 48 return observations – given the few data points utilised, a single outlier can significantly influence the final estimate. The paper illustrates this point using AGL as an example:

*“For example, AGL produced a +5% stock return on the back of positive results announced in September 2001. The fact that this occurred in a month in which the broad market was down 6% (primarily due to terrorist activities in the US) causes the estimated beta to be significantly lower than it would otherwise have been.”*

If implemented appropriately, this process can often lead to noticeable improvements in the  $R^2$  statistic.

- Removal of unrepresentative market events such as stock market crashes and bubbles. SFG (2005a) explains the rationale for this adjustment as follows:

*“Whenever historical data is used to estimate equity betas, the features of the dataset that is used are effectively assumed to recur in the future, with the same frequency with which they occur in the data set. For example, if a four-year data set is used, and this period happens to contain a stock market crash, a beta estimated with reference to this data implicitly assumes that such a crash will occur once every four years on average. Similarly, if a two-year bubble is included in a four-year data set, betas estimated using that data set effectively assumes that such a stock market bubble will repeat, on average, in two of every four years in the future.”<sup>12</sup>*

Reference is made to the work of Annema and Goedhart (2003)<sup>13</sup> which used US data to examine the impact on beta estimates of the telecom-media technology (“TMT”) stock market bubble of 1998-2001. Annema and Goedhart (2003) noted that *“despite volatility in the market during the 20 years before 1998, industry-specific betas were remarkably stable. But during the bubble, betas for many industries appeared to decline significantly ... these apparent decreases actually reflect the influence of telecom, media and technology share prices on the indexes during the 1998-2001 bubble and distort the real change in the relative risk borne by companies in other industries.”* Annema and Goedhart (2003) re-estimated betas after excluding the 1998-2001 period, and found that the resulting estimates were substantially higher and more consistent with pre-bubble levels.

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<sup>12</sup> SFG (2005a), op cit, para 4.3.24.

<sup>13</sup> Annema, Andre and Marc H Goedhart (2003), “A Better Beta”, McKinsey Quarterly, 2003, 1,1-5.

CEG also notes that the Allen Consulting Group has also provided advice to the QCA<sup>14</sup> and to the Economic Regulation Authority<sup>15</sup> in Western Australia in relation to recent determinations made by these regulators, that after having considered empirical evidence and the desirability of maintaining stability in regulatory decisions across time and across businesses, the use of an equity beta of 1.0 (for a gearing level of 60%) is justified in the absence of rigorous evidence in support of some other value.

- applying the “Blume” adjustment for non-persistent estimation error. SFG (2005a) reports that commercial providers of beta estimates, including Bloomberg and ValueLine, apply a statistical adjustment that is designed to correct for the type of estimation error that pervades simple OLS regression estimates. This adjustment is based on the work of Blume (1975) who shows that beta estimates exhibit mean reversion over time<sup>16</sup>. Blume (1975) recommended that a statistical adjustment be applied to simple OLS beta estimates to incorporate this observed mean reversion.

The use of the Blume adjustment was previously rejected by the Victorian ESC. Whilst the ESC acknowledged the empirical support for the tendency for mean reversion in beta estimates, it argued that mean reversion was most likely due to the conscious diversification and gearing strategies employed by businesses, which caused companies with low betas to move towards higher betas. No evidence, however, was presented to support the ESC's contentions. SFG (2005a) therefore consider that the ESC has rejected the Blume adjustment in error. SFG (2005a) considers that the explanation for mean reversion in beta estimates may lie in the possibility that the *estimates* of beta revert to one over time, but the true betas are stable over time. They postulate that a very low beta estimate is more likely to be contaminated by negative measurement error and a high beta estimate is more likely to be contaminated by positive measurement error. If these errors were random over time, this would manifest itself as beta estimates regressing towards one over time, even if the true betas were constant.

- Using longer data sets. A longer data set provides more observations but is also increases the likelihood that the nature of the business has changed over that time. Similarly, sampling more frequently (i.e. using weekly returns rather than monthly returns data) can increase the number of data points however, if there are thin trading problems in the data, this approach will exacerbate the problem. SFG (2005a) notes that the theory behind the CAPM provides no guidance about the appropriate data period to be used to estimate equity betas. Commercial practice is to use four or five years of monthly data.
- After applying a range of statistical methods<sup>17</sup> to several different data sets<sup>18</sup> with a view to determining the equity beta that best characterises the likely future relationship between the

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<sup>14</sup> The Allen Consulting Group: Queensland Distribution Network Service Providers – Cost of Capital Study, December 2004 Report to Queensland Competition Authority.

<sup>15</sup> The Allen Consulting Group: May 2004, AlintaGas Networks Revised Access Arrangement: Proposed Rate of Return, Report to the Economic Regulation Authority.

<sup>16</sup> That is, the estimate is more likely to move towards one from one period to the next.

<sup>17</sup> The adjustments included the Blume adjustment, elimination of certain outlier observations and removal of the impact of the technology bubble (which involves eliminating data from July 1998 to June 2001)

<sup>18</sup> The data sets included a four year, five year and 3.5 year period. The latter was tested as this is the period since the end of the technology bubble.

stock and market returns for an Australian energy distribution business, SFG (2005a) found that:

*“All of the empirical techniques we examine, when properly applied to a range of market data sources, lead us to the conclusion that the appropriate equity beta for an Australian energy distribution business (with 60% gearing) is at least one. An equity beta estimate of 0.8 is unreasonable in light of the empirical evidence and the purpose for which it is to be used.”*<sup>19</sup>

In light of these findings, CEG questions the Tribunal's choice of a value of 0.8 at the low end of its preferred equity beta range.

CEG has referred extensively to the research conducted by SFG (2005a) in the discussion above in order to emphasise to the Tribunal, the complex issues that are involved in interpreting estimates of equity betas. CEG is not proposing that market evidence should not be used in estimating the equity beta, but rather that such data should be interpreted with caution and pragmatism. Gray et al (2005)<sup>20</sup> argues that:

*“In the absence of any information regarding the systematic risk of the firm, the best estimate of the equity beta of any stock is unity. Even where information is available, unity may still be the best estimate of the equity beta if that information contains substantial estimation error or is particularly imprecise.”*<sup>21</sup>

Given the inherent imprecision with the estimates of beta as discussed above, CEG questions whether it is possible for the Tribunal to conclude with a sufficient degree of confidence, that the true equity betas are currently at lower levels than they were at the last price determination. The inherent imprecision in available estimates of beta mean that it is difficult conclude whether currently observed estimates of beta are lower than previous observations because of true market conditions or because of statistical error. As noted above, comprehensive research and analysis undertaken by SFG (2005a) concludes that *“...when the technology bubble and statistical outliers are removed from the analysis, there is no support for an equity beta estimate less than one.”*<sup>22</sup> On this basis, CEG urges the Tribunal to re-consider its choice of values for the equity beta.

Notwithstanding that the Tribunal's ultimate choice of a point estimate for WACC lies towards the high end of the resulting calculated WACC range, CEG believes that this does not eliminate the need for the Tribunal to re-assess the equity beta range and to adopt a value or a range that can be credibly described as feasible. As a matter of principle, the Tribunal's choice of values for the equity beta is described as “meeting the requirements of the Code”. In light of the issues discussed above, we do not agree that the requirements of the Code are met by adopting an equity beta within a range of 0.8 to 1.0.

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<sup>19</sup> SFG (2005a), para. 1.19.

<sup>20</sup> Another study on techniques for estimating equity betas is: Gray, S., Hall, J., Bowman, J., Brailsford, T, Faff, R and R. Officer, “The performance of alternative techniques for estimating equity betas of Australian firms”, a report prepared for the Energy Networks Association, May 2005.

<sup>21</sup> Gray et al (2005), page 11.

<sup>22</sup> SFG (2005), op cit. page 5.5.13

## 5. Regulatory risk

The Tribunal's draft decision requires CEG to include a capital redundancy mechanism in its reference tariff policy so that the value of assets that cease to contribute to the delivery of services can be removed from CEG's capital base. In assessing an appropriate rate of return, the Tribunal has acknowledged the requirement of the Code for it to consider the impact of such a mechanism on the allowed rate of return. However, after considering its impact, the Tribunal has concluded that:

*"Having regard to section 8.27, the Tribunal considers that any asset stranding resulting from such a mechanism is a diversifiable risk and so should not be included in a rate of return that is based on the CAPM. This is because the CAPM rewards investors only for non-diversifiable (systematic) risk."*<sup>23</sup>

CEG does not agree with the Tribunal's characterisation of the asset stranding risk that arises from the capital redundancy mechanism as being "diversifiable". We agree that asset stranding is not "systematic" in the sense that it does not fit the description of a market-wide risk under the CAPM. However, diversification is only possible under the CAPM where the distribution of expected returns is normal. It is the property of symmetry in the normal distribution that allows investors to diversify risks.

The inclusion of a mechanism that can result in assets being removed from CEG's capital base has an asymmetric impact on CEG's potential returns. It results in an expected return distribution that is skewed because assets can be valued below (depreciated) cost but there is no equivalent and offsetting mechanism in place that allows the value of CEG's capital base to be increased above the cost of the asset. Its effect is similar to the regulatory discretion that is afforded to the Tribunal to disallow capital expenditure where it is assessed as being inefficient. Due to its asymmetric impact on expected returns, the risk resulting from the capital redundancy mechanism is not diversifiable. Accordingly, it is incorrect to describe this risk as being diversifiable under the CAPM – it is simply not accommodated by the CAPM.

The issue of asymmetric risk and the need for appropriate compensation was recognised over a decade ago:

*"Failure [by regulators] to account explicitly for regulatory and other asymmetric risk will usher in a new era of an undercapitalised public utility sector. Regulated firms will have strong incentives to deter investment and utilise small scale technology that is below minimum efficient scale."*<sup>24</sup>

Further:

*"...asymmetric treatment of uncertainty – by which losses of a firm are treated differently by the regulator than extraordinary profits – leads to distortions in the firm's actions that operate*

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<sup>23</sup> Draft Decision, page 62.

<sup>24</sup> Kolbe, A, W. B. Tye, and S.C. Myers (1993), *Regulatory risk: Economic principles and applications to natural gas pipelines and other industries* (Topics in regulatory economics and policy series), Kluwer, p. 60.

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*against optimality ... asymmetry can actually induce the firm to make decisions in a way that ultimately works against the goals of the regulator and the welfare of customers.”<sup>25</sup>*

CEG notes that in its 1999 determination on Great Southern Energy's gas access arrangement, the Tribunal acknowledged the impact of asset stranding risk by allowing some headroom for asset-specific risks generally in the rate of return. Furthermore, in the Tribunal's 2005 review for the NSW electricity distribution businesses, the Tribunal – whilst not incorporating asymmetric risk into the rate of return – acknowledged its presence and the need to account for it:

*“...if asymmetric risk represents a truncation of returns and consequently violates the CAPM assumption of normally distributed returns, a different model should be used. In the absence of a better model and sufficient evidence that asymmetric risk is the only risk that violates the assumption of normally distributed returns, the Tribunal considers it correct to account for these risks elsewhere in the building block model if necessary.”<sup>26</sup>*

In the draft decision on CEG's access arrangement, however, the Tribunal has once again shifted its position and not allowed any compensation for this risk in the rate of return nor in CEG's operating costs. We do not consider the Tribunal's approach to be reasonable.

There is no doubt that the nature of the asset stranding risk that arises from the inclusion of the capital redundancy mechanism is an inherently difficult risk to quantify. However, due to the characteristics of CEG's network, revenue is typically concentrated in the hands of a small number of large customers. CEG considers that the Tribunal's decision not to allow compensation for this risk on grounds of theoretical purity – particularly when it is clear that the underlying theory is imperfect - is at odds with the apparent emphasis that the Tribunal has placed on the interests of the service provider and incentives for investment elsewhere in its assessment of an appropriate rate of return for CEG.

CEG considers that the Tribunal should make some allowance for this risk in assessing an appropriate return through the equity beta. At the very minimum, and in conjunction with the arguments presented earlier on the measurement issues affecting the equity beta, we consider that the presence of this risk should lead to the selection of an equity beta no lower than 1.0.

## **6. Value of gamma**

In the draft decision, the Tribunal states that it accepts the range of 0.3 to 0.5 which was proposed by CEG for the value of gamma. CEG previously noted in its submission that a range of 0.3 to 0.5 for the value of gamma was consistent with previous decisions by the Tribunal and that whilst there was evidence that suggested that the appropriate value of gamma should be closer to zero (i.e. by Cannavan, Finn and Gray (2001)), this research was relatively new at the time and not yet subject to widespread scrutiny.

In responding to the Tribunal's draft decision, CEG wishes to point to a number of recent developments in relation to the value of gamma that have a bearing on the value that should be adopted:

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<sup>25</sup> Train, K (1991), *Optimal Regulation, The theory of Natural Monopoly*, MIT Press, p.96-7.

<sup>26</sup> IPART (2004), *NSW Electricity Distribution Pricing 2004-05 to 2008-09, Final Report*, June.

- firstly, the research by Cannavan, Finn and Gray (2001) has since been published in a top tier academic journal<sup>27</sup>. This evidence in a leading international peer-reviewed journal must be contrasted against un-reviewed, unpublished working papers and local publications. It adds strength to the main conclusion of that paper that since the introduction of the 45 day rule, the value of imputation credits is worthless to the marginal investor. We are not aware of any published research that challenges the key conclusion in this paper;
- secondly, new research by Hathaway and Officer (2004)<sup>28</sup> indicates that the value of imputation credits is approximately 35.5 per cent. This paper is an update of Hathaway & Officer's previous research on the value of imputation credits which provided support for a value of imputation credits of 50 per cent. We note that the previous work of Hathaway & Officer was relied upon by regulators around Australia. Taken together, the papers by Cannavan, Finn and Gray (2004) and Hathaway & Officer (2004) would suggest that the feasible range of values for gamma would now appear to be between zero and 35.5 per cent, rather than 30 and 50 per cent;
- thirdly, CEG notes that in its recent draft decision on the 2005-2010 electricity price distribution review in Victoria, the ESC has flagged that an explicit adjustment for the value of imputation credits may no longer be consistent with broad market practice for the treatment of this parameter. On this basis, the ESC has questioned whether it should dispense with an adjustment for the value of gamma. In responding to the draft decision, the Victorian distributors have submitted evidence to the ESC that indicates that standard market practice is not to explicitly adjust the rate of return for the value of imputation credits<sup>29</sup>;
- fourthly, CEG is aware that it has been suggested by some regulators (e.g. the ESC) that the value assumed for gamma is tied to the value assumed for the market risk premium ("MRP"). CEG has reviewed a paper by SFG (2005b)<sup>30</sup> prepared for the Victorian electricity distributors, which examines the relationships between the assumed value for the MRP, the assumed value of gamma and the dividend yield that this relationship implies. SFG argues that the ESC's practice of setting the value of gamma equal to 0.5 and the value of the MRP equal to 6% implies a dividend yield that is more than twice the level that is normally observed in the market. This combination of assumed values is therefore untenable. SFG (2005b) argues that setting the value of gamma equal to zero is the most straightforward and complete way of restoring consistency between gamma and the MRP.

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<sup>27</sup> Cannavan, D., F. Finn, S.Gray. (2004). "The Value of Dividend Imputation Tax Credits in Australia." *Journal of Financial Economics* 73, 1, 167-197.

<sup>28</sup> Hathaway, N. and B. Officer (2004). "The Value of Imputation Tax Credits", [www.capitalresearch.com.au/downloads/ImputationUpdate2004.pdf](http://www.capitalresearch.com.au/downloads/ImputationUpdate2004.pdf)

<sup>29</sup> The evidence includes: Truong, G., Partington G and Peat M (2005), "Cost of capital estimation and capital budgeting practice in Australia", working paper, University of Sydney and Conference Proceedings, AFAANZ 2005, and KPMG (2005), "Cost of Capital – Market practice in relation to imputation credits, prepared for the Victorian electricity distributors, July 2005.

<sup>30</sup> Refer SFG Consulting, "The Relationship Between Franking Credits and the Market Risk Premium: Implications for the Regulatory Cost of Capital, August 2005, attached as Appendix E of Powercor's submission to the ESC's 2005-10 EDPR draft decision, <http://www.esc.vic.gov.au/apps/page/user/pdf/AppendixE.pdf>. CEG notes that this paper is shortly due for publication in the journal 'Accounting and Finance'.

CEG notes that based on the model utilised in the paper by SFG (2005b) and holding all other variables constant, reducing the assumed value of the MRP below 6% would have the effect of reducing the implied dividend yield. However, our calculations indicate that it would be necessary to assume an unrealistically low value for the MRP (for which there would be no empirical support) in order to obtain a dividend yield comparable to the levels observed in the market. In any event, CEG notes that research by KPMG has found that 6% is the most common value for the MRP assumed by independent experts in conducting valuations of companies subject to takeovers.<sup>31</sup> Furthermore, research commissioned by the Energy Networks Association on the MRP has confirmed that historical data supports an Australian market risk premium of at least 6%.<sup>32</sup>

The evidence discussed above suggests that the appropriate value for gamma lies in a feasible range of zero to 35%. In the context of the original range of 0.3 to 0.5 proposed by CEG, the evidence suggests that the appropriate value for gamma lies towards the lower end of our proposed range. On this basis, we have adopted a preferred value of 0.3 for gamma. Furthermore, a value of 6% has been maintained for the MRP.

## 7. Summary of cost of capital parameters, cost of equity and debt, and WACC range

The table below provides a summary of the parameter values that have been proposed in this response to the Tribunals's draft decision and the resulting WACC estimate.

Parameter	Feasible Range		
	Low	High	Preferred
Nominal risk free rate	5.3%	5.3%	5.3%
Real risk free rate	2.4%	2.4%	2.4%
Inflation expectation (implied)	2.8%	2.8%	2.8%
Equity beta	1.00	1.00	1.00
Market risk premium	6.0%	6.0%	6.0%
<b>CAPM cost of equity</b>	<b>11.3%</b>	<b>11.3%</b>	<b>11.3%</b>
Equity proportion	40%	40%	40%
Debt proportion	60%	60%	60%
Pre-tax cost of debt	6.61%	6.70%	6.66%
Debt margin	1.36	1.45%	1.41%
Corporate tax rate	30.0%	30.0%	30.0%
Value of imputation credits	35%	0%	30%

<sup>31</sup> KPMG (2005), Cost of Capital – Market practice in relation to imputation credits, prepared for the Victorian electricity distributors, July 2005.

<sup>32</sup> Gray, S and R. Officer (2005), A Review of the Market Risk Premium and Commentary on Two Recent Papers, prepared for the Energy Networks Association, 15 August 2005.

Parameter	Feasible Range		
	Low	High	Preferred
Pure vanilla WACC - nominal	8.5%	8.5%	8.5%
Post-tax nominal WACC	6.7%	7.3%	7.0%
<b>Pre-tax real WACC – forward transformation</b>	<b>6.6%</b>	<b>7.4%</b>	<b>7.0%</b>

The pre-tax real WACC range resulting from the amendments that we have proposed is 6.6% to 7.4%. Within this range, we propose a point estimate of 7.0% for our gas distribution network business. This estimate is significantly below the point estimate of 8% that was originally proposed by CEG in December 2003, but is consistent with the recent Tribunal approved point estimate pre-tax real WACC for AGL Gas Networks.

When considering the fact that Country Energy Gas would have received a pre-tax real WACC of 7% at the same time as AGL Gas Networks but for delays in the access arrangement review process due to factors beyond Country Energy Gas' control, and the fact that the next regulatory period will end at the same time as that of AGL Gas Networks, Country Energy Gas believes this point estimate to be the most fair and reasonable rate of return applicable at this point in time.