A report on the cost of equity in Aurora's revised regulatory proposal

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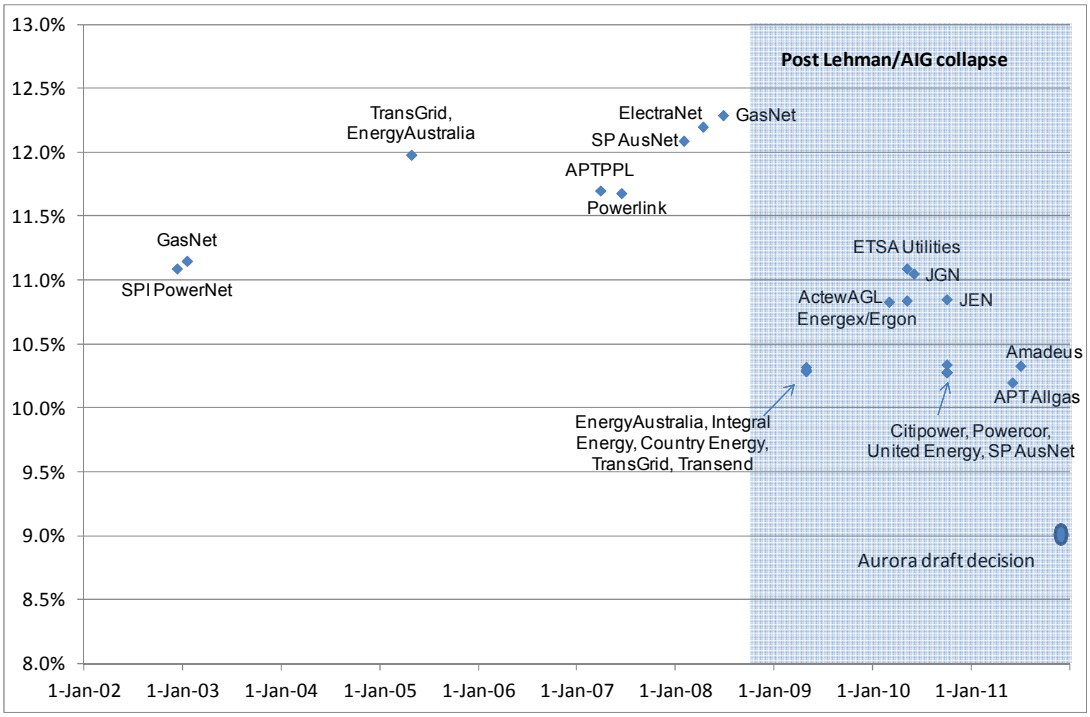
1. Factual background

1. The AER's Aurora draft decision assumes that equity investors in a 60% geared electricity distribution business require a 9.08% nominal (6.4% real) return on equity. This is by far the lowest cost of equity allowance allowed by the AER, or the ACCC before it, for an energy transport business. By comparison, the allowed cost of equity decisions prior to the global financial crisis of late 2008 were universally above 11% and averaged around 12%.

Figure 1: AER cost of equity decisions for regulated energy businesses



2. Figure 1 above demonstrates an important phenomenon. Since the global financial crisis the allowed cost of equity set by the AER has been lower than before the crisis – with the Aurora draft decision being the most extreme example.

3. The mechanical explanation for this phenomenon is relatively simple to understand. It reflects the AER methodology which applies the Capital Asset Pricing Model in a manner that:

   - sets the risk free rate equal to the prevailing risk free rate (which is very volatile); and

- sets the market risk premium primarily based on the AER's estimate of the historical average risk premium earned by Australian equity investors (which is, by its construction, very stable).

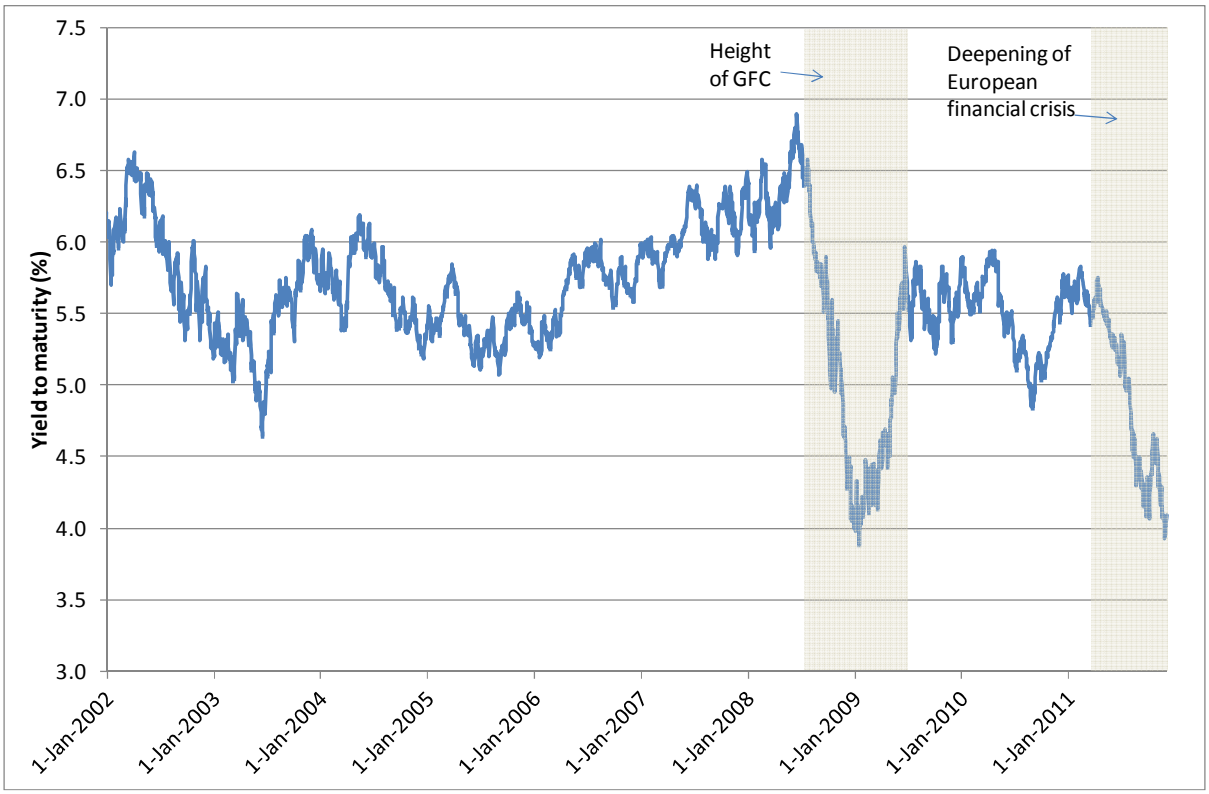
4. These two variables fit together in the CAPM as per the following equation:

   Cost of equity = Risk Free Rate + β× (Market Risk Premium)

5. This equation makes clear that if the risk free rate is volatile and the market risk premium estimate is stable then, for any given beta estimate, the cost of equity estimate will have the same absolute volatility as the risk free rate.

6. The risk free rate has indeed been very volatile over the last decade as shown in the following figure.

Figure 2: Time series for yields on ten year Commonwealth Government Securities (CGS)



7. As indicated in this figure, the largest swings in the risk-free rate were associated with the onset of financial market crises. Firstly, in the aftermath of the collapse of Lehman

Brothers and the near collapse of other financial institutions in late 2008, and, secondly, in the subsequent recessions in the US and Europe, which then gave rise to a deepening sovereign debt, banking and currency crisis in the Euro zone.

8. During both of these financial crises there has been a dramatic fall in 10 year CGS yields in Australia. The decline has left CGS yields at their lowest levels in the last decade and, indeed, over the past 50 years (see RBA statement below).

9. The standard interpretation of these events is that there has been a flight to the safety and liquidity of AAA rated Government debt. The most recent fall in the yields on Australian Government CGS has been explained in the following terms by the RBA[1]:

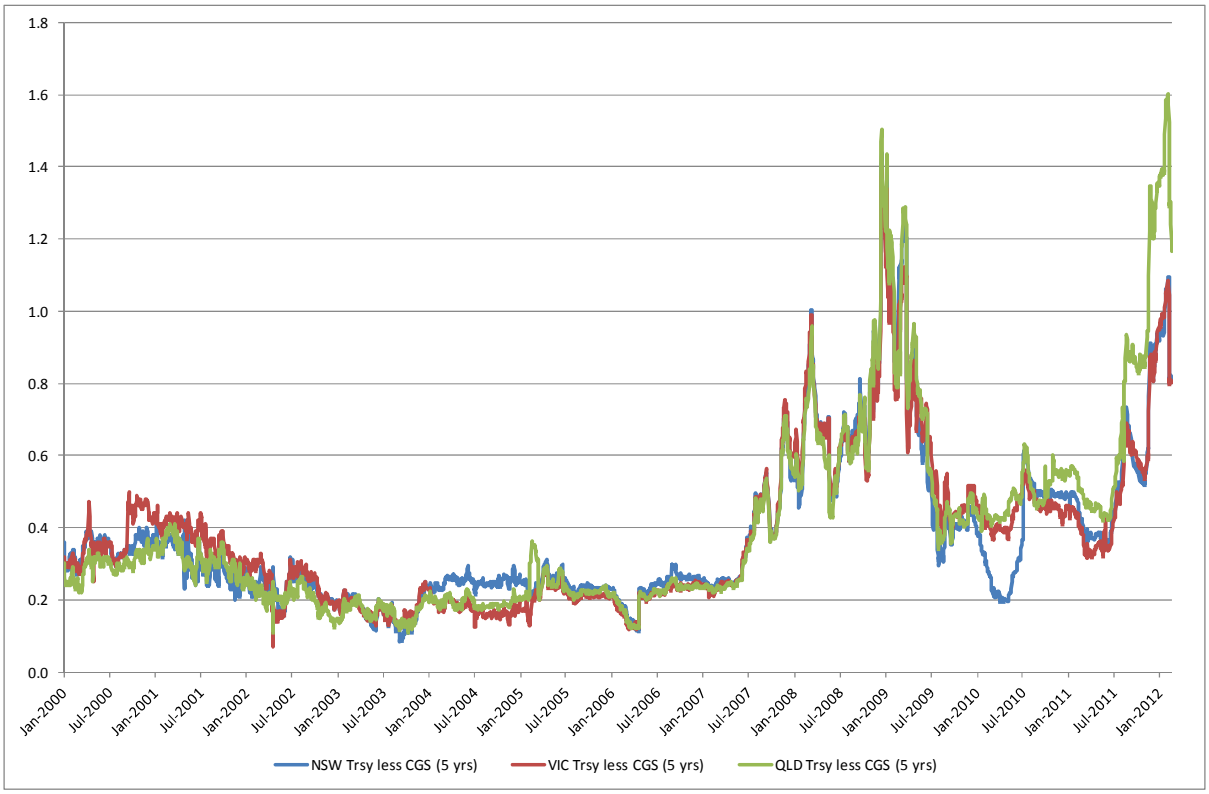
> *Strong demand, particularly from offshore investors, for relatively safe assets in the uncertain global climate has been apparent in the demand for Australian Government bonds over the past couple of months. (As at the end of September, non-residents were estimated to be holding around 75 per cent of Commonwealth Government securities (CGS) on issue.) The yield on 10-year CGS fell to 3.67 per cent in mid January, its lowest level in 50 years….*
>
> *The strong investor preference for CGS and a deterioration in liquidity in the state government securities market, primarily as a result of heightened risk aversion related to events in Europe, led to a widening of the spread between yields on these securities (Graph 4.4). At their peak, 5-year spreads had widened by around 70 basis points from where they were at the end of October for South Australia and Queensland, and by around 50 basis points for New South Wales and Victoria. In recent weeks, spreads have narrowed and issuance has picked up considerably. Yields on longer-term state government debt have increased since the previous Statement as the increase in spreads has more than offset the fall in yields on CGS, but they remain low by historical standards.*

10. Of course, the flipside of a flight *to* safety is, by definition, a flight *from* risk.

11. The widening spread between State Government bond yields and CGS yields is illustrated in the figure below which shows the spread between 5 year CGS and 5 year Victorian, NSW and Queensland State Government debt. This figure illustrates that the recent fall in CGS yields has not been associated with the same fall in the yields on other very low risk assets. As was the case in the midst of the 2008/09 crisis, CGS yields have fallen much faster and further than the yields on State Government debt – causing the spread (risk premium) on State Government debt to rise (by an amount in the order of 50bp to 100bp).

[1] Statement on Monetary Policy, Reserve Bank of Australia, February 2012, chapter 4, page 49.

Figure 3: Time series for spread between CGS and State Government debt



Source: Bloomberg and CEG analysis

12. We note that there are many other indications of a heightened market risk premium at the moment. The widening spreads between CGS and other AAA rated debt that is referred to by the RBA above has a corollary in the widening of the spreads between AAA corporate debt and BBB corporate debt.

13. This spread[2], is a common proxy for the level of the market risk premium. Jagannathan and Wang (1996)[3] use this as an indication of the forward looking market risk premium, and note that this is a widely accepted method in finance.

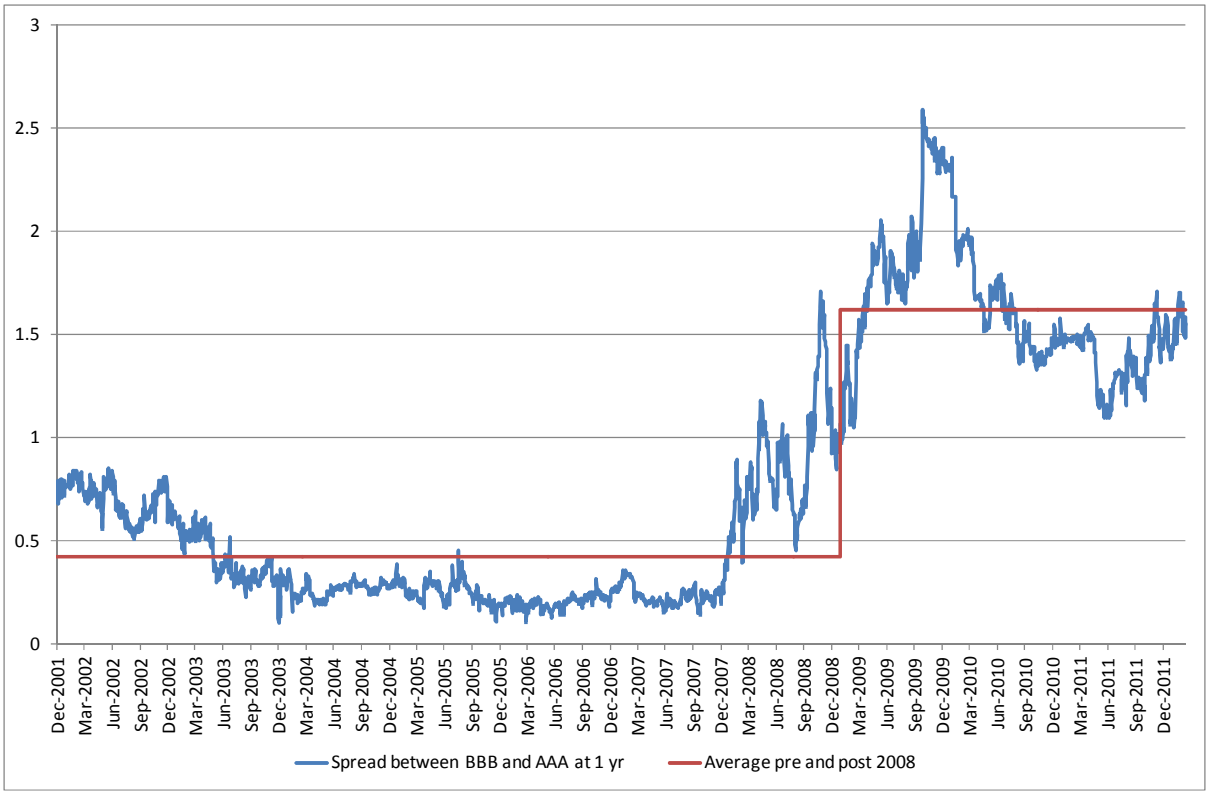
> *Based on these findings, I choose the yield spread between BAA- and AAA-rated bonds, denoted by R_{t-1}^{Prem} as a proxy for the market risk premium. The variable R_{t-1}^{Prem} … has been used extensively in finance.*

[2] That is, the difference between the yield to maturity on short term BBB rated bonds and short term AAA rated bonds – such as is proxied by the difference between Bloomberg's fair value curves at each rating and at one year's maturity.

[3] Ravi Jagannathan and Zhenyu Wang, *The Conditional CAPM and the Cross-Section of Expected Returns* The Journal of Finance, Vol. 51, No. 1. (Mar., 1996), pp. 3-53.

14. The above quote refers to Moody's credit ratings. The equivalent Standard and Poor's credit ratings are AAA and BBB. When we examine the same measure in Australia using the longest history of fair value estimates available from Bloomberg we observe the following history for the spread between Standard and Poor's AAA and BBB rated bonds with one year to maturity. In Figure 4 below, the spreads between AAA and BBB rated bonds are shown up to 17 February 2011.

Figure 4: Spreads between BBB and AAA rated bonds at 1 year maturity



Source: Bloomberg

15. It can be seen that the level of the spread between BBB and AAA rated bonds with one year maturity prior to 2008 was almost always less than 0.5% and averaged 0.42%. Since 2008, the average spread has been over three times higher at 1.6%. While it is true that these spreads spiked in April 2009 at 2.6%, they have not fallen back to pre-crisis levels and are currently very close to their average levels since 2008.

16. Bloomberg estimates that in November 2011 yields were still more than three times (200% higher than) the pre-2008 average yields.[4] This is consistent with ERPs being similarly elevated above their pre GFC levels.

Table 1: AAA to BBB spreads

Sampling period	Spread
Average pre 2009	0.42%
Average post 2008	1.62%
Ratio pre and post 2008	**3.8**
November 2011	1.5%
Ratio November 2011 to pre 2008 Average	**3.6**

Source: Bloomberg, CEG analysis

17. It must also be noted that, as per the RBA analysis reported above, in late 2011 the spread between CGS and other AAA rated bonds was itself at historically wide levels and this heightened spread is not captured in the above figures.

18. In addition, current debt risk premiums (DRPs) allowed by the AER itself are at historically elevated levels. In its Aurora draft decision, the AER set a DRP based upon an average of a sample of long dated bonds and arrived at an estimate of 3.14%. This is much higher than the DRPs allowed by the AER pre-GFC. In June 2007, the AER set a DRP of 1.14% for Powerlink, while the average DRP allowed by Commonwealth and State energy regulators from December 2002 (SPI PowerNet) to the June 2007 Powerlink decision was 1.28%.

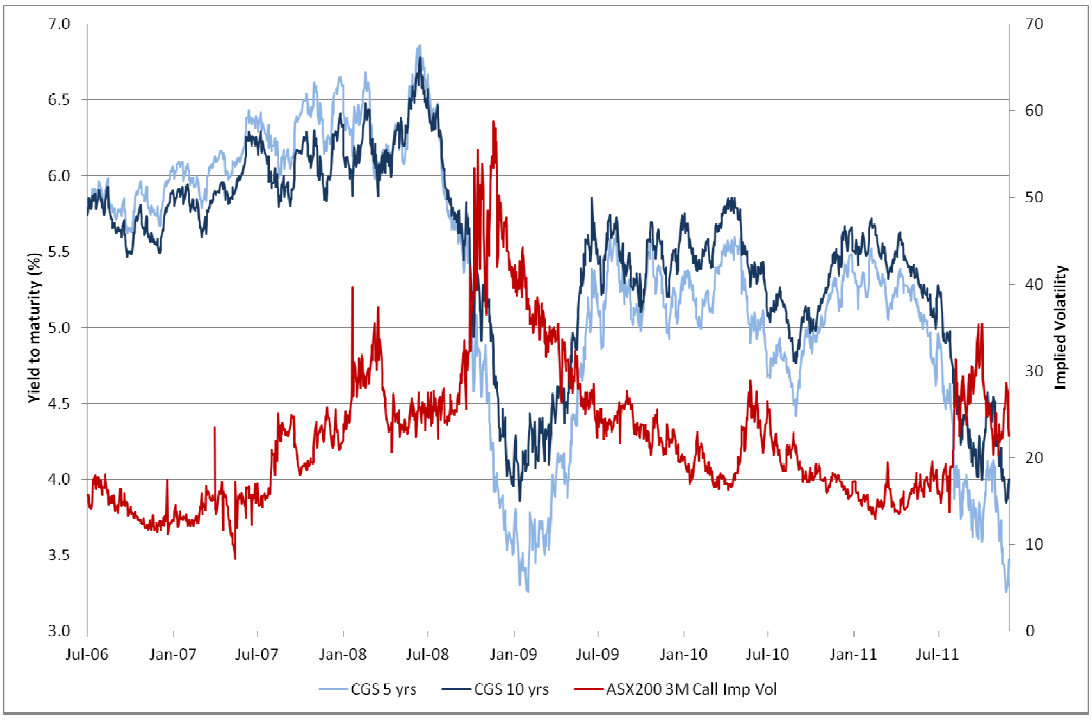
19. Standard finance theory predicts that a heightened debt risk premium for a firm will also be associated with a heightened equity risk premium for the firm. Moreover, any increase in the DRP would tend to be associated with a similar proportionate (but larger absolute) increase in the equity risk premium[5]. With debt risk premiums in the order of 3% to 4% (AER estimate versus Bloomberg estimate) this suggests an at least 2% increase in the DRP relative to pre GFC levels. Standard finance theory predicts a more than 2% increase in the MRP would be associated with this increase in the DRP.

20. In addition, the dramatic declines in the risk free rate in late 2008 and late 2011 have both been associated with dramatic increases in implied stock market volatility (which has been commonly described as an indicator of changes in the MRP). This is illustrated in Figure 5 below and is consistent with the views of the RBA described above.

[4] BBB/BBB+ yields for July 2010 are estimated at 1%.

[5] Bruce D. Grundy, The *Calculation of the Cost of Capital,* A Report for Envestra, , 30 September, 2010

Figure 5: Commonwealth Government Security yields vs implied stock market volatility



Source: Data from Bloomberg, RBA. CEG analysis

2. CEG views

2.1. Why the AER methodology results in error in the Aurora draft decision

21. The AER methodology, embodied in its Aurora decision, involves a presumption that the market risk premium is stable over time.

22. In our view, this is not a sound presumption. Rather, it is our view that the AER should test its estimates of CAPM parameters against market data at the beginning of each regulatory period. If this is not done then it is likely that the resulting allowed return on equity will not reflect the prevailing cost of equity.

23. If one is going to estimate the CAPM using a prevailing risk free rate then it is vital that the value for the MRP must also be reflective of market conditions at around the same time that the risk free rate is estimated.

24. This is because it is wrong to assume that the cost of equity falls with the risk free rate. This is only true if the equity risk premium stays constant. However, there is no reason to expect this to be the case. Furthermore, it is well accepted that the risk free rate and the equity risk premium tend to move in opposite directions – especially in periods of financial crisis.

25. This makes intuitive sense given that the reason interest rates are low is because investors' risk premiums are elevated such that they prefer to hold Government bonds rather than invest in riskier assets. That is, risk free rates are lowest when there is a flight from risky assets to safe assets.

26. The RBA's own analysis, described in paragraph 9 above, points to precisely this reason for the current historically low CGS yields. Indeed, the RBA points out that AAA rated State Government debt yields have fallen by less than CGS noting that the risk premium for even these very low risk assets has increased dramatically during the latter half of 2011.

27. By contrast, the AER has assumed that the expected yield demanded by equity investors in regulated businesses has fallen by the full amount of the decline in CGS yields in the second half of 2011. In fact, the AER has imposed an even greater fall because it has actually reduced its estimate of the MRP from 6.5% to 6.0% over the same period.

28. In our view this is an error. If a flight from risky assets is depressing CGS yields then the premium on risky assets must be assumed to be rising – at least partially if not fully offsetting the impact of the fall in risk free rates on the CAPM cost of equity. The fact

that we see a substantial widening in the risk premiums on even AAA rated State Government debt is strong evidence for this conclusion.

29. This is reflected in advice to, and accepted by, UK regulators that the MRP would tend to move to offset any change in the risk free rate. [6]

> *"Given our preferred strategy of fixing on an estimate of the equity return, any higher (or lower) desired figure for the safe rate would be precisely offset by a lower (or higher) equity premium, thus leaving the central estimate of the cost of equity capital unaffected."*

30. This is also consistent with the approach of most US regulators who use the dividend discount model to estimate the cost of equity for regulated businesses. The cost of equity derived from these estimates tends to be more stable than one that would rise and fall in lock-step with the risk-free rate.[7] It is also, as noted in Aurora's revised regulatory proposal, consistent with the approach taken by IPART.

31. By contrast, the AER practice of setting a stable premium above the risk free rate, based on long run historical averages, wrongly estimates that the cost of equity during periods of high risk aversion (and therefore low risk free rates) is at all time lows.

2.2. Error already found by the Australian Competition Tribunal

32. An example of precisely this error was found in the AER's approach to estimating the cost of equity for EnergyAustralia. In late 2008 and early 2009, Government bond yields plunged during the global financial crisis of that period. This reflected a flight to safety and liquidity by investors as they shunned alternative riskier assets.

33. EnergyAustralia (along with the other NSW electricity businesses) were advised by both Grundy and Hird that, if the MRP was fixed, then measuring the risk free rate at historical lows in the CAPM would result in an erroneous estimate of the cost of equity. The AER contested this view and proceeded to estimate the cost of equity using an MRP of 6% and a nominal/real risk free rate of 4.3%/1.8% (the lowest yield on nominal 10 year CGS since the early 1950s).

34. This decision was appealed to the Tribunal. The issue of contention was whether the historically low risk free rates during the crisis should be passed through in equally low cost of equity allowances.

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[6] Smithers and Co, *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K., A report commissioned by the U.K. economic regulators and the Office of Fair Trading,* 2003, p. 49.

[7] See Appendix A of CEG, Review of Lally September 2010, A Report for Vector, December 2010

35. In the context of those proceedings, Hird provided expert evidence very much along the lines described above.[8] The Tribunal agreed that using such rates to set the cost of equity without increasing the market risk premium was likely to underestimate the cost of equity. The Tribunal stated:[9]

> *The Applicants submitted that these facts demonstrated that basing a risk free rate on the AER's specified averaging periods would not achieve the objective of an unbiased rate of return consistent with market conditions at the date of the final decision. They appealed to expert opinion that the market risk premium was far higher than its deemed value while the risk free rate was abnormally low, so that the return required by investors was much higher than the AER's specified averaging period would generate.*
>
> *…*
>
> *The Tribunal considers that an averaging period during which interest rates were at historically low levels is unlikely to produce a rate of return appropriate for the regulatory period.*

36. It is relevant to note that the real risk free rate set in the Aurora decision is even lower than the real risk free rate that was overturned in the EnergyAustralia decision (1.6% versus 1.8%). We focus on the real risk free rate because it is the real risk free rate and not the nominal risk free rate that determines the nominal level of revenues that the PTRM cost model actually delivers to regulated businesses.

37. In these circumstances, the AER's Aurora draft decision (November 2011) not only fails to raise the MRP to at least partially offset the impact on the cost of equity of lower risk free rates resulting from a flight from risky assets. In fact, the AER decided to use its discretion to *reduce* the MRP from 6.5% as set out in the SORI to 6.0% - with the effect of compounding the impact of the falling CGS rates on the allowed cost of equity. .

38. The table below compares the CAPM parameters used in the Aurora draft decision to the parameters rejected by the Tribunal as being in error in EnergyAustralia.

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[8] CEG, *Rate of return and the averaging period under the National Electricity Rules and Law*, January 2009.

[9] *Application by EnergyAustralia and Others (includes corrigendum dated 1 December 2009)* [2009] ACompT 8 (12 November 2009), paras. 112-114.

Table 2: Cost of equity estimates

Parameter	Tribunal correction to AER error	AER decision (pre Tribunal correction)	AER in Aurora Energy (draft)
Real risk free rate	3.3%	1.8%	1.6%
Beta	1.0	1.0	0.8
MRP	6.0%	6.0%	6.0%
Real cost of equity	9.3%	7.8%	6.4%

39. This table demonstrates that the AER has set the same MRP but a materially lower risk free rate than the AER set in the EnergyAustralia decision (which the Tribunal overturned). The effect of this is that the AER draft decision for Aurora sets a real risk free rate at 0.2% less than the level that the Tribunal found in EnergyAustralia was:[10]

> *[…] unlikely to produce a rate of return appropriate for the regulatory period.*

40. Moreover, because the Aurora decision has a lower equity beta, this gives rise to a cost of equity that is 1.4% lower than the cost of equity that the Tribunal overturned in EnergyAustralia, and 3.5% lower than the value that resulted from the Tribunal correction of the AER errors.

2.3. Aurora revised proposal

41. Aurora's revised proposal makes the following statements:

> *The regulatory framework that is focused on returns estimated through application of the Capital Asset Pricing Model (CAPM). In circumstances of temporary financial market instability there is a significant danger that the estimated returns will under-estimate the true cost of equity. This is because the CAPM will work relatively well if a long term MRP and a long term estimate of the RFR are applied, or if a short term MRP is applied in conjunction with a short term (i.e. crisis affected) RFR, but will fail when one of these elements is fixed to the long term while the other is allowed to vary with short term market conditions.*
>
> And
>
> *There are therefore two choices that can be made when addressing a period of extraordinary volatility in financial markets that depresses CGS yields:*

[10] *Application by EnergyAustralia and Others (includes corrigendum dated 1 December 2009)* [2009] ACompT 8 (12 November 2009), para. 114.

- *the first is to adopt an MRP that reflects the current market environment, i.e. adopt a higher MRP than the long term MRP; and*

- *the second approach is to adjust the RFR to a level that reflects the long term average.*

42. For the reasons set out previously in this report we agree with these statements. We note that, at the current time, with risk free rates at 50-60 year lows, this is an especially important issue. Aurora proposes to adopt the second solution set out above – a proposal that may reflect the particular legal circumstances surrounding its revised proposal. Aurora's implementation would raise the risk free rate used in the CAPM cost of equity to 5.5% (a 1.2% increase on the AER's estimate).

43. In our opinion, the use of an historical average measure of the risk-free rate will, in current market circumstances, and when combined with an historical average MRP, result in a manifestly more reasonable estimate of the cost of equity than the AER's methodology.