

**C E C G**

*Competition and Regulatory Economists*



## **A methodology for estimating expected inflation**

**26 October 2007**

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## **1. PRELIMINARIES**

1. My name is Thomas Nicholas Hird, a Director of the Competition Economics Consulting Group, 9 Hartpury Avenue Elwood, Melbourne. I have sixteen years experience as a professional economist, largely specialising in cost of capital issues. My full curriculum vitae is at Attachment A.

### ***Terms of reference***

2. I have been asked by Envestra, SPAusnet and Multinet to review the ESCV's methodology for calculating the real expected yield on a nominal Commonwealth Government Security (CGS) with a maturity of 10 years as found in the Draft Decision on the gas distribution businesses' access arrangements. In particular I have been asked as to whether it meets the criteria in sections 8.2(e) and 8.30 of the Gas Code. I have also been asked to examine the AER's approach to the same issue.

### 3. BODY OF STATEMENT

#### *The ESCV's approach*

4. The ESCV's description of its methodology for deriving the real risk free rate from the yield on nominal bonds is summarised in the following extract from page 382 of the draft decision.

*"... the Commission considers that the most appropriate methodology to estimate the risk-free rate in the current market environment is to observe the yield on 10 year nominal government bonds to derive a nominal risk-free rate and then apply a forecast of the expected rate of inflation to derive the real risk-free rate. While this is a deviation from the methodology previously applied by the Commission, it still permits a market-based expectation of inflation to be taken into account (consistent with the requirements of section 8.30 of the Code).*

*"In deriving an estimate of the real risk-free rate by inflation adjustment of a nominal risk-free rate, it is necessary to exercise judgement in establishing an inflation forecast. A range of short term forecasts of inflation are provided in table 10.4, indicating a range in forecasts of inflation of 2.5 per cent to 3.8 per cent.*

Table 10.4 **Inflation forecasts**  
Per cent per annum

	2008	2009
ANZ Economic and Financial Market forecasts	2.70	2.90
BIS Shrapnel	3.00	3.00
KPMG	3.08	3.08
The Melbourne Institute Survey of Consumer Inflationary Expectations	3.80	n/a
RBA underlying inflation	2.50	2.50 – 3.00
Commonwealth Government	2.50	2.50
Victorian Government	2.50	n/a

Source: ANZ 2007, *ANZ Economic and Financial Market Forecasts*, 1 June. BIS Shrapnel 2007, *Outlook for wages to 2012/13: Electricity, gas and water sector Australia and Victoria*, report prepared for Envestra, Multinet and SP AusNet, March. KPMG 2007, *Weighted average cost of capital*. A report prepared for Multinet and SP AusNet, March. The Melbourne Institute of Applied Economic and Social Research 2007, *The Melbourne Institute Survey of Consumer Inflationary Expectations: Monthly Report*, June. Reserve Bank of Australia (RBA) 2007, *Statement on Monetary Policy*, May. Costello, P. 2007, *Budget Speech 2007-08*, May. Brumby, J. 2007, *Budget Paper No. 2 – Strategy and Outlook*, May.

*“On the basis of these forecasts, the Commission considers that it would be appropriate to apply an inflation forecast of 3 per cent, which sits at the upper bound of the RBA target inflation range.*

*“Conclusion*

*“The Commission is of the view that consistency with prevailing conditions in the market for funds and the risk involved in delivering the Reference Services requires that the Rates of Return proposed by the distributors should be assessed with reference to a real risk-free rate of 3.12 percent. This value is derived by adjusting the observed yield on nominal bonds (6.21 per cent – average to 20 June 2007 adjusted to an effective annual rate) by an inflation rate of 3.0 per cent.”*

### ***Problems with the ESCV's approach***

5. In my opinion the ESCV's methodology methodology is appropriate for determining the real risk free rate (provided the correct nominal risk free rate has been identified). However, the practical implementation of this methodology is flawed in three important ways.
  - a) The ESCV's methodology attempts to estimate the average inflation rate over ten years by only having regard to short-term forecasts (2 years) of CPI;
  - b) The ESCV's selection of forecasts detailed in table 10.4 is not representative of all credible forecasts and one of the forecasts that is included is clearly not credible as a forecast of investors expectations (namely the Melbourne Institute Survey of Consumer Inflationary Expectations); and
  - c) The ESCV appears to make an error in its attribution of a 3.08% forecast of inflation to KPMG.
6. Considering each of these issues in turn, the ESCV's approach is to start with the promised yield to maturity on a nominal bond maturing in ten (10) years. The ESCV then deducts an estimate of expected inflation for 2 years (2008 and 2009) to estimate an implied expected real yield to maturity at 10 years. Consistency requires that the period over which expected inflation is estimated is also a ten year period. That is, if we want to estimate the real return investors expect on a 10 year nominal bond we must remove investors' expectations of inflation over the entire 10 year period until the bond matures (not just their expectations of inflation over a subset of that period).
7. The ESCV derives an estimate of expected inflation having regard to short term inflation forecasts for only 2008 and 2009. If investors expect long term inflation (beyond 2009) is different from short term inflation this will result in

a biased estimate of the true real return expected on a CGS bond with ten years to maturity. For example, if expected inflation in 2010 to 2017 is lower than expected inflation in 2008 and 2009 this approach will underestimate the truly expected real return on CGS with 10 years to maturity (and *vice versa* if investors expect inflation to be higher after 2009 than before 2009).

8. The second problem I have identified is that the ESCV's selection of inflation forecasts appears to be an artificially small sample of publicly available forecasts. For example, the ESCV lists ANZ bank's forecast of inflation but does not provide the inflation forecasts of any of the other major commercial banks. At the same time, the ESCV includes the Melbourne Institute Survey of Consumer Inflationary Expectations which I do not regard as a credible estimate of investors' expected level of inflation.
9. I do not regard the Melbourne Institute Survey of Consumer Inflationary Expectations as a reliable estimate of inflation expected by investors providing finance in the Australian "market for funds" (as this term is used in section 8.30 of the Gas Code). I form this view for two primary reasons:
  - a) The survey is, as its name suggests, of consumers not investors nor those involved in advising investors in the market for funds. Consequently, it can not be relied on in the current circumstances unless one also assumes that consumers have the same expectations as those operating in the market for funds. Given that consumers as a group have relatively little expertise in economic forecasting, or reason to develop that expertise, I regard that assumption as problematic;
  - b) The historical evidence is that consumer expectations (as measured in the Melbourne Institute survey) tend to materially overestimate expected inflation. This historical fact is consistent with the fact that the figure of 3.80 in the above list is a clear outlier in the ESCV's list of forecasts (and even more so in a more comprehensive list of forecasts I have collated and detailed below). This fact has also been noted by the RBA
  - c) The Consumer survey estimate is higher than the inflation rate implied from differences in nominal and indexed CGS yields. The RBA considers both estimates to be biased upwards. It is simply illogical to attempt to 'fix' one identified bias in inflation forecast by having regard to a prediction for inflation that is even more biased.
10. These criticisms are captured in a quote from the current RBA Governor (then deputy Governor):

*"Has the inflation psychology so prevalent in the 1970s and 1980s been removed from the economy? The answer is yes, with relatively few exceptions. Measures of inflation expectations are scarce, especially ones over a longer horizon. The Melbourne Institute's measure of expected inflation,*

*derived from a monthly household survey and funded by the RBA over many years, showed a sharp break in 1990 when actual inflation came down. During the 1990s, it did not move much. It increased a lot in 2000 just ahead of the introduction of the GST which pushed the level of the CPI permanently higher and the rate of change of the CPI temporarily higher, and came down again shortly thereafter. The median measure averaged about 4½ per cent over the decade, which shows a persistent error in this measure of expectations (of the kind which is not supposed to occur in economics!). One reason for this is that there continues to be a significant proportion of households who anticipate inflation of 10 per cent or more even after a decade of inflation of 2½ per cent. Presumably our message has yet to filter through completely”<sup>1</sup>*

11. Critically, the survey consistently overestimates actual inflation. This is explained by the fact that the survey gives weight to vies of relatively uninformed consumer households (not investors in the market for funds) and is biased up because some of these consumers hold non-credible views regarding future inflation.
  
12. Finally, I am unable to locate any KPMG forecast of inflation in the document cited by the ESCV above. It is unclear to me how the ESCV has determined an estimate of 3.08% in 2008 and again 3.08% in 2009. I have searched the KPMG document electronically for “3.08” and find no reference. I have also searched the document for “2009” and find no reference. For the absence of doubt, the KPMG document that I am referring to is entitled “2008 Gas Access Arrangement Review, Weighted Average Cost of Capital, March 2007” and was downloaded from <http://www.esc.vic.gov.au/NR/rdonlyres/E76EABE3-9A3C-4E88-8284-83A1990E900F/0/SPAusNetAppendixHWACC.pdf>.
  
13. It may be that the ESC is assigning a 3.08 inflation forecast to KPMG on the basis that KPMG sets the real risk free rate equal to the yield on indexed CGS (and by implication uses an implied inflation rate equal to the difference between indexed and nominal CGS yields). However, on my reading of the KPMG this is entirely inappropriate. KPMG explicitly states that their methodology should not be interpreted in this way.

*“Our estimate of the real risk free rate does not include any allowance for the bias that has been identified in the recent study by NERA. This does not imply our lack of acceptance of the results of NERA’s study, but rather, reflects our view that a conservative position is warranted at this stage given that the study is recent, currently unpublished and yet to be subject to academic scrutiny. We expect the 2008 GAAR process to provide an opportunity to debate these issues in further detail.”*

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<sup>1</sup> Glenn Stevens, Address to South Australian Centre for Economic Studies April 2003 Economic Briefing Adelaide - 10 April 2003

14. On the basis of the above, it is my opinion that the KPMG and Melbourne Institute survey items from the ESCV's list should be excluded. In summary, the value attributed to KPMG is not KPMG's forecast, but merely the application of the method for estimating forecast CPI that is being rejected and the Melbourne Institute's survey is not a forecast of inflation that can reasonably be expected to be reflective of the views of investors. If I remove them from the list the remaining forecasts are summarised below.

**Table 1: Adjusted Table 10.4 of the ESCV Draft Decision**

	2008	2009
ANZ	2.70	2.90
BIS	3.00	3.00
RBA underlying inflation	2.5	2.5-3.00
Commonwealth Government	2.5	2.5
Victorian Government	2.5	
<b>Mean</b>	<b>2.6</b>	<b>2.8</b>

15. Even for the short term, and having regard to the ESCV's limited set of forecasts, an estimate of 3.0 expected inflation is well above the average. In the following section I provide what I consider to be the most robust survey of inflationary expectations on the information available to me.

***Correcting the problems with the ESCV's approach***

16. The table below provides a more detailed survey of available estimates of expected inflation.

Table 2 Summary of Available Inflation Forecasts

Forecaster	Date	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Econtech	Aug-07	2.8	2.3	2.9	3.0	2.5	2.2	2.3	2.3	2.0	2.2		
Access Economics	Apr-07	2	2.6	2	2.4	2.8							
BIS Shrapnel	Jul-07	2.6	2.9	3.3	3.2	2.7	2.9	2.9					
ANZ	Sep-07	2.4	3.1	2.9	2.7	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Westpac	Sep-07	2.3	2.9	2.5	2.5	2.5	2.45	2.45	2.45	2.45	2.45	2.45	2.45
Comm Bank	Aug-07	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NAB	Jul-07	2.0	2.5										
RBA (underlying)	Aug-07	2.75	2.75	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Cwlth Treasury	May/Aug-07	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
OECD	May-07	2.2	2.7										
Consensus Ec.	Sep-07	2.3	2.9	2.7	2.6	2.5	2.6	2.6	2.6	2.6	2.6	2.6	

Sources. Econtech Labour Costs Growth Forecasts, a report prepared for the Australian Energy Regulator, 13 August 2007 available at [www.aer.gov.au](http://www.aer.gov.au). Access Economics Business Outlook June 2007. BIS Shrapnel, 19 October 2007 letter to SP AusNet from Richard Robinson at BIS. Advice direct from ANZ to CECG provided by email on Monday the 17 September 2007. Westpac, CPI Forecast and Comment dated 18 September 2007. Commonwealth Bank of Australia, CBA's Inflation Forecasts 26 September 2007. NAB, Australian Outlook, July 2007 available at [www.nab.com.au](http://www.nab.com.au). RBA August Statement on Monetary Policy for available at [www.rba.gov.au](http://www.rba.gov.au) was relied on for forecast of years 2007 and 2008, beyond that I relied on the RBA's 9 August 2007 letter to Joe Dimasi at the ACCC available at [www.aer.gov.au](http://www.aer.gov.au). Commonwealth Treasury, May Budget papers available at [www.treasury.gov.au](http://www.treasury.gov.au) and 7 August 2007 letter to Joe Dimasi at the ACCC. OECD, OECD Economic Outlook No. 81 - Australia, 24 May 2007, available at [www.oecd.org](http://www.oecd.org). Consensus, October 2007, Asia Pacific Consensus Long Term Forecasts available at [www.consensus-economics.com](http://www.consensus-economics.com).

17. Examination of the above table suggests that most forecasters believe that both short and long term inflation will be below 3%. In this regard, it is instructive to examine the summary statistics associated with the raw data detailed in Table 2 above.

**Table 3 Summary Statistics**

<b>Statistic</b>	<b>Equal weight to all forecasters</b>	<b>BIS Shrapnel excluded</b>	<b>Government forecasters excluded</b>	<b>Government and BIS Shrapnel excluded</b>
Mean of all observations	2.54	2.51	2.55	2.51
Median of all observations	2.50	2.50	2.50	2.50
Forecasters with mean forecasts equal or greater than 3%	0%	0%	0%	0%
Mean of observations from 2007 to 2009	2.58	2.52	2.56	2.50
Mean of observations from 2010 to 2018	2.55	2.49	2.56	2.49
<b>Weighted average of short and long term forecasts</b>	2.54	2.51	2.55	2.51

18. Focussing on the first column of numbers, these show that the mean forecast for all observations listed in Table 2 is 2.54%. That is, if each annual CPI forecast for each forecaster is given equal weight (whether it be long or short term) the average is 2.54%. Similarly, the median forecast is 2.50% on the same basis. That is, there are the same (or more) number annual forecasts at or below 2.5% as there are above 2.5%. None of the forecasters has an average inflation forecast (ie, the mean of each year's forecast they provide) that is equal to or above 3%. (Moreover, the forecaster with the highest forecast, BIS Shrapnel, should be given little weight in the current context for the reasons described below.)

19. However, these measures of central tendency give all annual estimates the same weight. This may be problematic because there are more short term than long term forecasts listed in Table 2. As a consequence, this equal weighting approach will tend to result in a biased estimate of long term inflation if the short term forecasts are different to the long term forecasts. To check whether this is a relevant concern we need to separate out short and long term inflation expectations and give them the appropriate weights. Because we are interested in average inflation over 10 years the relevant weights are 30% to the first three years and 70% to the last 7

years.<sup>2</sup> However, when this is done the average of all forecasters' (listed in Table 2) expectations over the next ten years (where those expectations are available) remains at 2.54%.

20. For completeness I have also reported in Table 3 the results if the Government forecasts of inflation (Treasury, RBA and OECD) are excluded. I do not propose that they should be but this is merely reported to illustrate that there is no material difference between government and private sector forecasts of inflation.
21. It is also relevant to note that Table 2 includes forecasts from Consensus Economics. These forecasts are the result of surveys that Consensus carries out of other forecasters' short term inflation expectations. That is, Consensus Economics does not carry out its own forecasts. As such, there is an element of double counting in the Consensus Economics forecasts as these include some of the other forecasters separately detailed in Table 2.<sup>3</sup>
22. In my opinion the shaded column of numbers in Table 3 above is the most reliable summary of forecasts for the purpose at hand. The second column excludes the forecasts of BIS Shrapnel. The basis for this is that I am informed that BIS Shrapnel's forecast is an estimate of the mode and not the mean of inflation outcomes.<sup>4</sup> I am further informed that BIS Shrapnel believes that the mean forecast lies below the mode forecast.
23. This is relevant in the current context because, from an investor's perspective, it is the mean inflation forecast not the mode forecast that determines the expected real return on holding a nominal government bond. This is because the mode gives 100%

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<sup>2</sup> I note that ideally one would take account of the fact that the nominal Government bond the ESCV is using as its starting point is not a zero coupon bond. This means that not all of the income from the bond will be received at the time it matures. Consideration of this fact would lead to a higher weight being given to short term inflation than I describe above. Against that consideration is the fact that 2007 is more than part way through and the forecasts listed in Table 2 for 2007 include some actual inflation that has already occurred – suggesting a lower weight on 2007 forecasts. Given that the average for short term inflation is close to the average for long term inflation any such adjustments to weights would produce an immaterial impact on the weighted average. .

<sup>3</sup> I note that it is not clear which entities have provided these long term forecasts to Consensus Economics. The short term forecasts published by Consensus Economics include forecasts provided by BIS Shrapnel, Access Economics, ANZ, CBA, Westpac and NAB. The suppliers of long term forecasts are not listed.

<sup>4</sup> See 19 October 2007 letter from BIS to SP AusNet where BIS state:

"Over the five year period 2008-2013, we estimate that headline inflation will average 2.9%.

"We consider these forecasts to be the 'most likely' outcomes, given our assessment of the outlook for a range of macroeconomic variables. While we expect labour markets to remain tight, a moderation in demand over the period, along with a pick up in productivity, will provide some relief for price pressures.

"However, we believe the Reserve Bank will act to prevent CPI inflation running at over 3.0% for long periods. Accordingly, a 'mean' of a range of alternative scenarios would be less than our 'most likely' 2.9% figure. Therefore, with regard to the second point raised in your letter, yes, we expect that the probability distribution of possible inflation outcomes has a shorter tail above 3 per cent."

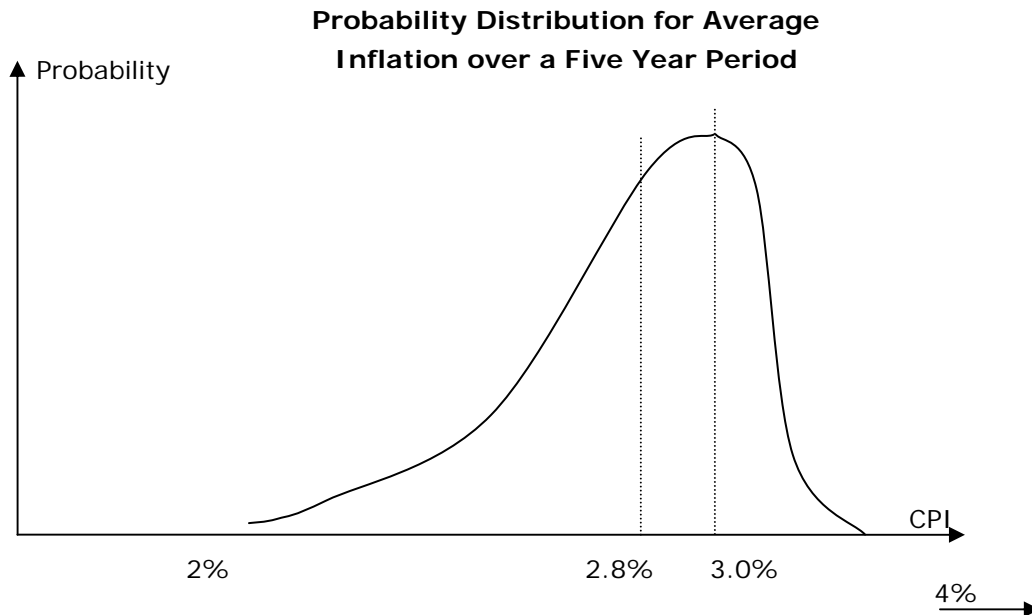
weight to the forecast that is most likely to come true – even if there are other inflation outcomes that have a positive probability of occurring instead. By contrast, the mean forecast gives weight to all possible outcomes according to their probability.

24. To see the importance of this consider the example where an investor has the following probability distribution for inflation outcomes.

**Table 4: Illustrative Example of Probability Distribution**

<b>Potential Inflation Outcome</b>	<b>Probability of each outcome</b>	<b>Probability weighted outcome</b>
3.0%	40%	1.2
2.8%	30%	0.8
2.5%	30%	0.8
<b>Expected inflation (mean)</b>		<b>2.8%</b>

25. In the above example the most likely (mode) outcome is that inflation will be 3.0%. However, the mean outcome is less than this (2.8%) because there is a material probability (60%) that inflation will be lower than 3.0% and no probability (in this example) that inflation will be higher than 3.0%. Faced with the above probability distribution a rational investor would not use an inflation forecast of 3.0% when attempting to calculate the real return on a nominal bond. To do so would be to give zero weight to the higher real returns that will occur if inflation is less than 3.0% (for which there is a 60% probability). A rational investor would give weight to all possible outcomes equal to the probability of their outcomes.
26. The above example is very simplistic with only three discrete outcomes for inflation. In reality, investors are likely to have a continuous probability distribution for expected inflation. However, the potential difference between mean and mode forecasts can be illustrated, with the help of a diagram, using a continuous probability distribution.
27. Consider the probability distribution drawn below for inflation over a five year forecast period. As drawn, the most likely inflation outcome is 3% (the highest point on the probability distribution). This is consistent with a scenario where inflationary pressures are expected to be relatively high over the next five years. However, the mean of all possible outcomes is 2.8% because the tail of the distribution above 3% is shorter than the tail of the distribution below 3%.



28. I understand that, in general terms, this is the shape of the probability distribution that underlies BIS Shrapnel's forecasts. The reason for this is that BIS Shrapnel believes that if inflation goes above the top of the RBA's target range of 2-3% the RBA will actively use monetary policy (raise interest rates) to reduce inflation. [See letter from BIS Shrapnel attached.] However, BIS believes that the RBA will not actively seek to increase inflation unless inflation is approaching the bottom of its target range. The combination of these facts mean that when inflationary pressures are high – with inflation nearer the top than the bottom of the RBA's target range – the distribution of expected inflation is likely to be skewed to the left (and *vice versa* when inflation pressures are low). Specifically, BIS state:

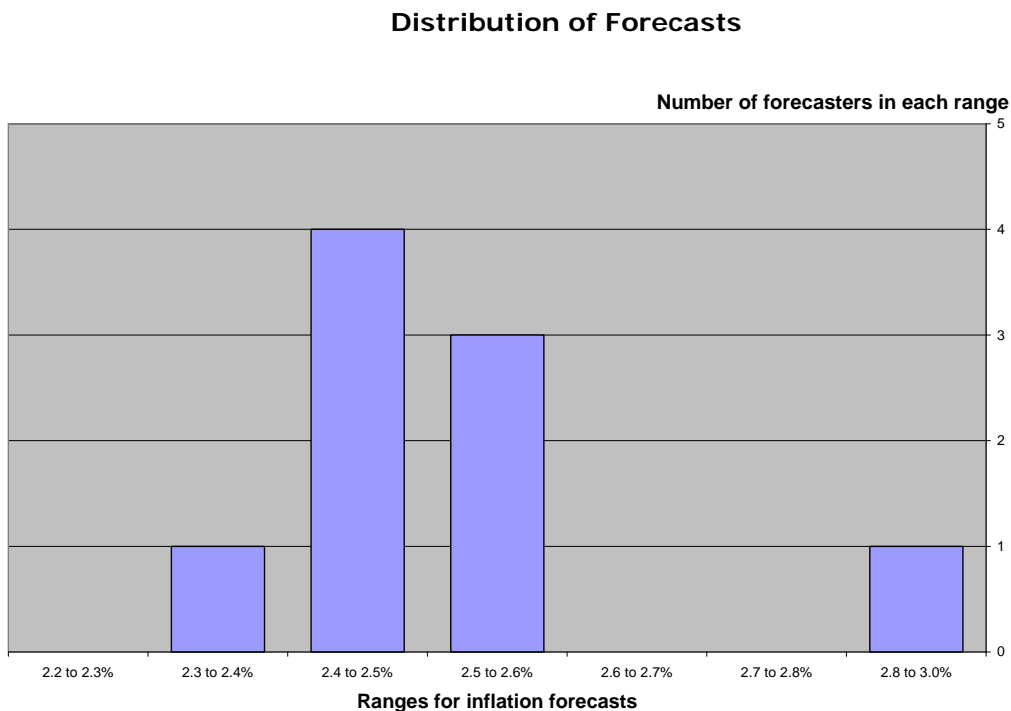
"However, we believe the Reserve Bank will act to prevent CPI inflation running at over 3.0% for long periods. Accordingly, a 'mean' of a range of alternative scenarios would be less than our 'most likely' 2.9% figure. Therefore, with regard to the second point raised in your letter, yes, we expect that the probability distribution of possible inflation outcomes has a shorter tail above 3 per cent."

29. I find BIS Shrapnel's analysis of this matter compelling. In my opinion, it is an accurate reflection of the operation of Australian (and international) monetary policy. It relies on a simple and, to my knowledge widely accepted assumption. Namely, that inflation moving outside the central bank's target range will more quickly trigger a vigorous monetary policy response than inflation movements within the central bank's target range.

30. Given that the BIS Shrapnel forecast used in Table 2 above is higher than their mean forecast I recommend that this be excluded from the sample (or at least given lower weight).

***Best estimate of expected inflation over 10 years***

31. On the basis of the above I recommend that the best estimate of expected (mean) inflation over a ten year period is obtained when excluding BIS Shrapnel’s forecast (shaded column in Table 3). The relevant estimate is the weighted average mean of forecasters’ short and long term expectations (2.51%). This estimate is not materially different to the median forecast or to the mean forecast including BIS Shrapnel. It is also in the middle of a quite narrow distribution of forecasts as illustrated below (with the BIS estimate being the outlier).



32. I note that selecting an estimate of 2.51% for expected inflation is also consistent with the written advice of both the RBA and the Commonwealth Treasury who have separately noted that:

*“Given inflation expectations have been firmly anchored by the Bank’s inflation-target regime for some time, a rough estimate of a real risk-free rate would be the nominal government bond yield less the centre of the inflation target band (ie the nominal yield less 2½ per cent).” (9 August letter from Assistant RBA Governor, Mr Guy Debelle, to ACCC Executive General Manager Mr Joe Dimasi)*

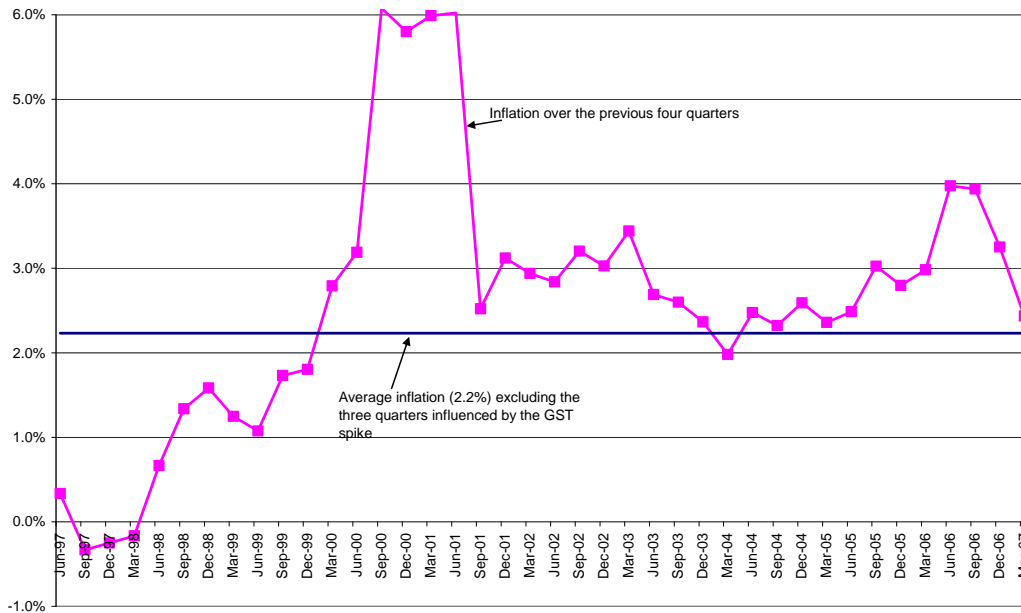
and

*The Australian Government's suspension of issuance of these inflation-linked bonds, as well as increased demand for this asset class, is likely to cause market-implied inflation estimates to exceed consensus forecasts of inflation over the medium term. We therefore recommend that the ACCC uses the mid-point of the RBA's target band for inflation (that is, 2.5 per cent per annum) as the best estimate of inflation. Since the independence of the Reserve Bank board in conducting monetary policy was formalized in 1996, annual inflation has averaged 2.5%. (7 August letter from Treasury Executive Director, Mr Jim Murphy, to ACCC Executive General Manager Mr Joe Dimasi)*

### ***Historical inflation***

33. I believe that the Treasury is correct to note that historical inflation has averaged 2.5% over the last ten years. This is a relevant observation because a rational investor will have regard to past experience when forming expectations about the future. In particular, a rational investor will have regard to past experience when determining whether the RBA can credibly be expected to determine monetary policy in a manner consistent with its inflation targets.
34. However, it is worth noting that the last ten years included an unusual event in the form of the introduction of the Goods and Services Tax (GST) in 2000. This had a one off impact on the measured CPI. I note that excluding the impact of this event would mean inflation would have been in the bottom half of the RBA's target range over the last ten years .

### **Historical Annual Inflation (including GST)**



## Summary

35. Section 8.30 of the Gas Code states:

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

36. Section 8.2(e) requires that such estimates must represent *"best estimates arrived at on a reasonable basis"*.

37. The issue at hand is what real risk free rate is consistent with "the prevailing conditions in the market for funds". The ESCV's methodology attempts to estimate this by starting with the estimated yield on a nominal 10 year CGS (which it believes is the best proxy for the prevailing return on a nominal riskless asset) and subtracting expected inflation to derive investors expected real return.

38. As discussed above, this means that it must be a ten year expected inflation estimate and it must be representative of financiers'/investors' expectations. It also means that the estimate of expected inflation must be well informed (as investors have a strong incentive to be well informed) and must represent an averaging across expectations of practitioners in the market for funds. It must also be an estimate of expected inflation in the probabilistic/statistical sense. That is, it must be a forecast of the probability weighted average of potential inflation outcomes.

39. There are two conceivable ways in which to estimate expected inflation.<sup>5</sup> The first is to perform a comprehensive and unbiased (ie, random) survey of market practitioners and give more weight to those practitioners with greatest funds to invest. The second is to perform a comprehensive and unbiased survey of experts whose profession it is to forecast inflation (some of whom might also be market practitioners such as the major banks and the central bank). The two approaches are obviously linked because investor's views will tend to be based on the views of professional forecasters. In my view it is not appropriate to have regard to non-professional forecasts of inflation, such as consumer or business surveys, as these will neither directly reflect the views of financiers nor will they be relied on by financiers to form their own expectations.
40. It is my view that a direct survey of financiers will be extremely difficult to perform in practice due to the difficulty of identifying the true population of those participating 'in the market for funds' and then sampling randomly from that population. These difficulties are likely to make this approach less accurate than simply examining professional forecasts.
41. In my view, an estimate of 3.0% for expected inflation over a ten year period is not consistent with Sections 8.30 and 8.2(e) of the Gas Code. This estimate is well above the mean and median of the forecasts I have had regard to. It is also materially above even the highest professional forecast of mean expected<sup>6</sup> inflation that I am aware of.
42. In this regard, I note that of all the forecasters examined in this statement, only BIS Shrapnel have average inflation forecasts across all years of more than 2.6%. The other nine forecasters all have estimates of 2.6% or less.
43. In my opinion, this fact alone would make an estimate of 3.0% unreliable in the context of Section 8.30 and section 8.2(e). However, this conclusion is made stronger by the observation that neither the BIS Shrapnel's forecasts are not estimates of mean expected inflation. The BIS Shrapnel forecast is, by BIS Shrapnel's own acknowledgement, above the mean forecast over ten years. These facts mean that a 3.0% expected inflation rate is not consistent with Section 8.30.
44. In my view, the mean of a comprehensive sample of professional forecasts is the best estimate of financier's expectations of inflation. Having regard to the evidence

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<sup>5</sup> Assuming, as seems to be widely agreed, that differences in yields on indexed and nominal bonds are an unreliable source of information on expected inflation.

<sup>6</sup> As far as I am aware the only professional forecast that is arguably consistent with ten years of 3.0% inflation is that by BIS Shrapnel. However, even this estimate is now less than 3.0% (it has been revised down to 2.9%) and I am informed (by BIS Shrapnel) that this is not a forecast of expected (mean or probability weighted) inflation and that BIS Shrapnel believes the expected outcome will be below its forecasts.

presented in this statement it is my view that 2.5% is the best estimate of expected inflation over a ten year period and is consistent with the requirements of Section 8.30 and section 8.2(e) of the Gas Code.

45. I have read and considered the Federal Court Guidelines on Expert Witnesses. I have made all inquiries that we believe are desirable and appropriate to answer my terms of reference. No matters of significance that I regard as relevant have to my knowledge been withheld.

Thomas Nicholas Hird

26 October 2007

**C E C G***Competition and Regulatory Economists*

Tom Hird is a founding Director of CECG's Australian operations. Tom has a Ph.D. in Economics from Monash University. Tom is also an Honorary Fellow of the Faculty of Economics at Monash University. Tom has 18 years professional experience in the economic analysis of markets and the provision of expert advice in litigation, business strategy, and policy contexts.

Prior to forming CECG Tom was an Associate Director at NERA economic consulting and prior to that was a senior officer in the Australian Commonwealth Treasury.

Tom's clients include private businesses and government agencies, including the World Bank and national regulators. Tom has advised clients on matters pertaining to: valuation, cost of capital, competition policy issues, merger clearance processes, restraints of trade, vertical and horizontal effects of transactions, access to bottleneck facilities.

Tom's industry experience spans the, aviation, electricity and gas transport, electricity generation, finance, ports, rail transport, retailing, industrial packaging, telecommunications and tourism sectors. In terms of geographical coverage, Tom's clients have included businesses and government agencies in Australia, Europe, New Zealand, Macau, Singapore and the Philippines. Selected assignments on the cost of capital include:

**2007**

Advising the Energy Networks Association on the appropriate estimation technique for the risk free rate used in CAPM modeling.

Advising on the cost of capital for ACTEW's water and waste water operations.

Advising on the cost of capital for Victorian electricity distributors' metering operations.

**2006**

Advising the Australian Energy Regulator on the cost capital issues in relation to the RBP pipeline access arrangement.

Advising on the cost capital issues in relation to the cost modeling of Telecom New Zealand's TSO obligations

**2005**

Advising on the relative merits of CBASpectrum and Bloomberg's methodology for estimating the appropriate debt margin for long dated low rated corporate bonds.

Advising the Australian Competition and Consumer Commission, Australia on the potential for asymmetric costs of errors in WACC estimation.

Advising Prime Infrastructure on the relative merits of the QCA's draft cost of capital decision for Queensland electricity distribution.

**2004**

Advising the Australian Competition and Consumer Commission, Australia on the correct discount rate to use when valuing future expenditure streams on gas pipelines.

Advising TransGrid on CBASpectrum's methodology for estimating the appropriate debt margin for long dated low rated corporate bonds.

Provided a report for Prime Infrastructure the weighted average cost of capital for its regulated activities (coal shipping terminal).

**2003**

Critique of the ACCC's statistical interpretation of historical proxy beta in its review of the Statement of Principles for the Regulation of Transmission Revenues.

**Tom Hird | Director | C E C G**  
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## Detailed Project Experience (Updated Dec 2006)

### Market Design and Competition Analysis

2006 Melbourne Water Industry, Australia  
Market Design – Bulk Water Sector

Developing reform proposals to facilitate the introduction of tradeable bulk water rights to the Melbourne system – including the specification of operational market rules.

2006 Australian Competition and Consumer Commission, Australia  
Merger Analysis – Electricity Industry

Providing expert opinion as well as strategic guidance to the Australian Competition and Consumer Commission (ACCC) on the competitive implications of a merger.

2006 Confidential, Australia  
Section 46 of the TPA - Telecommunications

Providing expert opinion in relation to an action under Section 46 of the Trade Practices Act.

2006 Australian Competition and Consumer Commission, Australia  
Merger Analysis - Transport Industry

Providing expert opinion as well as strategic guidance to the Australian Competition and Consumer Commission (ACCC) on the competitive implications of proposed merger between Toll and Patrick.

2005 Confidential, Australia  
Merger Analysis - Telecommunications Industry

Providing expert opinion as well as strategic guidance to the merging firms on the competitive implications of that merger.

2005 AirServices Australia (ASA), Australia  
Review of Pricing Conduct

Providing expert opinion to ASA on pricing for its services at Australian Airports. Including an examination of allegations that pricing contravened National Competition Agreements.

2001-2005 TransGrid, Australia  
Market for transmission

Analysis of the design of the National Electricity Market (NEM) and its implications for efficient investment in generation and transmission assets. This work has involved providing private advice to TrnasGrid as well as public policy documents such as drafting TransGrid's submission to the US energy regulator (FERC) on market design.

2005 Confidential, Australia  
Competition Assessment of Pricing Strategy

Advising a large corporate on the economic implications of the Trade Practices Act for its pricing conduct.

2005 Australian Competition and Consumer Commission, Australia  
Competition Assessment of Electricity Generation Merger

Advised the ACCC on the competition concerns (and potential remedies) associated with a specific proposed merger of electricity generation interests.

2004 Australian Competition and Consumer Commission, Australia  
Competition Impact of Exclusive Rights to Content

Provided a public report to the ACCC on the competition concerns (and potential remedies) associated with the use of exclusive rights to content by incumbent telecommunications infrastructure owners.

2004 Australian Competition and Consumer Commission, Australia  
Empirical Evidence of Predatory Pricing in Telecommunications

Provided the ACCC with an expert report that developed an imputation test framework and empirical model to test allegations of predatory pricing of broadband services.

2003/04 Singtel Optus, Australia  
Expert Report on Market Definition and Existence of Market Power in Mobile Termination

Provided Optus with an expert report on the appropriate market definition to use in analysing competition between mobile network operators in providing terminating access.

2003/04 Singtel Optus, Australia  
Expert Economic Advice on Competition Complaint

Providing Optus advice on a confidential competition complaint relating to the exercise of market power by one of Optus' competitors.

2001-03 QANTAS  
Advice on Competition Law and Predation Allegations

Provided input into NERA's advise in relation to allegations of anticompetitive behaviour under section 46 of the Trade Practice Act.

2002 National Competition Council (NCC), Australia  
Exploitation of Market Power by a Gas Pipeline

Provided a report to the NCC in which we developed a number of tests for whether current transmission prices were evidence of the exploitation of market power by a gas transmission pipeline. Also provided a separate report that applied these tests. This analysis was used to inform the NCC's decision on whether to recommend the pipeline in question be subject to regulation under the Australian Gas Code.

### **Cost of Capital Issues**

2006 ACTEW Corporation, Australia  
Cost of Capital

Advising on the cost of capital for ACTEW's water and waste water operations.

2006 AER, Australia  
Cost of Capital

Advising on the cost capital issues in relation to the RBP pipeline access arrangement.

2006 Integral Energy, Australia  
Cost of Capital

Advising on the cost of capital for Integral's retail operations.

2006 Telecom New Zealand, New Zealand  
Cost of Capital

Advising on the cost capital issues in relation to TSO.

2005 Energy Networks Association, Australia  
Debt Margin

Advising on the relative merits of CBASpectrum and Bloomberg's methodology for estimating the appropriate debt margin for long dated low rated corporate bonds.

2005 The Victorian ESC, Australia  
Cost of Capital

Advice on the cost of capital for electricity distribution network assets.

2005 The Australian Competition and Consumer Commission, Australia  
Cost of Capital

Advice on asymmetric costs of errors in WACC estimation.

2005 Prime Infrastructure, Australia

Weighted Average Cost of Capital

Provided a report for Prime Infrastructure critiquing the QCA's draft cost of capital decision for Queensland electricity distribution.

2004 The Australian Competition and Consumer Commission, Australia  
Cost of Capital

Provided a report advising on the correct discount rate to use when valuing future expenditure streams on gas pipelines.

2004 ETSA Utilities, Australia  
Weighted Average Cost of Capital

Provided a report for ETSA examining the use of historical proxy betas.

2004 ActewAGL, Australia  
Weighted Average Cost of Capital

Provided a report for ActewAGL estimating its weighted average cost of capital for regulated activities (gas distribution).

2004 TransGrid, Australia  
Debt Margin

Provided a report critiquing CBASpectrum's methodology for estimating the appropriate debt margin for long dated low rated corporate bonds.

2004 Prime Infrastructure, Australia  
Weighted Average Cost of Capital

Provided a report for Prime Infrastructure the weighted average cost of capital for its regulated activities (coal shipping terminal).

2004 ActewAGL, Australia  
Debt Margin

Provided a report for ActewAGL advising on the appropriate calculation of debt margins for BBB+ ten year bonds.

2003 Electricity Transmission Service Providers, Australia  
Expert Report on the Use of Historical Proxy Betas

Critique of the ACCC's statistical interpretation of historical proxy beta in its review of the Statement of Principles for the Regulation of Transmission Revenues.

2003 Orion, New Zealand  
Cost of Capital

Critique of Associate Professor Lally's advice on the Cost of Capital for New Zealand Electricity Distribution .

2003 TransGrid, Australia  
Expert Report on TransGrid's WACC

Advising TransGrid on the appropriate weighted average cost of capital (WACC) for its regulated assets

2003 EnergyAustralia, NSW, Australia  
Advice on Financial Capital Maintenance

Advising EnergyAustralia on issues relating to its appropriate WACC and the modelling of cash flows to ensure the expected present value of future net revenues was equal to the value of the regulated asset base.

2002 Rail Access Corporation, Australia  
Hurdle Rates of Return

Advising rail access corporation on the appropriate hurdle rates of return that should be applied when assessing competing investments.

2002 Integral Energy, Australia  
Return on Capital

Advising Integral Energy on what risk adjusted regulatory return on capital is necessary to provide sufficient incentive to invest in new infrastructure assets.

2001 TransGrid, Australia  
Advice on ACCC's Powerlink WACC decision

A report critically appraising the ACCC's decision regarding Powerlink's weighted average cost of capital (WACC).

2001 Optus, Australia  
Affidavit on Telstra's PSTN WACC

Providing expert testimony to the Australian Competition Tribunal on Telstra's use of the CAPM model to determine an appropriate rate of return on PSTN assets.

2001 Australian Competition and Consumer Commission, Australia  
International Comparison of WACC Parameters

Preparation of a report on international and domestic WACC parameters and the potential impact of variations in declared WACCs on incentives to invest in various regulatory jurisdictions.

### **General Regulatory Analysis**

2006 GDSE, Macau, SAR PRC  
Efficient Electricity Tariff Reform

Advise the Macau regulator (GDSE) on efficient tariff reform for the vertically integrated generation and network provider. This involved estimating the LRMC on maximum demand and translating this into efficient tariff designs given relevant constraints (eg, metering constraints).

2005/06 Integral Energy, Australia  
Efficient Electricity Tariff Reform

Advise Integral Energy on its LRMC of meeting growing network demand and on how this could be reflected in efficient tariff design (including design of critical peak pricing).

2005 Telecom New Zealand, New Zealand  
Modelling of New Entrant Costs for TSO

Provide expert reports on the correct methodology for calculating the cost of providing the TSO (universal service obligation) using new entrant costs.

2005 Telecom New Zealand, New Zealand  
Operating Cost Benchmarks

Advised Telecom on appropriate operating cost benchmarks for telecommunications services

2005 TransGrid, Australia  
Capital Expenditure Indexation

Advised TransGrid on the development of a price index to reflect movements in the unit costs of inputs into its capital expenditure program.

2005 TransGrid, Australia  
Forecast of Capital Expenditure

Advised TransGrid on appropriate adjustments to forecast capital expenditure to take account of material increases in demand for investment in future Australian electricity infrastructure.

2005 TransGrid, Australia  
ACCC's Capital Expenditure Regime

Advised TransGrid on the ACCC's proposed regulatory regime to apply to capital expenditure.

2005 Actew, Australia  
Financing of New Infrastructure

Advised Actew on options for financing new infrastructure.

2004 Telecom New Zealand, New Zealand  
Avoided Retail Cost Study

Developing an avoided cost study associated with Telecom's fixed line retail activities.

2004 TransGrid, Australia  
Fair Sharing of Efficiency Gains

Provided a report to TransGrid advising on whether the ACCC's draft decision was consistent with the National Electricity Code's requirement that there be a 'fair sharing' of efficiency gains.

2004 Australian Competition and Consumer Commission, Australia  
Asset Valuation Report

Provided an expert report to the ACCC on the calculation of depreciated optimised replacement cost (DORC) in the context of the EAPL's appeal of the ACCC's valuation of its Moomba to Sydney pipeline.

2004 ESCOSA, Australia  
Incentive Regulation

Provided ESCOSA with a report on the appropriate mechanism to provide ETSA Utilities with an incentive to achieve cost reductions in operating and capital expenditure.

2004 Perisher Blue Ltd, Australia  
Review of Municipal Services

Assisted PBL with its submission to IPART on the review of municipal services (roads, waste, water and sewerage) at the Perisher Blue Resort.

2004 TransGrid, Australia  
ACCC Regulatory Review

Assisted TransGrid in drafting its Application to the ACCC for regulated revenues and in its response to the ACCC's draft decision.

2003 Telecom New Zealand, New Zealand  
Expert Report on Efficient Recovery of CSO Costs

Provided Telecom with a report stepping through all the information necessary to administer recovery of CSO costs in a manner consistent with "Ramsey efficient" pricing. The purpose of this was to inform the NZ Commerce Commission of the practical difficulties associated with pursuing such an outcome.

2003 EnergyAustralia, NSW, Australia  
Advice on Financial Capital Maintenance

Advising EnergyAustralia on issues relating to its appropriate WACC and the modelling of cash flows to ensure the expected present value of future net revenues was equal to the value of the regulated asset base.

2003 Optus, Australia  
Critique of Telstra's Access Undertaking for PSTN Services

Advising Optus in relation to the reasonableness of Telstra's cost modelling assumptions underlying its access undertaking for PSTN services.

2003 Optus, Australia  
Indicative Pricing Principles

Advising Optus in relation to appropriate pricing principles the ACCC should adopt when establishing indicative prices for access to PSTN services.

2003 Optus, Australia  
Estimation and Recovery of Telstra's Access Deficit

Provided a report to the ACCC on behalf of Optus addressing the appropriate measurement of any 'access deficit' that may exist between the cost to Telstra of its access network and the revenues associated with that network. Also examined the most appropriate recovery methodology for any access deficit.

2003 Rail Infrastructure Corporation, NSW, Australia  
Expert Report on Hurdle Rates of Return

Advising RIC on the appropriate WACC each division should use as a hurdle rate of return when assessing competing capital projects.

2003 Telecom New Zealand, New Zealand  
Expert at Commerce Commission Hearing

Provided expert testimony to the NZ Commerce Commission on the appropriate calculation of a wholesale discount for regulated services.

2002 Telecom New Zealand, New Zealand  
‘Intelligent’ Wholesale Benchmarking Report

Carried out a benchmarking survey and provided a report to the New Zealand Commerce Commission on behalf of Telecom New Zealand. This report adjusted wholesale prices in the United States for differences in cost drivers (in terms of the cost of capital and labour) compared to New Zealand.

2002 Telecom New Zealand, New Zealand  
Interconnection Pricing

Advised Telecom New Zealand on the potential forms of price control the New Zealand Commerce Commission could adopt in regulating PSTN interconnection prices.

2002 Telecom New Zealand, New Zealand  
‘Intelligent’ Interconnection Benchmarking Report

Carried out a benchmarking survey and provided a report to the New Zealand Commerce Commission on behalf of Telecom New Zealand. This report adjusted interconnection prices in Europe, Australia and the United States for differences in cost drivers (in terms of switching and transmission economies of scale, transmission link lengths and the cost of capital and labour) compared to New Zealand.

2002 SPI PowerNet, Australia  
Design of Efficiency Carryover Mechanism

Advised SPI PowerNet on the appropriate design of an efficiency carryover mechanism intended to share efficiency gains between a regulated business and its customers.

2002 SPI PowerNet, Australia  
ReOptimisation of Transmission Assets

Advised SPI PowerNet on the appropriate approach to calculating the value of assets previously optimised out of its regulatory asset base and now being “un-optimised” due to greater utilisation levels of those assets.

2002 SPI PowerNet, Australia  
Strategic Adviser on Revenue Reset Application

Advised SPI PowerNet on a range of high level issues in relation to their regulated revenue reset application, including appropriate drafting and consistency of argument throughout the document. Presented aspects of SPI

PowerNet's application to the ACCC and in an ACCC sponsored regulatory public forum.

2002 Telecom New Zealand, New Zealand  
Review of Interconnection Benchmarking Report

Advised Telecom New Zealand on issues arising out of an Interconnection Benchmarking report commissioned by the Commerce Commission of New Zealand for the purpose of setting interim interconnection charges. This role included the submission of a report to the Commerce Commission and presentation of the findings of that report at a Commerce Commission hearing.

2002 Australian Pipeline Trust, Australia  
Expert Advice on CPI Indexation

Advised APT in relation to a dispute with customers on the appropriate CPI indexation adjustment of prices for the impact of the GST required under the Trade Practices Act.

2002 EnergyAustralia, Australia  
Pricing Strategy Under a Price Cap

Advised EnergyAustralia on the commercial implications for pricing strategies under a weighted average price cap.

2001 IPART, Australia  
Minimum Standards in Regulation of Gas and Electricity Distribution

Advised the NSW regulator on the appropriate role of minimum standards in regulatory regimes and how this could be practically implemented in NSW.

2001-03 Rail Infrastructure Corporation, New South Wales  
Preparation of access undertaking

Advised on all economic aspects arising in the preparation of an access undertaking for the New South Wales rail network. Issues arising include: pricing principles under a 'negotiate and arbitrate' framework, asset valuation, efficient costs, capacity allocation and trading, and cost of capital.

2001 Australian Competition and Consumer Commission, Australia  
Determination of Local Call Resale Prices

The ACCC's expert regarding the determination of local call resale prices from Telstra's fixed line network. This involved the application, and manipulation, of the Australian incumbent's (Telstra's) regulatory accounting framework to determine appropriate wholesale prices.

2001 All NSW electricity distribution businesses, Australia

## Form of Price Control

Advice on the economic efficiency implications of various forms of price control that can be applied under the National Electricity Code.

2001 Wesfarmers, Australia  
Expert Advice on Reasonable Cost Recovery

Advising Wesfarmers in relation to a dispute with customers on reasonable recovery of costs of coal production.

2001 Integral Energy, Australia  
Pricing Strategy Paper

Advising on appropriate pricing strategy for Integral's electricity distribution business, including advice on an appropriate regulatory engagement strategy.

2001 TransGrid, SPI PowerNet and GPU GasNet, Australia  
CPI Indexation Adjustment

Advice on the appropriate CPI indexation adjustment for the impact of the GST required under the Trade Practices Act.

2001 All NSW gas and electricity distribution businesses, Australia  
CPI Indexation Adjustment

Advice on the appropriate CPI indexation adjustment for the impact of the GST required under the Trade Practices Act.

2000 One.Tel, Australia  
ULL Pricing

Advising OneTel in their arbitration with Telstra on pricing for access to the unbundled local loop.

2000 Electricity Supply Association of Australia and Australian Gas Association,  
Adjusting the Regulatory Regime for the Impact of Tax Reform

Advised the peak energy bodies on the implications of tax reform on their members under the Trade Practices Act.

2000 Victorian Department of Treasury and Finance, Australia  
State Business Tax Reform

Advised the Department of Treasury and Finance on State business tax reform including in relation to the relative economic costs associated with payroll, stamp duty and other transaction taxes.

1999 Independent Pricing and Regulatory Tribunal of NSW  
Various energy regulation issues

Advice on a range of issues in regulation of the NSW energy sector.

1990-99 Commonwealth Treasury, Australia  
Various economic policy issues

Provided input in the formulation of a number of economic policies. These included: the year 2000 reforms of the Australian indirect and corporate tax regimes; reform of the social security system and labour market regulation; economic forecasting and monetary policy monitoring; reform to the regulation of the Australian financial system.

### **Application of Regulatory Test for Network Augmentation**

2003 TransGrid, NSW Australia  
Submission to the ACCC's Review of the Regulatory Test

Advised TransGrid in response to the ACCC's Discussion Paper on the review of the regulatory test. Tom prepared a report which commented both on the ACCC's proposal to amend the regulatory test to improve clarity and to ensure consistency with the provisions in the National Electricity Code, and also on the ACCC's proposed options for incorporating 'competition benefits' in the regulatory test.

2003 Clayton Utz, TransGrid, NSW, Australia  
Murraylink's Application for Regulated Status

Tom advised TransGrid and Clayton Utz in responding to Murraylink's Application to the ACCC for regulated status, and, in particular, Murraylink's use of the regulatory test to derive a regulatory asset value.

Tom also advised TransGrid in responding to the ACCC's Preliminary View on Murraylink's Application, and helped draft a further report commenting on aspects of the ACCC's approach.

2001-03 TransGrid, NSW, Australia  
Application of the regulatory test to network augmentation in the Western Area

Advised TransGrid on the application of the regulatory for intra-regional network augmentation planned for the Western Area of NSW. The application highlighted issues in applying the regulatory test in a situation where an agreed reliability standard is not currently met.

### **Commercial Asset Valuation**

2002 Screenrights, Australia

Advice on methodologies used to estimate the value of retransmitting copyright content contained in local free-to-air broadcast.

General Policy Analysis

2003 Betfair, UK

The Impact of Internet Betting Exchanges on the Racing Industry

This project involved estimating bounds for the price elasticity of demand for wagering in Australia and using these to determine the likely impact of licensing internet betting exchanges to compete with existing TAB wagering operations. This project also involved modelling the impact on wagering tax rates required to achieve revenue neutrality under various price elasticity scenarios.

2002 Marsh, Australia

The Impact of Taxation on Levels of Property Insurance

This project involved estimating the number of uninsured households destroyed in the recent NSW bushfires that would otherwise have been insured if the only tax insurance premiums were subject to was GST. The methodology used was based on evidence from studies of the price responsiveness of demand for property insurance in the US and Australian evidence on the proportion of people without home or contents insurance.

### **Educational Services**

2006 RMIT University, Australia

Economics Unit for MBA

Developed the course materials for the economics unit in RMIT's MBA course.

### **Speeches, Presentations and Testimony**

2005 International Telecommunications Society regional Conference, Perth, Stepping over the Competitive Line.

2005 ACCC Regulatory Conference, Gold Coast, Exclusive Rights to Content and Competition in Telecommunications.

2005 sworn expert testimony to the South Australian District Court critiquing the ESCOSA cost of capital determination for ETSA Utilities.

2004, Office of the Water Regulator, Perth, Cost Benchmarking – Practical Pitfalls.

2004, ACCC Conference of Regulatory Principles for Electricity Transmission, Melbourne, Drawing a Line in the Sand on Cost of Capital Issues.

2004, Macquarie Bank, internal presentation on regulatory risk across jurisdictions and industries, Terrigal.

2003 ACCC Regulatory Conference, Gold Coast, Anticompetitive Pricing in Telecommunications.

2003 ACCC Conference on SPI PowerNet Regulatory Decision, presentation on the operation of the efficiency carryover.

2002 International Telecommunications Society regional Conference, Perth, TSLRIC Regulation and Leverage of Market Power.