Attachment 9.1

Measuring Expected Inflation for the PTRM

A report by CEG

2016/17 to 2020/21 Access Arrangement Information

Australian Gas Networks

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Measuring expected inflation for the PTRM

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Executive summary

1. Over SAPN's averaging period my best estimate of expected inflation is 2.06%. By way of comparison, application of the AER's methodology will result in an estimate of expected inflation of 2.55%. There are two sources of the difference between these estimates. The first is that I adopt a market based estimate of inflation which accounts for 0.27% of the difference. The second is that I adopt a weighted average of 5 and 10 year horizons for my estimate where the weights are determined by the weight of debt and equity in the RAB. This accounts for the remaining 0.22% difference.

Compensation for inflation in the regulatory framework

2. The PTRM uses forecast inflation as an input in order to model an assumed path of the nominal RAB over the regulatory period. The higher the inflation forecast used in the PTRM the higher will be the assumed growth in the nominal value RAB and, consequently, the lower the level of compensation provided for in modelled revenues during the regulatory period.

3. However, only if actual and forecast inflation are the same will the modelled growth of the RAB in the PTRM due to inflation be the same as the actual growth in the RAB that will subsequently be compensated (in the RAB roll-forward model used to determine the opening RAB for the next regulatory period). The RAB roll-forward model will roll-forward the RAB using actual rather than forecast inflation.

4. Consequently, if forecast inflation in the PTRM is less than actual inflation then the business will actually receive higher compensation for inflation than modelled in the PTRM (and vice versa). In fact, the business will receive:

   - real compensation equal to nominal costs less forecast inflation (modelled in the PTRM); plus
   - actual inflation (modelled in the RAB roll forward model five years later when actual inflation is known).

Horizon of inflation forecast in the PTRM

5. To the extent that the objective is to deliver compensation equal to the nominal return on debt and equity inputs into the PTRM then the inflation forecast in the PTRM must be a forecast of the actual inflation that will be used in the RAB roll-forward model at the beginning of the next regulatory regime. Given that the RAB roll-forward model will utilise five years of actual inflation it is these five years of inflation that the PTRM inflation input must forecast.

6. For the cost of debt it is clear that the objective should be to deliver compensation as close as possible to the nominal cost of debt used as an input into the PTRM. The cost of debt is a fixed nominal contract with lenders. That is, instead of the real cost of debt being fixed and the nominal cost of debt varying with inflation, the opposite is true. The nominal cost of debt is fixed under contracts entered into historically and the real cost of that debt falls/rises depending on whether future inflation is higher/lower. In order to accurately deliver compensation equal to the nominal (and real) cost of debt the inflation input into the PTRM needs to be a 5 year inflation forecast – and it needs to be specific to the start and end dates over which inflation will be measured when the RAB roll-forward model is implemented at the beginning of the next regulatory period.

7. The same conclusion does not apply when it comes to the cost of equity. Equity contracts are not written to promise a fixed nominal or a fixed real return. That said, it is the real return that investors care about and which a regulated business must offer in order to induce equity investors. To the extent that inflation is higher/lower than expected, so long as the nominal return adjusts upwards/downwards in line with inflation, then this real return will be delivered.

8. When it comes to the cost of equity, the objective is to determine a real cost of equity and deliver nominal compensation consistent with this based on actual inflation. In this context, the horizon of the inflation forecast used in the PTRM needs to be specific to the horizon of the nominal cost of equity estimate. If this is the case then the PTRM will, in effect, turn the nominal cost of equity into a real cost of equity (which will be compensated in regulated revenues during the regulatory period) and compensation for actual inflation will be delivered in the RAB roll-forward model when it is applied at the beginning of the next regulatory period.

9. The AER's current practice is to use the prevailing 10 year Commonwealth Government Security (CGS) yield as the proxy for the free rate upon which the nominal cost of equity is built. A 10 year horizon inflation expectation is, naturally, embedded in the prevailing 10 year nominal CGS yield. It follows that the prevailing real risk free rate must be estimated by removing expected inflation over the same 10 year horizon.

Weighted average inflation forecast

10. For the reasons set out above, there is a tension between the correct horizon to use for the inflation forecast in the PTRM. The cost of debt must be deflated by a five year horizon forecast of inflation while the cost of equity requires a 10 year horizon forecast of inflation. Consequently, the appropriate inflation forecast used as an input into the PTRM is a weighted average of 5 and 10 year expected inflation with the weights reflecting the assumed proportion of debt versus equity financing (60%/40%).

Methodology for arriving at an inflation forecast

11. Separately from the issue of the selection of a horizon of the inflation forecast used in the PTRM, for any given horizon there remains the question of how to arrive at a forecast of inflation. The AER's inflation estimation methodology assumes that expected inflation is equal to:

    - the RBA's most recent forecast of short term inflation published in the quarterly Statement of Monetary Policy. This provides a forecast of up to two years inflation; plus
    - an assumption that investors expect inflation to be 2.5% in every year thereafter, which corresponds to the mid-point of the RBA's inflation target band.

12. I consider this approach to be broadly reasonable in most market circumstances where investors expect that monetary policy can be relied on to return inflation to, and maintain inflation at, the midpoint of the RBA's target range.

13. However, I do not consider this to be reflective of the current market circumstances, considering the fact that:

    - global inflation rates have been persistently below target, with instances of deflation in the US, Japan, the UK and the Eurozone;
    - the ability of monetary policy to provide economic stimulus is limited, given the proximity of official interest rates to the 'zero lower bound', coupled with the fact that, at current low interest rates, further rate reductions are of uncertain value in terms of providing economic stimulus; and
    - the IMF's April 2015 World Economic Outlook publication specifically mentions Australia as being at risk of falling into a low inflation trap.

14. These are all points that the RBA and its Governors have made or echoed in various publications and speeches. For example, Deputy Governor Philip Lowe stated on 5 March 2015:

    > *Overall, looking at this experience, I find it difficult to escape the conclusion that changes in interest rates are not affecting decisions about spending and saving in the way they might once have done.*[1]

15. In this context, it is reasonable to expect that investors perceive an asymmetry in the probability that inflation will be above/below the RBA's target, at least in the medium term.

[1] RBA Deputy Governor Lowe, Speech to the Goldman Sachs Annual Global Macro Economic Conference, Sydney - 5 March 2015

16. Based on the above observations, I consider that the best estimate of expected inflation is derived from the difference in yields on nominal and inflation indexed CGS of the same maturity. This is known as 'breakeven' inflation because, if inflation is expected to be higher/lower than this level, then the expected return on nominal CGS will be lower/higher than the expected return on indexed CGS. In the table below I report breakeven inflation estimates at a 5 and 10 year horizon and, for the purpose of comparison, the inflation estimate derived from the AER method.

Table 1: Weighted average of 5 and 10 year inflation; 9 February to 6 March

	5 year	10 year	Weighted average
Breakeven	1.91%	2.28%	2.06%
AER method	2.60%	2.55%	2.58%

Source: Bloomberg, RBA, CEG analysis

1 Introduction

17. I have been asked by SAPN to provide a report advising on the best estimate of the inflation expectation to be used as an input into the PTRM. The terms of reference are provided at Appendix C.

18. The remainder of this report is structured as follows:

    - **Section 2** provides an assessment of investors' expectations of future inflation; and
    - **Section 3** examines whether the PTRM requires an estimate of expected inflation at the 5 or 10 year horizon.

19. I acknowledge that I have read, understood and complied with the Federal Court of Australia's *Practice Note CM 7, Expert Witnesses in Proceedings in the Federal Court of Australia*. I have made all inquiries that I believe are desirable and appropriate to answer the questions put to me. No matters of significance that I regard as relevant have to my knowledge been withheld. I have been provided with a copy of the Federal Court of Australia's *Guidelines for Expert Witnesses in Proceedings in the Federal Court of Australia*, and confirm that this report has been prepared in accordance with those Guidelines.

Thomas Nicholas Hird

2 Breakeven vs AER estimated inflation

20. The AER's proposed methodology for estimating 10 year inflation results in an estimate that is in excess of breakeven inflation; where breakeven inflation is the difference between the yields on nominal and indexed CGS. In my view, breakeven inflation is a better estimate of expected inflation than the method associated with the AER's estimate. There are two reasons for this:

    - First, the AER's methodology assumes that investors expect that inflation will be in the middle of the AER target range beyond 2 years. While this is a reasonable assumption in most market circumstances it is not a reasonable assumption in current market circumstances - whereby the risks of below-target inflation are heightened. By contrast, breakeven inflation takes its estimate of medium to long term inflation from traded prices in bond markets.
    - Second, adopting breakeven inflation in the PTRM has the advantage of setting the real risk free rate equal to the yield on indexed CGS. This is an advantage because, as explained in a separate report for United Energy,[2] indexed CGS have a beta that is, while still negative, materially closer to zero than nominal CGS. Consequently, adopting the yield on indexed CGS as the real risk free rate will substantially reduce the potential for bias from this source.

2.1 Why the AER method is unsound in current circumstances

21. The AER's methodology for estimating expected inflation is to take the longest available forecast of future inflation from the RBA's most recent Statement on Monetary Policy (published quarterly) and to assume that inflation beyond that forecast period is equal to the midpoint of the RBA's inflation targeting range (2.5%).

22. Given that the RBA's forecasts only tend to extend out one or two years into the future and the AER is estimating expected inflation with a 10 year horizon, then this result inevitably centres very strongly on 2.5%. I consider that this approach is reasonable in most market circumstances where investors expect that monetary policy can be relied on to return inflation to, and maintain inflation at, the midpoint of the RBA's target range.

23. Moreover, I consider that there have been some periods in the past when the AER's method has resulted in a better estimate of expected inflation than market based estimates (such as breakeven inflation measured as the difference in yields between

[2] CEG, Measuring risk free rates and expected inflation, A report for United Energy, April 2015. See section 2.

nominal and CPI indexed CGS). Specifically, in the period from 2006 to late 2008 the indexed CGS market was much smaller than today. RBA analysis suggested that the limited supply, in combination with heightened demand by foreigners due to regulatory changes, were combining to push up indexed CGS prices and push down real yields; with the effect that breakeven inflation estimates were overstated.

24. For example, as noted in a report that I co-authored,[3] in its February 2006 Statement on Monetary policy (pages 48 to 49) the RBA states:

> *"…Other investors, such as hedge funds, are said to have recognised that this process is likely to continue for some time and have added to demand. These developments, against a background of a small, tightly-held domestic supply of indexed bonds, have seen their prices rise (yields fall) significantly. As a consequence, and despite having fallen a little in February, the current spread between yields on nominal and indexed government bonds overstates the market's expectations of inflation."*

25. At that time the Australian Office of Financial Management was not issuing new indexed linked securities and there were doubts about its commitment to maintain a supply of these bonds into the future. However, since then the AOFM has recommenced issuance of these bonds and the stock of bonds have increased by more than 400% and the number of different maturity dates have more than doubled from 3 to 7.[4] The AOFM has also announced the imminent issuance of a new 2040 or 2045 CPI indexed bond.[5]

26. On this basis I consider that the shortage of supply of these bonds which led to breakeven inflation *overstating* expected inflation prior to 2009 is no longer a material concern. In any event, to the extent that it was a material concern it would imply that breakeven inflation would be overestimating expected inflation which, if true, would suggest the AER's methodology (which forecasts higher inflation than breakeven inflation currently) was overestimating by even more.

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3 NERA, Relative Bias in Indexed CGS Bonds as a Proxy for the CAPM Risk Free Rate March 2007.

4 In a 26 May 2015 speech "*Australian Government Sovereign Debt: Are we there yet? What more can be expected in terms of developing the market? – Presentation to the Australian Business Economists luncheon*" the CEO of the AOFM stated:

> *From a modest starting point in 2009 when we recommenced indexed issuance (with $6 billion on issue spread across 3 lines), we now have around $27 billion in stock outstanding ($33 billion when adjusted for inflation indexation). This is spread across 7 lines with a curve extending 20 years.*

5 The following quote from "*Australian Government Securities: Issuance and Market – CEO presentation at the Australian Government Fixed Income Forum, Tokyo*" states:

> *"We have recently announced to the market that we will establish another new long-end maturity for the coming year – this will be either a 2040 or 2045 maturity."*

27. While the AER method may be reasonable in what might be termed 'normal' market conditions, this is not currently the case. With the RBA cash rate at record low levels of 2.00%, and with further near term rate cuts priced into financial markets,[6] the RBA cash rate is dangerously close to the 'zero lower bound'. Monetary policy's most direct effect on the economy and, therefore, inflation is through lower interest rates. However, the RBA cannot set a cash rate below zero (or at least not materially below zero) because at such levels, businesses and households will prefer to hold cash – which delivers a zero rate of interest. Thus, the potential for monetary policy to stimulate economic activity diminishes as policy interest rates approach zero, thereby creating the potential for a low inflation trap, which monetary policy may be ineffective at extracting the economy from.

28. This is not a theoretical prospect but is the actual experience of many countries in recent history (consistent with the global low returns on government debt). At the time of writing, the United States, the Eurozone and Japan have all had policy interest rates at the zero lower bound for extended periods and have all suffered from below target inflation (and deflation in much of the Eurozone and in Japan). While the US, after five years at the zero lower bound, is expected to be able to raise policy interest rates towards the end of this year, this is not the case in the Eurozone or Japan. As noted by the IMF recently:

> *"… with the United States expecting to exit the zero lower bound this year, but with no such prospects for the euro area or Japan."*[7]

29. In the same document, the IMF pointedly refers to the risk that Australia will fall into the same low inflation trap.

> *However, in economies in which output gaps are currently negative (Australia, Japan, Korea, Thailand), policymakers may need to act to prevent a persistent decline in inflation expectations.*[8]

30. The Australian Financial Review has, in an article entitled "*IMF warns Australia faces low*-inflation *trap*" interpreted this statement as an unusually direct reference to the serious risks facing a member nation.

> *The International Monetary Fund has put Australia in the same category as deflation-wracked Japan, saying the Reserve Bank of Australia may need to cut interest rates again to prevent inflation slowing too quickly.*

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6 At the time of writing, market expectation, as revealed in short term debt prices, are for the RBA cash rate to reach around 1.86% by the end of 2015. See Appendix A.

7 International Monetary Fund, "World Economic Outlook", April 2015, p. xiii.

8 Ibid, p. 56.

> *The warning raises the prospect of Australia succumbing to the weak growth and inflation malaise that has gripped Europe and North America since the 2008 crisis.*
>
> *…*
>
> *In a first, the IMF pointedly listed Australia alongside Japan, Korea and Thailand as an Asia-Pacific economy growing slower than its "potential" pace, raising the prospect that inflation may become too weak.*
>
> *…*
>
> *While the Reserve Bank has kept open the option of further reductions in rates, the official cash rate is rapidly nearing the level at which it is unlikely to spur any significant additional growth – something the bank has acknowledged in recent months.*[9]

31. This last statement refers to a series of statements by the RBA to the effect that, at current levels, lower interest rates are not stimulating economic activity to the same extent as historically. For example, Deputy Governor Philip Lowe stated on 5 March 2015:

> *Overall, looking at this experience, I find it difficult to escape the conclusion that changes in interest rates are not affecting decisions about spending and saving in the way they might once have done.*[10]

32. On the 13 February 2015 RBA Governor Stephens stated:

> *The Board is also very conscious of the possibility that monetary policy's power to summon up additional growth in demand could, at these levels of interest rates, be less than it was in the past. A decade ago, when there was, it seems, an underlying latent desire among households to borrow and spend, it was perhaps easier for a reduction in interest rates to spark additional demand in the economy. Today, such a channel may be less effective. Nonetheless we do not think that monetary policy has reached the point where it has no ability at all to give additional support to demand. Our judgement is that it still has some ability to assist the transition the economy is making, and we regarded it as appropriate to provide that support.*[11]

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9 Australian Financial Review, IMF warns Australia faces low-inflation trap, Apr 14 2015 (Updated Apr 15 2015 at 6:33 AM)

10 RBA Deputy Governor Lowe, Speech to the Goldman Sachs Annual Global Macro Economic Conference, Sydney - 5 March 2015

11 RBA Governor Stevens, Opening Statement to House of Representatives Standing Committee on Economics, Sydney - 13 February 2015.

33. In this context, it is reasonable to expect that investors perceive an asymmetry in the probability that inflation will be above/below the RBA's target, at least in the medium term. This means that, even if the 'most likely' estimate is for expected inflation to average 2.5% in the medium to long term, this is not the mean (probability weighted) estimate. That is, there is more downside than upside risk to inflation. Indeed, this is precisely what market-based estimates of expected inflation are predicting – as I discuss in the subsequent sections.

2.2 Breakeven inflation is a better estimate

34. The CAPM is, like all asset pricing models, a model of the determinants of the real return on assets. As such, the risk free rate that is relevant in the CAPM is the real risk free rate. Nominal CGS are only meaningfully an input into the CAPM once they are transposed into a real return by the subtraction of an estimate of investors' expected inflation rates. Indeed, and as discussed in section 3.1 below, this is precisely what is done in the PTRM when the nominal risk free rate is combined with an assumption regarding expected inflation. That is, the implicit real risk free rate used in the PTRM is the nominal risk free rate estimated by the AER (traditionally the nominal 10 year CGS yield) less the AER's estimate of expected inflation.

35. Breakeven inflation is simply the difference between nominal and inflation indexed CGS. It is referred to by this name because, at this inflation rate, the two different types of bonds will provide investors with the same nominal return (that is, returns on one bond will equal returns on the other bond over the life of the bonds).

$$\text{10 yr breakeven infl.} = CGS_{10}^{nominal} - CGS_{10}^{Indexed}$$ [12]

36. Adopting breakeven inflation, unlike adopting the midpoint of the RBA's inflation target, can be viewed as the probability weighted forecast of inflation in all possible circumstances that market participants perceive. For example, market participants may believe that the most likely (mode or median) outcome is for inflation to be equal to the midpoint of the RBA's target range. However, if investors believe that

    - there is a greater probability of Australia falling into a low inflation trap (with inflation continually at the low end or below the RBA range as warned of by the IMF and as has been the experience of most other developed countries over the last half decade or so); than

[12] This equation is actually a simplification of the Fisher equation where 10 yr breakeven infl. = $(CGS_{10}^{nominal} - CGS_{10}^{Indexed})/(1+ CGS_{10}^{Indexed})$. This equation accounts for the impact of inflation on not just the capital value of the bond but also the return. However, at low levels of real risk free rates and inflation this more complicated formula delivers very similar results to its simpler counterpart. I use the simpler version in this report for ease of exposition.

- Australia falling into an inflationary spiral (where inflation rises above the RBA target and the RBA is unwilling/powerless to bring it down to the middle of the target); then
- this asymmetry of probabilities will be reflected in a breakeven inflation estimate that is lower than the midpoint of the RBA range (even if investors believe the midpoint is the most likely estimate).

37. It follows mathematically that, if breakeven inflation is used in the PTRM, and the AER continues to use 10 year nominal CGS as the proxy for the nominal risk free rate, then the real risk free rate in the PTRM will equal the yield on indexed CGS.

$$Real\ RFR^{PTRM} = Nominal\ RFR^{PTRM} - Expected\ Inflation^{PTRM}$$

38. If 10 year nominal CGS yields are used as the proxy for $Nominal\ RFR^{PTRM}$ and 10 year breakeven inflation is used as the proxy for $Expected\ Inflation^{PTRM}$ then the real risk free rate in the PTRM is:

$$Real\ RFR^{PTRM} = CGS_{10}^{nominal} - (CGS_{10}^{nominal} - CGS_{10}^{Indexed})$$

$$Real\ RFR^{PTRM} = CGS_{10}^{Indexed}$$

39. This means that the use of nominal CGS as the risk free rate in combination with the use of breakeven inflation results in the real risk free rate being set equal to the yield on indexed CGS. As explained in a separate report for United Energy,[13] this is a material advantage to the use of breakeven inflation. This is because both nominal and indexed CGS yields are depressed by the existence of negative beta risk for government bonds. However, indexed CGS are less affected by the bias associated with negative betas so this source of bias is automatically reduced by the use of breakeven inflation. That is, any relatively higher bias in nominal CGS is automatically removed by the use of breakeven inflation as the forecast inflation in the PTRM.

40. In the SAPN averaging period of 9 February to 6 March, applying the AER's method for arriving at an expected inflation estimate results in expected 5/10 year inflation of 2.60%/2.55%. The nominal 5 and 10 year CGS yields were 2.03% and 2.55% respectively. Consequently, if the AER's method for estimating expected inflation is accepted as accurate then the implied real return on 5/10 year nominal CGS is -0.57%/0.00%. This is below the guaranteed real yield on indexed CGS available in the bond market over the same period at 5/10 year maturity of 0.12%/0.27%. If the AER's inflation forecast was correct it would imply that investors in nominal bonds expect to receive a negative real yield – notwithstanding that they could invest in an indexed CGS that will deliver a guaranteed positive real yield.

[13] CEG, Measuring risk free rates and expected inflation, A report for United Energy, April 2015. See section 2.

41. Put another way, if the AER were to use its current methodology then its cost of capital allowance would be based on the implicit assumption that investors require not only a negative real return on the "risk free"[14] asset, but a substantially lower real return than is available from the purchase of inflation indexed CGS.

42. If the AER's methodology for estimating inflation expectations is accurate (I will explain in the next section why I do not consider this to be true), then investors must be willing to accept a lower expected real return on nominal CGS than inflation indexed bonds. However, if we accept that investors are willing to accept a lower real yield on nominal CGS than inflation indexed CGS, the next relevant question becomes why this would occur.

43. The only plausible reason is that they are perceived as lower risk. However, as already discussed and explained in my separate report for United Energy,[15] and consistent with the IMF analysis surveyed in that report, an assessment of this relative risk reveals that nominal CGS have materially more negative beta. This is consistent with nominal CGS having lower risk. However, if the AER rejects the use of breakeven inflation on this basis then the logical corollary is that nominal CGS should also be rejected as the proxy for the risk free rate in the CAPM. This then leads to the need to adjust the nominal risk free rate upwards by around 1% as discussed in section 2.5 of my report for United Energy.

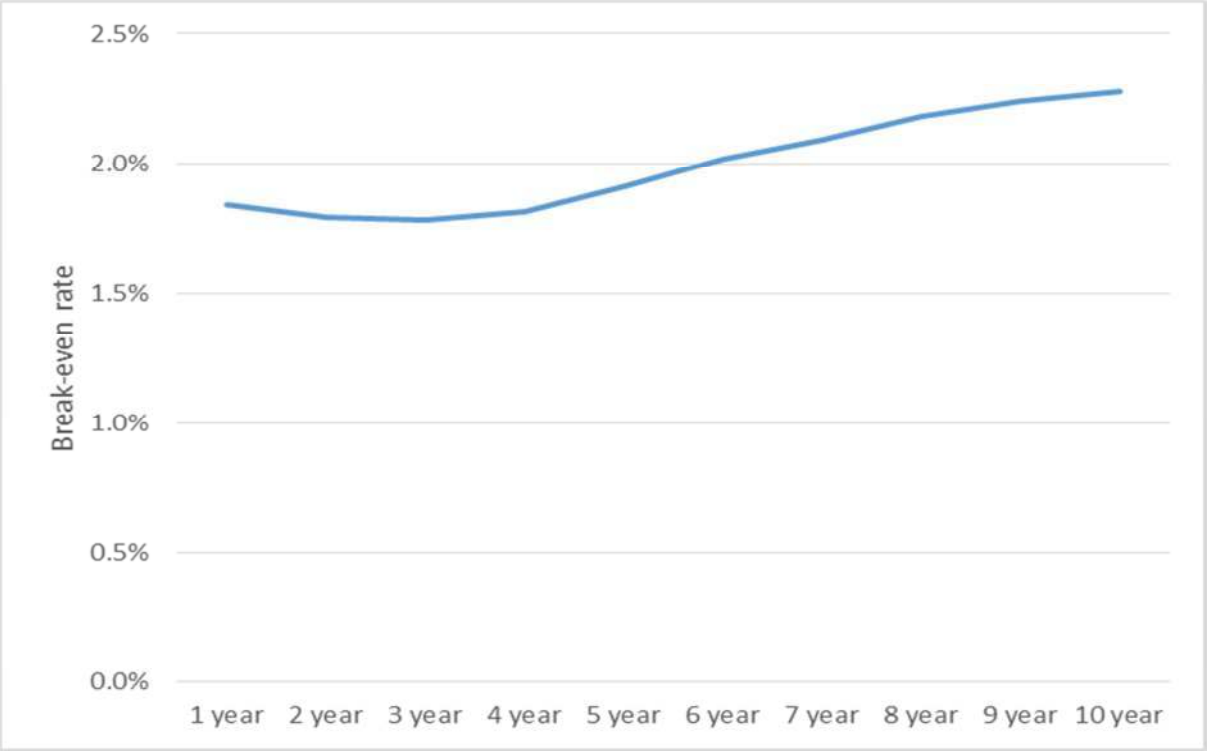
2.3 Break-even inflation over SAPN averaging period

44. Break even forecasts of inflation are currently much lower than 2.5% at both the 5 and 10 year term. Over 9 February to 6 March 2015, the implied term structure of average annual inflation from CGS yields is shown in Figure 1. This figure shows that average annual breakeven inflation over 10 years was 2.28%.

[14] The asset is free of default risk but, because it is nominal, it is still exposed to inflation risk. Moreover, its long maturity means that its market value can vary overtime. This is how it is possible to have negative beta risk. Indeed, the fact that the nominal bond will have a high real yield if inflation turns out to be low is one reason why its beta is negative (and more negative than indexed CGS). That is, in the event of the economy falling into recession and a low inflation trap (circumstances when the equity market will have low real returns) the real return on holding nominal CGS will be high (because coupons will not fall with inflation).

[15] CEG, Measuring risk free rates and expected inflation, A report for United Energy, April 2015. See section 2.

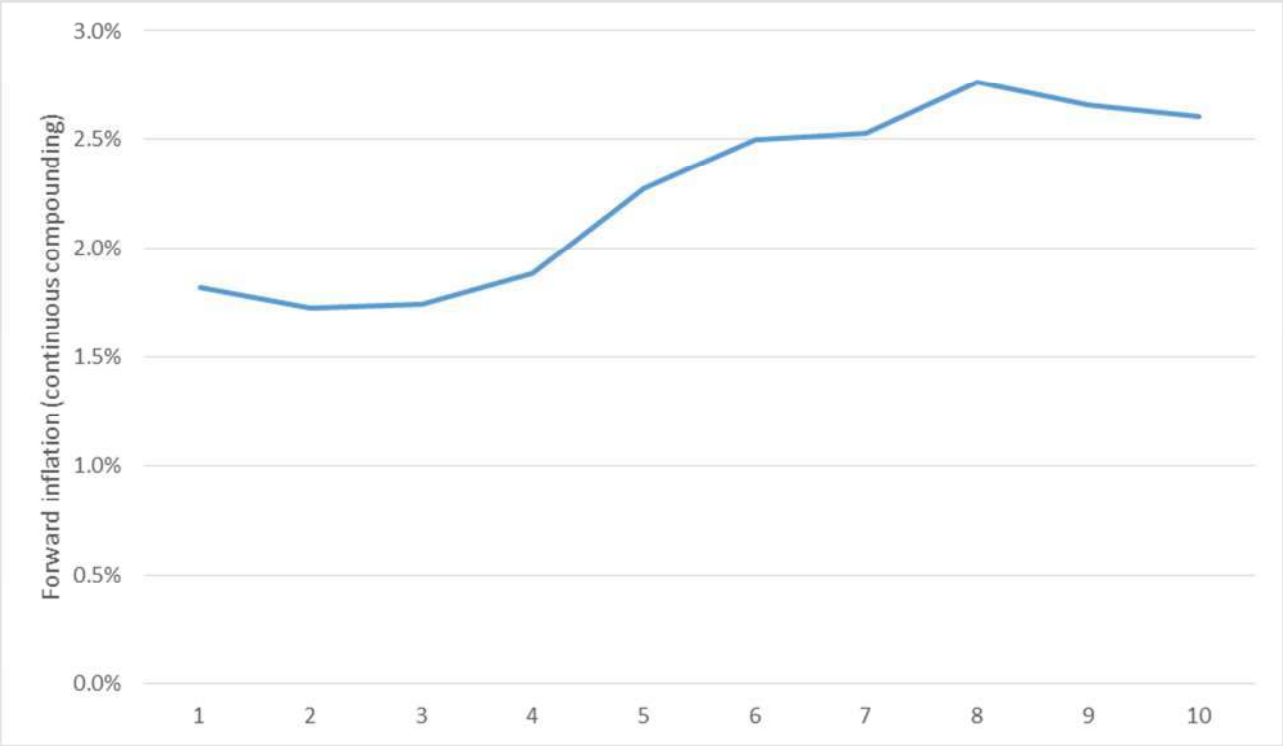
Figure 1: Implied (breakeven) inflation term structure from nominal and indexed CGS yields



Source: RBA, CEG analysis

45. The figures reported in Figure 1 above are average annual rates of increase in CPI over the horizon provided on the horizontal axis. However, implied in this term structure is expected breakeven inflation in each of the future years ("forward inflation"). This is provided in Figure 2 below.

Figure 2: Forward (breakeven) inflation implied by nominal and indexed CGS yields



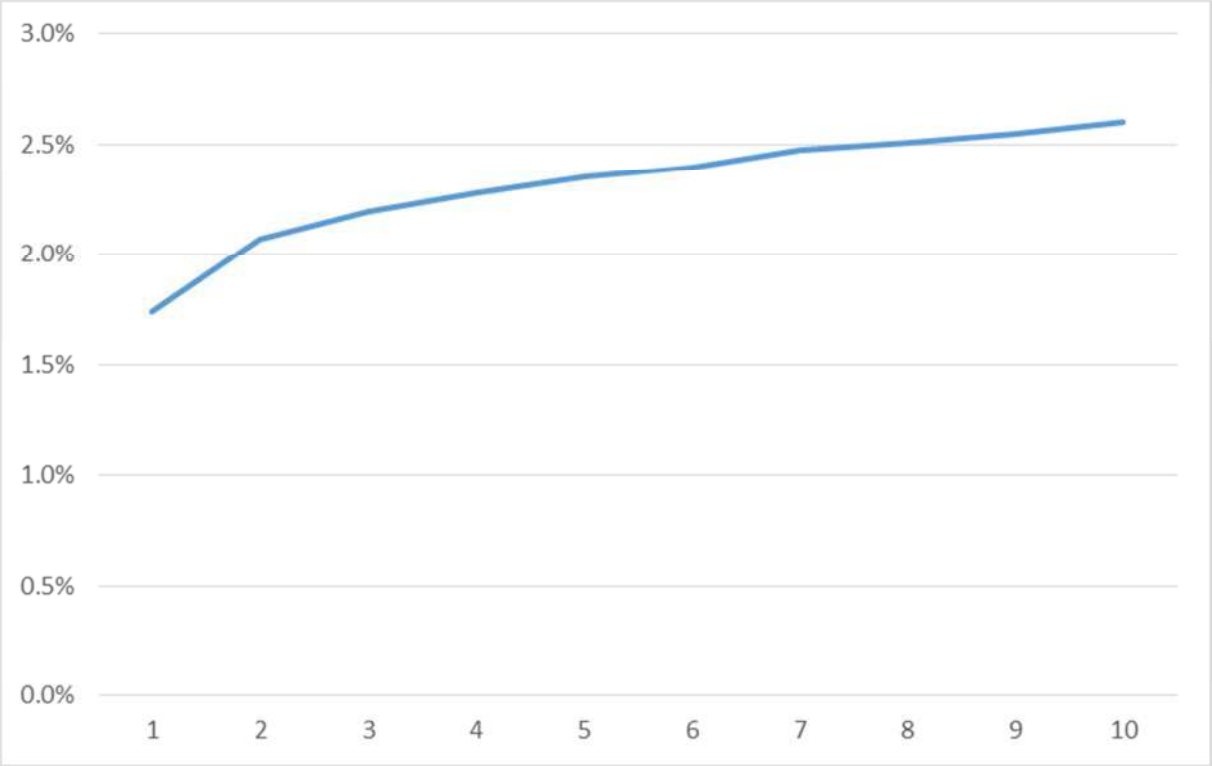
Source: RBA, CEG analysis

46. It can be seen that breakeven inflation is expected to remain below 2.0% over the next 4 years, rising to be approximately equal to 2.5% only after 6 years. This is entirely consistent with the evidence surveyed above, which suggests that the downside risks to inflation exceed the upside risks in the medium term.

2.4 Inflation swaps over the SAPN averaging period

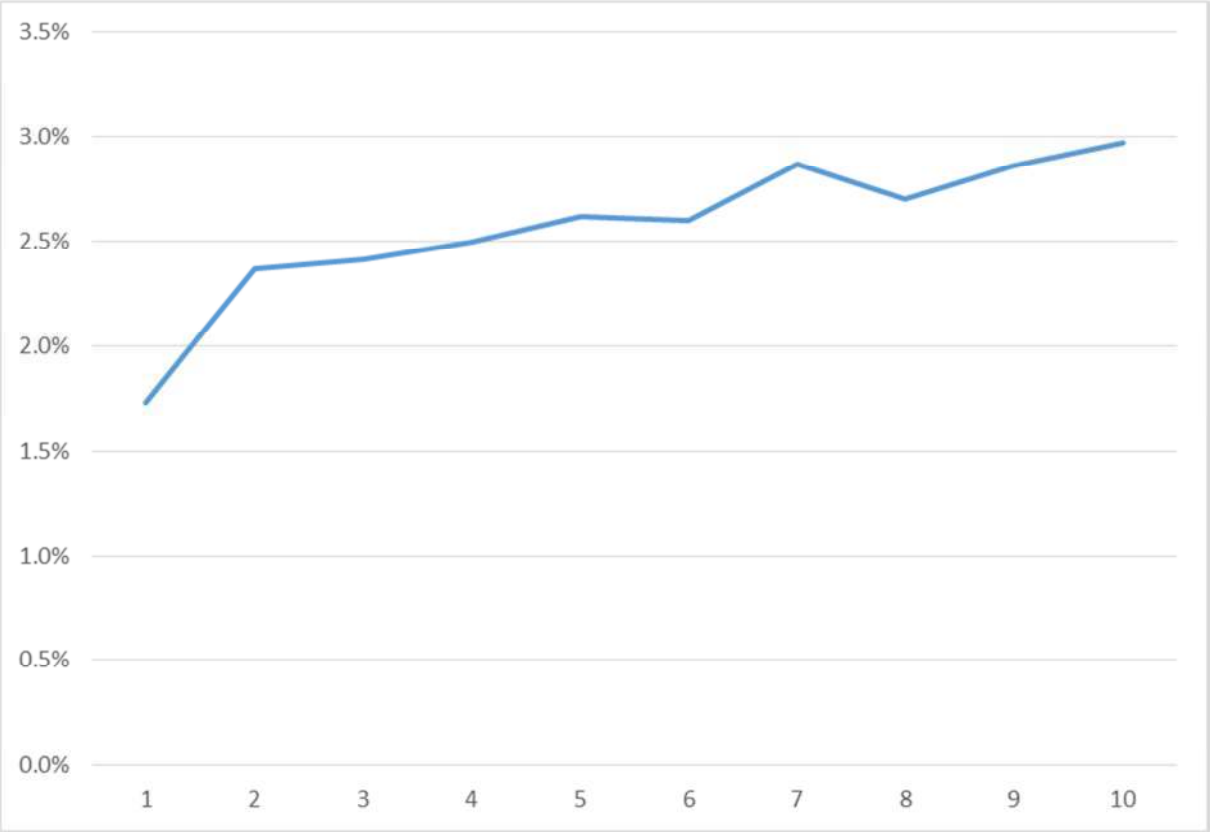
47. Another source of information about investor expectations of future inflation is inflation swaps. The term structure of inflation, over 9 February to 6 March 2015, implied by inflation swaps and the associated forward rates of inflation are provided below.

Figure 3: Implied inflation term structure from inflation swap markets



Source: Bloomberg, CEG analysis

Figure 4: Forward inflation from inflation swap markets



Source: Bloomberg, CEG analysis

48. Beyond 1 year the implied inflation from swap markets rise much faster than from CGS markets, such that implied forward inflation from year 4 to 10 is above the midpoint of the RBA target range (2.5%) and by year 10 is at the top of the RBA range.

49. In my view, implied inflation from swap markets at long maturities should be treated with caution. This is because the inflation swap market is one-sided in the sense that there is more demand for the fixed leg of an inflation swap than the floating leg. That is, there are more investors wanting to hedge long-term inflation than who want to be exposed to long term inflation (by taking on floating rate exposure). The Australian Treasury has, in its Treasury Roundup series, published analysis that notes this:

> *Further, one of the counterparties to an inflation swap will usually be a swaps dealer, who may seek to hedge their inflation exposure with parallel trades in the indexed bond market. Because a cash position in the indexed bond market necessarily entails a capital cost, and because indexed bonds are relatively illiquid, the swaps dealer may demand additional compensation for the cost and potential difficulties involved in*

> *hedging this risk. This, in turn, may drive a wedge between inflation swap rates and bond break-evens.*[16]

50. In this example the dealer is promising to pay the floating leg of the swap and then buy (taking a 'cash position' on) indexed bonds in order to receive a floating CPI payment which is a hedge to its floating exposure. If the swap market was evenly balanced the dealer would just take the floating side of another swap rather than buy indexed bonds.

51. Therefore, it is to be expected that inflation swap data will be above breakeven inflation because breakeven inflation defines the base rate of inflation that the dealer can use to hedge its exposure. Thus, the fixed rates offered by dealers must be above breakeven inflation if the dealer is to cover their costs and risks.

52. This issue is also discussed by Campbell, Shiller, and Viceira (2009):

> *The figure shows that the two breakeven rates track each other very closely up to mid-September 2008, with the synthetic inflation breakeven rate being about 35-40 basis points larger than the cash breakeven inflation rate on average.*
>
> *This difference in breakeven rates is typical under normal market conditions. According to analysts, it reflects among other things the cost of manufacturing pure inflation protection in the US. Most market participants supplying inflation protection in the US inflation swap market are levered investors such as hedge funds and banks proprietary trading desks. These investors typically hedge their inflation swap positions by simultaneously taking long positions in TIPS and short positions in nominal Treasuries in the asset swap market. A buying position in an asset swap is functionally similar to a levered position in a bond. In an asset swap, one party pays the cash flows on a specific bond, and receives in exchange LIBOR plus a spread known as the asset swap spread. Typically this spread is negative and its absolute magnitude is larger for nominal Treasuries than for TIPS. Thus a levered investor paying inflation - i.e. selling inflation protection - in an inflation swap faces a positive financing cost derived from his long-short TIPS-nominal Treasury position.*[17]

53. The Treasury Roundup paper quoted from above illustrates the persistently higher inflation in CPI swap markets than in breakeven markets as illustrated in the following figure from that paper.

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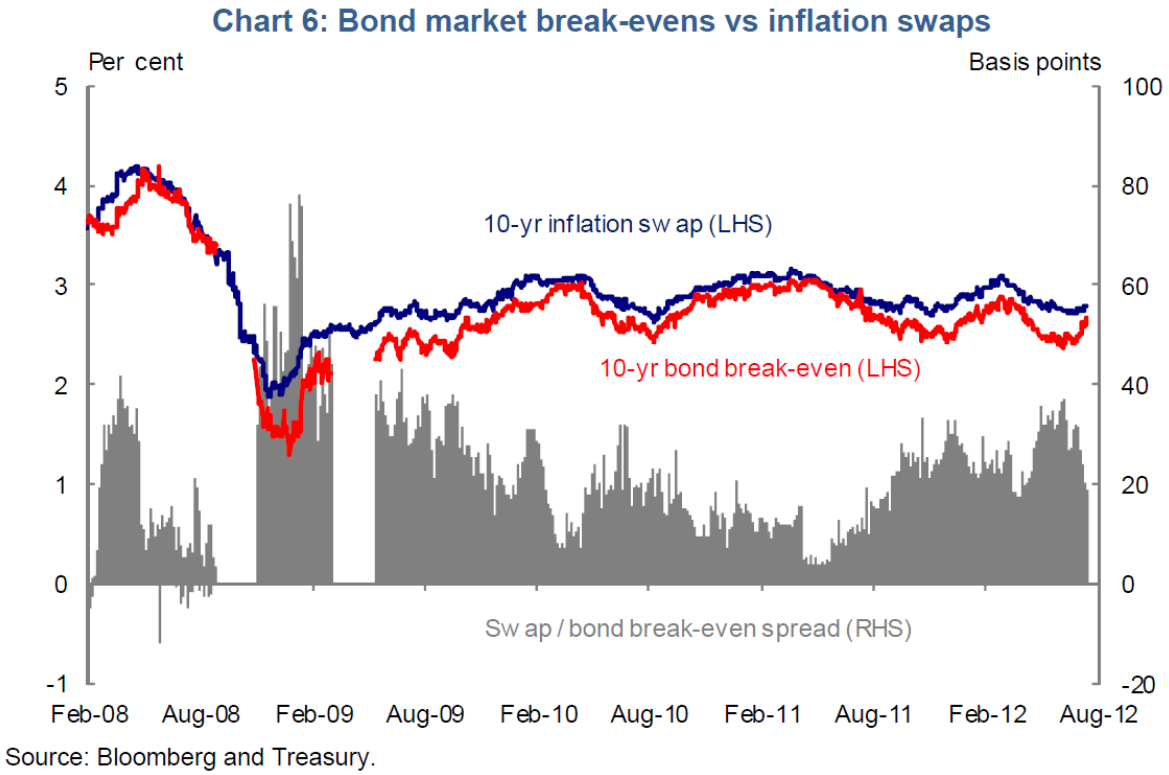
16 W. Devlin and D. Patwardha, Measuring market inflation expectation, Economic Roundup, Issue 2, 2012.

17 Campbell, Shiller, and Viceira, Understanding Inflation-Indexed Bond Markets, NBER Working Paper No. 15014, (2009), p. 21.

Figure 5: Chart 6 from Treasury round up



Source: W. Devlin and D. Patwardha, Measuring market inflation expectation, Economic Roundup, Issue 2, 2012.

54. Consistent with this, inflation swap rates remain well above breakeven inflation. It is notable that the period in early 2009 and late 2008 has the greatest difference between breakeven and inflation swap rates. This is an exceptional period where the opportunity cost of capital was very high for financial firms suggesting the costs of providing inflation swaps would be high. However, it is also the case that this was a period of extremely high liquidity premiums which likely depressed breakeven inflation rates (noting that nominal CGS tend to be more liquid than indexed CGS). In such exceptional circumstances it is difficult to be sure what the best estimate of expected inflation was. In periods outside of financial crisis the better estimate will tend to be break-even inflation given that the no-arbitrage condition means that the CPI swap market tends to reflect breakeven inflation rate plus a premium for the hedging costs of swap dealers.

55. This conclusion is borne out by noting the implied CPI swap forward rate for inflation of around 3% at the 10 year horizon. Consistent with the analysis in section 2.1, I do not think that this is a plausible best estimate of expected inflation. That is, while there are reasons to believe that the best estimate of expected inflation in 10 years' time will be below the midpoint of the RBA range, there is no

reason that I am aware of to believe that the best estimate is for inflation to be at the top of the RBA range.

56. In any event, it is relevant to note that, in the SAPN averaging period, breakeven inflation and CPI swaps are both predicting that inflation will be at or below 2.5% for the next 5 years – such that average inflation over the next 5 years is well below 2.5%.

2.5 Conclusion

57. The previous sections have surveyed:

- the recent experience of the United States, Eurozone and Japan;
- warnings from the IMF that Australia is at risk of falling into a low inflation trap;
- statements of concern by the RBA about the potency of monetary policy in a low interest rate environment; and
- evidence of market expectations of expected inflation consistent with expected inflation at less than 2.5% over the next 5 years.

58. In this context, the assumption implicit in the AER methodology that investors believe that inflation will be 2.5% beyond 2 years is not reasonable. The best assumption is that investors perceive a greater risk of underperforming relative to the RBA's midpoint than over-performing. In this context I regard breakeven inflation from the CGS market as the best estimate of expected inflation. In the below table I report both breakeven inflation and inflation associated with application of the RBA method.

59. I distinguish between 5 and 10 year inflation for the reasons set out in the next section. Specifically, because I recommend that the inflation forecast used in the PTRM should be a weighted average of the inflation expectations at the 5 and 10 year horizons where the weights are 60% to the five year horizon and 40% to the 10 year horizon – consistent with the weights of debt and equity in the RAB.

Table 2: Weighted average of 5 and 10 year inflation; 9 February to 6 March

	5 year	10 year	Weighted average
Breakeven	1.91%	2.28%	2.06%
AER method	2.60%	2.55%	2.58%

Source: Bloomberg, RBA, CEG analysis

3 Should 5 or 10 year inflation be used in the PTRM

60. This section sets out why the estimate of expected inflation used as an input into the PTRM should be equal to the weighted average of 5 and 10 year inflation expectations – where the weights given to 5/10 years should match the weights given to debt/equity finance respectively.

3.1 The role of forecast inflation in the PTRM

61. It is first necessary to understand the role of expected inflation in in the PTRM. While the PTRM is superficially a 'nominal model' in that it has nominal inputs for the WACC, the actual operation of the PTRM is best understood as a real return model. That is, the PTRM effectively:

    i. Takes a nominal input for the cost of debt and equity;

    ii. Deducts forecast inflation (another input into the PTRM) to arrive at a real return which is then embedded in the real regulated revenue path;

    iii. Provides nominal compensation that is equal to:

        a. The real return derived in step ii); plus

        b. The inflation that will occur over the regulatory control period (this is compensated primarily in the RAB roll forward model used to set the opening RAB at the beginning of the next regulatory period but also in the form of price escalation for inflation during the regulatory period).

62. The real revenue path in step ii) is the final output of the PTRM and is expressed in terms of a real "X"% increase or decrease plus actual inflation that will accrue (but is not yet known) over the regulatory period. This gives rise to the familiar CPI±X% expression of the revenue/price path.

63. As will become critical below, the nominal compensation from step iii) will be expected to be the same as the nominal compensation inputted into the PTRM in step i) if:

The inflation input into the PTRM in step ii ($\pi^{PTRM}_{Forecast}$)	=	Expected inflation over the regulatory control period ($Exp(\pi^{Actual}_{Over\ 5\ year\ reg\ period}$)

64. More specifically, if $\pi^{PTRM}_{Forecast}$ > Exp($\pi^{Actual}_{Over\ 5\ year\ reg\ period}$), then expected nominal compensation from regulated revenues will be less than the nominal cost inputted into the PTRM (and vice versa).

65. Given that the AER uses a 10 year forecast of inflation in the PTRM, then whenever 5 and 10 year forecasts are different, the expected nominal compensation will not match the estimated nominal costs inputted into the PTRM. For the reasons described below this is:

- entirely appropriate where the relevant cost is a fixed real cost, such that the corresponding nominal value varies with inflation (as is the case for the cost of equity); and
- inappropriate where the relevant cost is a fixed nominal cost, such that the corresponding real value varies with inflation (as is the case for the cost of debt).

3.2 Inflation input to the PTRM used to deflate the cost of equity

66. I agree with the AER that expected inflation over a 10 year horizon should be used to deflate the nominal cost of equity (although I consider that breakeven inflation should be used to derive this measure). This is consistent with the fact that the cost of equity that is of interest is the *real* cost of equity demanded by investors. The AER arrives at a real cost of equity by building up a cost of equity based on a 10 year CGS yield as the proxy for the CAPM risk free rate.

67. This means that 10 year inflation expectations are embedded in the AER's nominal cost of equity. It follows that the real cost of equity demanded by investors must be estimated by removing expected inflation with *the same* 10 year horizon.

68. In this context the PTRM and the final revenue path will:

- take the 10 year nominal cost of equity;
- deflate this, using a 10 year inflation estimate to arrive at an internally consistent real cost of equity;
- use this to set a real 5 year revenue path that compensates for this real cost; and
- apply actual CPI inflation over the five year regulatory control period to ensure (other things equal) that, whatever actual inflation is over this period, the estimated real cost of equity will be compensated.

69. As already noted, if the 5 year inflation expectation is less than the 10 year inflation expectation, then the benchmark entity will expect to receive a lower *nominal* compensation for the cost of equity than the *nominal* compensation that is used as the input into the PTRM.

70. However, this is entirely appropriate because it is necessary to deliver the best estimate of the real cost of equity. This recognises that it is the real cost of equity[18] that is, in fact, the important input into the PTRM and which is important for investors to have an expectation of receiving.

71. A numerical example will illustrate this. Imagine that the real cost of equity was invariant at 5% and that:

- inflation over the next 5 years of the regulatory control period is expected to be 0% pa; and
- inflation over the subsequent 5 years is expected to be 10% pa; such that
- average inflation over 10 years is expected to be 5%; and
- the nominal cost of equity over a 10 year horizon would be 10%(=5%+5%).

72. Using this nominal cost of equity over a 10 year horizon (10%) as an input into the PTRM along with the expected inflation over a 10 year horizon (5%) will deliver the correct real cost of equity (5%). This would then define the real revenue path and, if inflation grew, as expected, at 0% over the 5 year regulatory control period, then the nominal and real returns would both also be 5%. If inflation grew at "z%" then nominal returns would be 5+z% but real returns would always be 5%.

73. In contrast, combining the nominal cost of equity over a 10 year horizon (10%) in the PTRM with the expected inflation over a 5 year horizon (0%) would deliver an (incorrect) real cost of equity of 10%. This figure of 10% reflects the real return that will be earned no matter what the actual inflation is over the regulatory period – including if it was 0% pa as expected. In this example, double the real cost of equity is compensated for by using the 5 year horizon inflation forecast in the PTRM.

3.3 Inflation input to the PTRM used to deflate the cost of debt

74. The same is not true when it comes to the cost of debt because, unlike the cost of equity, the cost of debt is a nominal contract with lenders.[19] Moreover, the cost of debt input into the PTRM is an estimate of the nominal payments *made in each year of the* regulatory *period* (while the nominal cost of equity is an estimate at a horizon beyond the regulatory period).

---

18 The real cost of equity is a combination of a nominal cost of equity, which itself incorporates a 10-year expectation of inflation, (the nominal cost of equity input into the PTRM) less 10 year inflation expectations (which are captured in the actual inflation forecast that is entered into the PTRM).

19 The nominal cost of debt is fixed in nominal (not real) terms and is estimated specific to each year of the regulatory control period (not beyond).

75. Consequently, the nominal cost of debt must be converted into a real cost of debt within the PTRM using an inflation forecast that is expected to be the same as the actual inflation that will 'reinflate' real compensation over the regulatory period (under the CPI±X revenue path) and, most crucially,[20] in the RAB roll-forward model applied at the beginning of the next regulatory period.

76. This observation can be illustrated using an example that is analogous to the one above (an algebraic discussion is provided in Appendix B). Consider a scenario in which the nominal payments to debt holders over the regulatory period was expected to be 5% and that:

- inflation over the next 5 years of the regulatory control period is expected to be 0% pa; and
- this implies that inflation over the subsequent 5 years is expected to be 10% pa; such that
- average inflation over 10 years is expected to be 5%.

77. If the inflation forecast used as an input into the PTRM is the 5 year forecast (0%) then the real cost of debt allowance in the PTRM will be 5% (calculated as 5%-0%). This would then define the real revenue path. If inflation grew, as expected, at 0% over the 5 year regulatory control period, then the nominal return (inclusive of 0% actual RAB roll-forward) would also be 5%, which is the correct result that matches the fixed nominal obligations of the business.[21] .

78. In contrast, if the 10 year horizon inflation forecast of 5% was used in the PTRM, this would deliver an incorrect real cost of debt estimate of 0% (calculated as 5%-5%). This would then define the real revenue path and, if inflation grew, as expected, at 0% over the 5 year regulatory control period, then the nominal return (inclusive of 0% actual RAB roll-forward) would also be 0%. In this example, zero nominal compensation is allowed despite the modelled fixed nominal interest payments being 5%. This is clearly an incorrect outcome.

79. It is worth noting that the above stylised example is highly relevant to the market circumstances during the SAPN averaging period. Inflation expectations, as depicted in Figure 2 and Figure 4 (derived from CGS and inflation swap markets over 9 February to 6 March 2015), show that expected inflation at a 5 year horizon is well below the corresponding estimate at a 10 year horizon. Over the SAPN averaging period the difference between 10 and 5 year inflation was:

- Breakeven inflation from CGS markets: 0.37% (2.28%-1.91%); and

[20] This is where the majority of inflation compensation is provided.

[21] If inflation grew at more/less than this then the nominal compensation would be higher/lower than the modelled nominal payments but the possibility of gain/loss from this would be symmetric so there is not expected bias

- Inflation swap markets: 0.24% (2.60% less 2.35%).

3.3.1 Implications for the assumed benchmark efficient term of debt issued

80. For the absence of doubt, the analysis and conclusions in this section have no implications for the benchmark efficient debt management strategy and, in particular, the assumed term at which debt is issued. The assumed term of debt issued should, in my view, remain at 10 years consistent with business practice. All this section does is to describe the inflation input into the PTRM that must be used to give rise to an expectation that nominal revenues will be in line with nominal interest costs on 10 year debt.

81. In this context, the cost of debt is no different to any other long term contract efficiently entered into. If the benchmark entity efficiently entered into one (or a series of overlapping) 20 year nominal contracts with a supplier of transformers then the regulatory regime should be designed to compensate the benchmark entity for these nominal costs *over the course of each regulatory period over which the contract(s) span*. This would require that the nominal payments in that (those) contracts *over the course of each regulatory period* be converted into real costs using expected inflation *over the course of each regulatory period* – not expected inflation over the 20 year horizon of the contract or any other period. Precisely the same logic applies to the cost of debt as it would to long term contracts with suppliers.

3.4 Should inflation forecasts be purely prospective or can inflation that has already occurred be relevant?

82. Consistent with the analysis set out in sections 3.2 and 3.3 above:

- The inflation forecast that is paired with the cost of equity should be purely forward looking with the same maturity as the risk free rate and cost of equity and should be measured in the same averaging period as the risk free rate/cost of equity; and
- The inflation forecast that is paired with the nominal cost of debt should be the best estimate, available at the time of the final decision, of the inflation rate that will be used by the AER to escalate the RAB in the RAB roll-forward model and to index revenues over the regulatory period.

83. SAPN's revenues/RAB roll forward will be indexed to year ended December inflation. The five year period covered by this indexation begins with inflation from December 2014 to December 2015 and ends with inflation from December 2018 to December 2019. Therefore, the relevant period over which inflation must be estimated is December 2014 to December 2019.

84. In ordinary circumstances, at the time of the AER's Final Decision, the ABS will not yet have published any historical inflation estimates (or, at best, one quarter of inflation estimates) that will be used by the AER in its RAB roll forward model/revenue indexation over the forthcoming regulatory period. Therefore, in the ordinary course of events, the forecast of inflation that is paired with the nominal cost of debt will be precisely that – a forecast of future Australian Bureau of Statistics (ABS) published rates.

85. However, in the special case of SAPN, the AER will be making its final decision in 2015/16 to apply retrospectively to the regulatory period starting in July 2015. Therefore, at least some of the ABS published rates will actually be available to inform the AER's best estimate of inflation that will be used in the RAB roll forward model. For example:

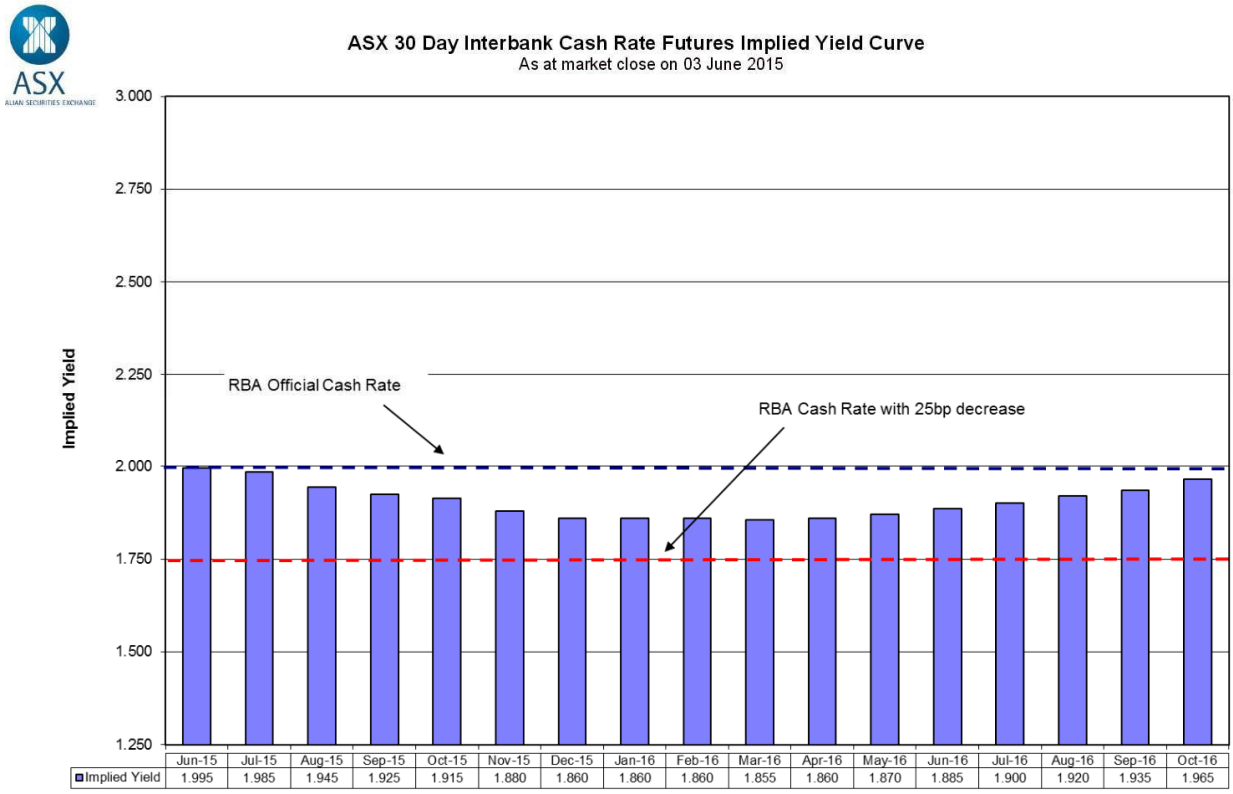
- Already the ABS has published its March 2015 quarter CPI – a quarterly increase of 0.19% or 0.75% annualised. Given that the SAPN inflation indexation is on a year ended December basis, this means that one quarter of actual inflation (inflation that will be used to index the RAB/revenues over the 2015-20 SAPN regulatory period) is already known;
- By July 2015 the June 2015 quarter CPI index will be known. This means that two quarters of actual inflation (inflation that will be used to index the RAB/revenues over the 2015-20 SAPN regulatory period) will be known;
- By October 2015 the September 2015 quarter CPI index will be known. This means that 3 quarters of actual inflation (inflation that will be used to index the RAB/revenues over the 2015-20 SAPN regulatory period) will be known;
- By January 2016 the December 2016 quarter CPI index will be known. This means that the full first year of actual inflation (inflation that will be used to index the RAB/revenues over the 2015-20 SAPN regulatory period) will be known.

86. To the extent that the AER final decision is made after these dates then regard should be had to the actual inflation that has already occurred and been measured by the ABS. This means that the five year inflation forecast that is paired with the cost of debt will need to be an average of actual inflation already measured and prospective inflation not yet measured.

Appendix A Market forecasts of cash rates

87. Figure 6 displays a chart published by the ASX, which shows the future expected cash rates implied by government bond yield curves.

Figure 6: ASX 30-day interbank cash rate futures implied yield curve



Source: ASX

Appendix B Algebraic example of the need for 5 year inflation forecast when deflating the nominal cost of debt

88. Let the average modelled nominal cost of debt over the regulatory period be $R_d^{Nominal\ 5\ year\ actual}$ and let this be measured without error and the estimate used as an input into the PTRM. Given that the PTRM will be annually updated for estimates of the nominal cost of debt, there is no need to forecast $R_d^{Nominal\ 5\ year\ actual}$.

89. Let the forecast of expected inflation in the PTRM be $\pi_{Forecast}^{PTRM}$. The PTRM will deliver a real cost of debt approximately[22] equal to:

$$R_d^{Real\ PTRM} = R_d^{Nominal\ 5\ year\ actual} - \pi_{Forecast}^{PTRM}$$

90. The compensation for the nominal cost of debt over the regulatory period is given by the following equation – recalling that the PTRM provides a real return which is then inflated by actual inflation over the regulatory period ($\pi_{Over\ 5\ year\ reg\ period}^{Actual}$) to provide nominal compensation.

$$R_d^{Compensated\ Nominal\ 5\ year\ actual} = R_d^{Real\ PTRM} + \pi_{Over\ 5\ year\ reg\ period}^{Actual}$$

91. Combining these two equations, the actual compensated nominal cost of debt is given by:

$$R_d^{Compensated\ 5\ Nominal\ year\ actual} = R_d^{Nominal\ 5\ year\ actual} - \pi_{Forecast}^{PTRM} + \pi_{Over\ 5\ year\ reg\ period}^{Actual}$$

92. In order for a business to expect to recover the nominal cost of debt that is an input to the PTRM ($R_d^{Nominal\ 5\ year\ actual}$) it must be the case that $\pi_{Forecast}^{PTRM} = \pi_{Over\ 5\ year\ reg\ period}^{Actual}$. To the extent that $\pi_{Forecast}^{PTRM}$ is, at the time it is

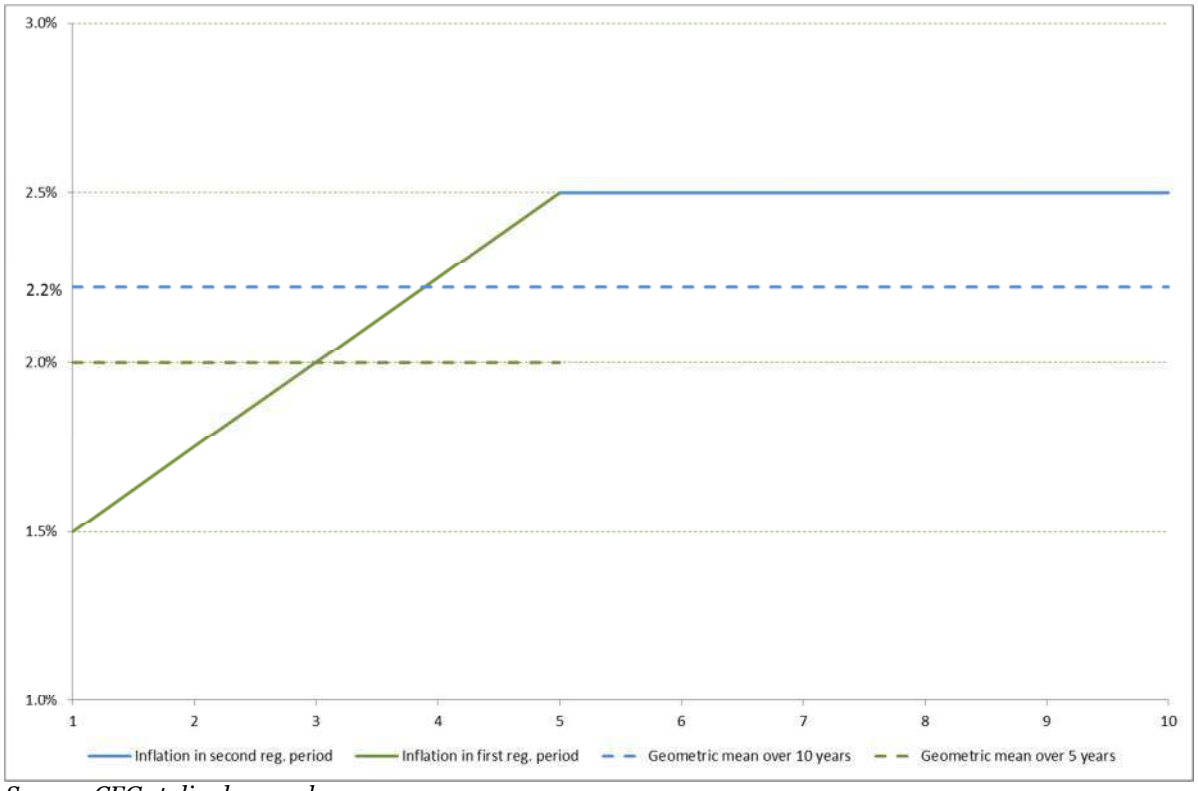
[22] In the following equations I simplify the relationship between real and nominal returns by assuming away the "Fisher effect" – which is small at low levels of nominal and real returns. However, the same result applies when using the Fisher equation; which states: $R_d^{Real} = \frac{R_d^{Nominal\ Actual} - \pi_{Forecast}^{PTRM}}{1+\pi_{Forecast}^{PTRM}}$.

made, above/below the best forecast of $\pi_{Over\ 5\ year\ reg\ period}^{Actual}$ then the resulting allowance for the nominal cost of debt will be biased relative to $R_d^{Nominal\ 5\ year\ actual}$.

93. The following example illustrates this. Let inflation expectations in the long run, say, beyond 5 years, be anchored around 2.5%. Also assume that, at the beginning of the next regulatory period (i.e., immediately prior to regulatory year t=1), the economy is depressed and inflation expectations are low, such that expected inflation over the next five years is expected to average 2.0%. Assume that this reflects an expectation that inflation will rise from 1.5% to 2.5% over the five years of the regulatory period but that investors expect inflation to remain at 2.5% in all subsequent years.

94. In this scenario, expected inflation at the 10 year horizon is 2.2% (which is the geometric mean of inflation over 10 years) but expected inflation over the next five years is only 2.0% (geometric mean over 5 years). This is illustrated in the following graphic.

Figure 7: Graphical illustration of stylised inflation assumption



Source: CEG stylised example

95. Figure 7 above illustrates that the average 10 year inflation forecast (2.2%) is a biased estimate of the 5 year inflation forecast (2.0%) because it is 'dragged up' by higher expected inflation beyond the regulatory period. Consequently, using

expected inflation at a 10 year horizon will result in expected actual nominal compensation for the cost of debt ($R_d^{Compensated}$) that is 20bp lower than the nominal cost of debt ($R_d^{Nominal\ 5\ year\ actual}$) used as an input into the PTRM.

96. It is worth noting that the above stylised assumptions about inflation expectations actually match fairly closely the market measures of inflation expectations depicted in Figure 2 and Figure 4 (derived from CGS and inflation swap markets over 9 February to 6 March 2015). Over 9 February to 6 March 2015 the difference between 10 and 5 year inflation was:

- Breakeven inflation from CGS markets: 0.37% (2.28%-1.91%); and
- Inflation swap markets: 0.24% (2.60% less 2.35%).

Appendix C Terms of reference

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16 June 2015

Partner
Nicolas Taylor
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Email:
NJTaylor@JonesDay.com

Dr Tom Hird
CEG

TERMS OF REFERENCE

You are engaged by Jones Day on behalf of SA Power Networks (SAPN).

You have previously written reports concerning the estimation of inflation for energy network regulatory purposes. In particular, those reports concerned the issue of whether projected inflation should be drawn from an analysis of traded capital market data or central bank projections and targets in the prevailing economic conditions at the time of the report.

In order to answer the questions below, please review and consider the following in the current economic circumstances:

- the suitability of sourcing inflation estimates for regulatory purposes from observed trading in capital and swap markets; and
- the prevailing commentary concerning the degree to which central banks generally, and the Reserve Bank of Australia in particular, provide suitable near term forecasts for economic regulatory purposes or have targets that are suitable for the AER to use as longer term measures of expected inflation.

In particular, please explain the following matters in your report:

1. How are measures of forecast and actual inflation used in the regulatory structure? In what way do these measures affect revenues and returns of network businesses?
2. Given the answers you provide to Question 1, what is the relevant term over which the AER should be projecting inflation?
3. Compare and contrast the different measures available from market trading data and from Reserve Bank of Australia forecasts and targets and recommend which is currently the most appropriate source of inflation for use by the AER.
4. More specifically, if the AER were to continue its current approach in SAPN's Final Determination, would the projection be accurate and would SAPN be afforded a reasonable opportunity to recover its efficient costs including earning a fair market return on its investments?

Compliance with the Code of Conduct for Expert Witnesses

Attached as **Annexure 1** is a copy of the Federal Court's Practice Note CM 7, entitled "Expert Witnesses in Proceedings in the Federal Court of Australia", which comprises the guidelines for expert witnesses in the Federal Court of Australia (Expert Witness Guidelines).

Please read and familiarise yourself with the Expert Witness Guidelines, and comply with them at all times over the course of your engagement.

In particular, your report prepared should contain a statement at the beginning of the report to the effect that the author of the report has read, understood and complied with the Expert Witness Guidelines.

Your report must also:

1. contain particulars of the training, study or experience by which the expert has acquired specialised knowledge;

2. identify the questions that the expert has been asked to address;

3. set out separately each of the factual findings or assumptions on which the expert's opinion is based;

4. set out each of the expert's opinions separately from the factual findings or assumptions;

5. set out the reasons for each of the expert's opinions; and

6. otherwise comply with the Expert Witness Guidelines.

The expert is also required to state that each of the expert's opinions is wholly or substantially based on the expert's specialised knowledge.

The declaration contained within the report should be that "[the expert] has made all the inquiries that [the expert] believes are desirable and appropriate and that no matters of significance that [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the report".

Please also attach a copy of these terms of reference to the report.

Kind regards

Nicolas Taylor

Nicolas Taylor

Partner

Annexure 1

FEDERAL COURT OF AUSTRALIA
Practice Note CM 7
EXPERT WITNESSES IN PROCEEDINGS IN THE FEDERAL COURT OF AUSTRALIA

Practice Note CM 7 issued on 1 August 2011 is revoked with effect from midnight on 3 June 2013 and the following Practice Note is substituted.

Commencement

1. This Practice Note commences on 4 June 2013.

Introduction

2. Rule 23.12 of the Federal Court Rules 2011 requires a party to give a copy of the following guidelines to any witness they propose to retain for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based on the specialised knowledge of the witness (see **Part 3.3 - Opinion** of the Evidence Act 1995 (Cth)).

3. The guidelines are not intended to address all aspects of an expert witness's duties, but are intended to facilitate the admission of opinion evidence[1], and to assist experts to understand in general terms what the Court expects of them. Additionally, it is hoped that the guidelines will assist individual expert witnesses to avoid the criticism that is sometimes made (whether rightly or wrongly) that expert witnesses lack objectivity, or have coloured their evidence in favour of the party calling them.

Guidelines

1. General Duty to the Court[2]

1.1 An expert witness has an overriding duty to assist the Court on matters relevant to the expert's area of expertise.

1.2 An expert witness is not an advocate for a party even when giving testimony that is necessarily evaluative rather than inferential.

1.3 An expert witness's paramount duty is to the Court and not to the person retaining the expert.

2. The Form of the Expert's Report[3]

1 As to the distinction between expert opinion evidence and expert assistance see *Evans Deakin Pty Ltd v Sebel Furniture Ltd* [2003] FCA 171 per Allsop J at [676].

2 The "*Ikarian Reefer*" (1993) 20 FSR 563 at 565-566.

2.1 An expert's written report must comply with Rule 23.13 and therefore must

(a) be signed by the expert who prepared the report; and

(b) contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and

(c) contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and

(d) identify the questions that the expert was asked to address; and

(e) set out separately each of the factual findings or assumptions on which the expert's opinion is based; and

(f) set out separately from the factual findings or assumptions each of the expert's opinions; and

(g) set out the reasons for each of the expert's opinions; and

(ga) contain an acknowledgment that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c) above[4]; and

(h) comply with the Practice Note.

2.2 At the end of the report the expert should declare that "[the expert] has made all the inquiries that [the expert] believes are desirable and appropriate and that no matters of significance that [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the Court."

2.3 There should be included in or attached to the report the documents and other materials that the expert has been instructed to consider.

2.4 If, after exchange of reports or at any other stage, an expert witness changes the expert's opinion, having read another expert's report or for any other reason, the change should be communicated as soon as practicable (through the party's lawyers) to each party to whom the expert witness's report has been provided and, when appropriate, to the Court[5].

2.5 If an expert's opinion is not fully researched because the expert considers that insufficient data are available, or for any other reason, this must be stated with an indication that the opinion is no more than a provisional one. Where an expert witness who has prepared a report believes that it may be incomplete or inaccurate without some qualification, that qualification must be stated in the report.

2.6 The expert should make it clear if a particular question or issue falls outside the relevant field of expertise.

2.7 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the opposite party at the same time as the exchange of reports[6].

3. Experts' Conference

(continued…)

3 Rule 23.13.

4 See also *Dasreef Pty Limited v Nawaf Hawchar* [2011] HCA 21.

5 The "Ikarian Reefer" [1993] 20 FSR 563 at 565

6 The "Ikarian Reefer" [1993] 20 FSR 563 at 565-566. See also Ormrod "Scientific Evidence in Court" [1968] Crim LR 240

3.1 If experts retained by the parties meet at the direction of the Court, it would be improper for an expert to be given, or to accept, instructions not to reach agreement. If, at a meeting directed by the Court, the experts cannot reach agreement about matters of expert opinion, they should specify their reasons for being unable to do so.

J L B ALLSOP
Chief Justice
4 June 2013