Escalators affecting expenditure forecasts

A report for NSW and Tasmanian Electricity Businesses

Dr. Tom Hird
Daniel Young

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Table of Contents

1. Introduction

1. We were engaged by the NSW and Tasmanian businesses[1] (the businesses) to prepare a report addressing the terms of reference that are set out at Appendix B. We have been provided with a copy of the Federal Court guidelines "Guidelines for Expert Witnesses in Proceedings in the Federal Court of Australia" dated 5 May 2008. We have reviewed those guidelines and our report has been prepared consistently with the form of expert evidence required by those guidelines. The focus of this engagement is to review the approach applied by the Australian Energy Regulator (AER) to estimate escalation factors for the business' expenditure programs over the upcoming regulatory period and to recommend amendments to these factors that would improve their accuracy.

2. The businesses all relied on substantively the same report from the Competition Economists Group (CEG)[2,3] when estimating escalation factors for their expenditure programs over the upcoming regulatory period. These reports set out a framework for developing forecasts for labour and materials escalation factors that represented a significant improvement in terms of process and transparency over the methods that had previously been used for this purpose.

3. The AER has since commented on these costs in separate draft decisions.[4,5,6] This commentary is substantively the same across the draft determinations. For the purpose of this report we do not, on each issue, refer to each of the AER's draft determinations. However, where there is a material difference in those draft determinations or an issue specific to a particular business that requires CEG comment we do so.

4. In its Draft Determinations, the AER has generally accepted the framework used by CEG but rejected specific aspects of CEG's approach. The AER has adopted updated Econtech estimates for labour and construction escalators and has generated its own estimates for materials escalators on the basis of publicly available data.

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1 Country Energy, Energy Australia, Integral Energy, Transend and TransGrid.

2 CEG, *Escalation factors affecting expenditure forecasts: A report for NSW Electricity Businesses*, April 2008.

3 CEG, *Escalation factors affecting expenditure forecasts: A report for Transend*, April 2008.

4 AER, *Draft Decision: New South Wales draft distribution determination 2009-10 to 2013-14*, 21 November 2008.

5 AER, *Draft Decision: Transend transmission determination 2009-10 to 2013-14*, 21 November 2008.

6 AER, *Draft Decision: Transgrid transmission determination 2009-10 to 2013-14*, 31 October 2008.

5. CEG considers the framework adopted by the AER is largely reasonable and accepts some of the changes made to CEG's method as reasonable. However, we have concerns with some technical aspects of the AER's modelling, which we consider lead to errors in its proposed escalation factors. We also do not agree with the AER's proposed approach to updating labour cost escalation factors in the final determination.

6. This report has been prepared by Dr Tom Hird, a Director of CEG and based in its Melbourne office. Dr Hird has been assisted in the preparation of this report by Daniel Young, an economist in CEG's Sydney office. The qualifications of Dr Hird and Mr Young are set out at Appendix C to this report.

7. In preparing this report, we have made all the inquiries that we believe are desirable and appropriate and no matters of significance that we regard as relevant have, to our knowledge, been withheld.

2. Correct approach to determining timing for escalation factors

8. Escalation factors are developed for the purpose of escalating the price of base planning objects to forecast future capital expenditure requirements over the next regulatory period.

9. Issues of timing are critical to determining escalators that can consistently be applied for this purpose. An escalator provides an estimate for the increase in price for an input from one period to another. For consistency it is important that the escalation factors that are applied to the base planning objects must:

   i. be derived in a way that is consistent with the base period in which these costs have been measured; and

   ii. be derived in a way that is consistent with their intended use in forecasting future costs in specific periods; and

   iii. avoid overlapping periods or 'gaps' such that escalation is either not properly accounted for or is double counted.

10. As an example of the first point above, if a base planning object has been costed as at June 2007, then the escalator that takes this forward must be based in June 2007. An escalator that has been derived as the average increase in prices between the 2007 financial year and the 2008 financial year cannot consistently be used to project forward this object.

11. It is our understanding that escalation factors are used to inflate the base planning objects to the mid-point of each financial year in the next regulatory period for the purpose of calculating the expected capex in each financial year. For example, capex for the 2010 financial year is forecast based on the difference between the average prices prevailing in 2009/10 and the prices prevailing in the base period (which may be a particular month in the past when costs were estimated). This can be thought of as escalation from the base period to December 2009 - where December is the mid-point of (or representative of) the average prices paid over the entire financial year. However, strictly speaking, this will only be true if price changes and expenditure are evenly spread over the year. More exact escalation factors developed for this purpose should, therefore, project forward prices from the base period to the average prices prevailing over a financial year (centred on December).

12. Finally, it is important that escalation factors do not either omit or double-count price changes over a particular period of time.

13. Within these rules, there are many ways that escalation factors may be derived, but they should all return the same result. For example, if the base month is June 2007 and the centre of the first regulatory period is December 2009, then a correct series of escalators will inflate prices from the month of June 2007 to the average over the financial year 2010. These escalators could be expressed in multitude of ways, but to be correct must represent the same underlying transformation of prices.

3. Assessment of each escalation factor

14. In each of the following sections we refer to the "AER's approach" as described in a spreadsheet provided to businesses[7] which demonstrates the estimation of the AER's escalation factors.

3.1. Copper, aluminium and steel

3.1.1. Timing

15. The AER uses escalation factors for copper, aluminium and steel that are calculated on the basis of June to June price movements. That is, each escalation factor measures the percentage change in the price of the commodity in June of one year to June of the following year. Implicitly this assumes both that:

- base planning objects have universally been costed in the month of June (ie, it is assumed that it is appropriate to take the starting prices for copper/aluminium/steel as those prices prevailing in June); and
- the intention is to estimate the change in costs 'as if' all future expenditure that is the subject of escalation will occur in June of each year (rather than being spread over the 12 months of the financial year).

16. We recommend that the base period for escalation should reflect the period in which base planning object prices were estimated. For example, if this was December 2006 then the base period in which copper/aluminium/steel prices are first measured should be December 2006. However, if base planning object prices were estimated based on prices observed over the full year to June 2007 then the base prices for cooper/aluminium/steel should reflect prices prevailing over that 12 month period to June 2007.

17. We also recommend that the base period prices be escalated to reflect the change in average price from the base period to the 12 months to June of each future year. This effectively estimates the change in average price for each commodity from the base period to the relevant financial year (where the middle of that year is the end of December). The effect of this is that each escalation provides escalation of costs to a 12 month period 'centred on December'. The economic assumption underlying this approach is that the objective of escalation

[7] For example, the escalation spreadsheet provided to TransGrid on 10 November 2008.

is to estimate the average cost (in constant dollar terms) of expenditure over each financial year – assuming that expenditure is evenly spread over each financial year.

18. For example, if the base planning object prices were estimated in the single month of December 2006 and copper prices were $100 in December 2006 (and were fully reflected in equipment prices in December 2006) and during the 12 month period to June 2010 (the first year of the regulatory period) copper prices are forecast to average $110 then the escalation factor from the base planning period to the first year of the regulatory period will be 10% (or 1.10)

3.1.2. Other issues

19. CEG's methodology for estimating copper and aluminium escalators was to use London Metals Exchange (LME) futures to forecast up to 27 months ahead, and then to use Consensus long term forecasts to project 10 years further ahead.

20. The AER adopts the same approach as proposed by CEG, but has made a number of specific changes. The AER:

- uses LME monthly averages to generate futures values, rather than basing these on a single day of trading;
- assumes that the long term Consensus forecasts relate to a 7.5 year horizon, rather than 10 years as assumed by CEG;
- rejects CEG's adjustment of Consensus forecasts to make these consistent with LME futures. Instead, the AER interpolates between the last LME future and the long term Consensus forecasts;
- converts the long term Consensus forecast into a nominal value using forecasts of US inflation sourced from the Congressional Budget Office, rather than the fixed assumption of 2.5% assumed by CEG;
- The AER assumes that hot rolled coil is the relevant material for escalation purposes and has used Consensus short term and long term forecasts to estimate future escalation factors for steel. The methodology is identical to that applied for copper and aluminium without the use of LME prices. CEG had previously assumed that the relevant material for escalation purposes was fabricated steel, and not hot rolled coil; and

- as already discussed under the heading 'timing', amends the methodology to calculate prices on a monthly, rather than yearly basis. The AER calculates the escalators for copper and aluminium as the change in Australian dollar prices between June and June, rather than the average financial year escalation calculated by CEG.

21. We regard both the AER's overall approach and our approach, as set out in our previous reports for the businesses, to be reasonable. With the exception of the timing assumption we have calculated escalators for the businesses on the basis of the AER's proposed method.

3.2. Crude oil

3.2.1. Timing

22. In contrast its method for copper, aluminium and steel, the AER adopted different timing assumptions for crude oil. Escalation factors for crude oil are calculated on the basis of the change in average prices prevailing over each calendar year.

23. This is similar to our proposed method for copper, aluminium and steel but provides an estimate of escalation over the 12 months centred on June rather than December. We have amended this method to be consistent with our recommended timing assumptions for copper, aluminium and steel.

3.2.2. Other issues

24. CEG used US Department of Energy historical data and NYMEX futures to estimate a set of escalation factors in respect of crude oil. The AER has largely accepted this approach. The only variations in its methodology appear to be that it uses 20 days of averaged NYMEX futures prices for the purpose of forecasting crude oil prices.

25. We have adopted the AER's method in developing updated escalators for the businesses.

3.3. EGW wages and construction costs - timing

26. The escalators for EGW wages, general labour and construction generally reference Econtech forecasts. We have found that these escalators are based on movements from the average of one financial year to the average of the next

financial year.[8] That is, when Econtech reports an x% increase in EGW wages to June 2009 it is reporting that the average value of the wages index over the four quarters to June 2009 will be x% higher than the average value of the wages index for the four quarters to June 2008 (and the same for CPI and construction costs).

27. The timing of the Econtech forecasts is not in general problematic from the perspective of application to the escalation of the electricity businesses' costs. However, the AER has incorrectly described it as a June to June movement. As we show in Figure 1 below, the Econtech forecasts can more accurately be represented as a December to December movement, since December is the midpoint of the financial year.

28. The AER has also determined that Enterprise Bargaining Agreement (EBA) figures should be used to determine future labour costs where these are available. However, in doing so the AER has assumed that the EBA should be deflated by a June to June CPI movement. This may be problematic for two reasons:

- the EBA is not, generally, a June to June movement; and
- this double counts inflation that is already used in Econtech's forecasts.

3.3.1. Econtech escalations are not 'month of June to month of June'

29. The AER employs Econtech forecasts as the only data source for its EGW labour, general labour and construction escalation factors. However, in contrast to the approach of the AER in developing June on June escalators, Econtech calculates changes between financial years on the basis of the movement of averages over the entire financial year.

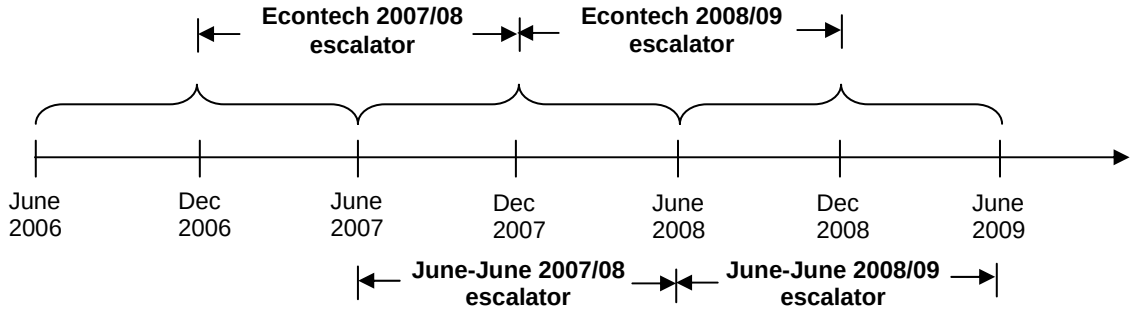
30. For example, the change in CPI over the year to June 2008 is 4.5% and this is the value that the AER uses to deflate its nominal escalations. In its October 2008 Australian National, State and Industry Outlook (ANSIO), Econtech show an actual change in CPI for the 2007/08 financial year of 3.4% - an estimate that can be derived by calculating the escalation from the average index value for the four quarters to June 2007 to the average index value for the four quarters to June 2008. Similarly, the December 2007 ANSIO indicated that the actual CPI

[8] While not clearly stated by Econtech this is apparent when one compares evidence from construction forecasts – comparing annual and quarterly forecasts. It is also evident from Econtech's reporting of historical CPI in its ANSIO forecasts.

movement for the 2006/07 financial year was 2.9% instead of the 2.1% June 2006 to June 2007 estimated by the Australian Bureau of Statistics.[9]

31. The financial year on financial year growth reported by Econtech is suitable for application to the businesses' capex program and consistent with CEG's recommended approach of using escalations for the 12 months centred on December.[10] However, CPI forecasts used to deflate nominal escalators must be derived in a consistent fashion to the nominal forecasts. For example, it is inconsistent to deflate a nominal escalation factor that is based on the difference between the average for two financial years by a CPI deflator that is based on the difference in CPI between June one year and June the next. The nature of this timing discrepancy can most easily be seen diagrammatically in Figure 1 below.

Figure 1: Timing of Econtech forecasts



32. Figure 1 shows that, in escalating across average financial years, the Econtech escalators cannot reasonably be used to approximate a June on June escalation. As can be seen from the diagram, June is at the extreme end of the period sampled and they more closely approximate a December on December escalation, in the same way that the AER used average calendar year escalation to approximate June on June escalation in the case of crude oil.

33. In our view, the Econtech forecasts for EGW labour, general labour and construction should be interpreted as average financial year (centered on December) escalators for the purpose of deriving escalators for the businesses' capex programs.

[9] This can also be confirmed for the construction forecasts used by the AER by comparing short term forecasts of construction costs to long term forecasts.

[10] CEG's original escalation factors were all reported on a financial year on financial year basis.

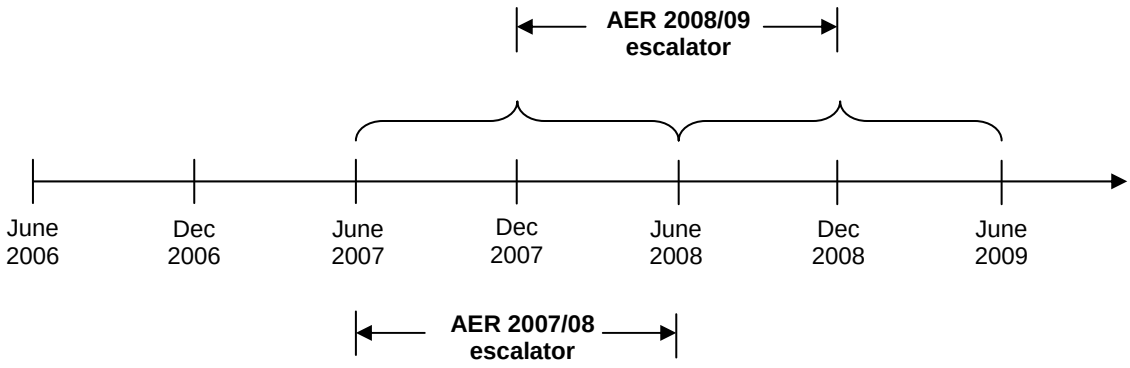
3.3.2. Double-counting CPI

34. The AER is proposing the use the outcomes of the businesses' EBAs as its 2007/08 EGW labour escalation factor, instead of using the actual Econtech estimate for this period. CEG agrees that it is reasonable to use the outcome of actual wage agreements for this purpose, provided that they are an accurate reflection of the actual cost of EGW labour to the businesses. However, we recommend an improvement in the integration of the EBA together with Econtech forecasts. In particular, we do not propose the use of the 2007/08 June on June CPI movement of 4.5% to deflate the EBA outcome.

35. As described earlier, Econtech forecasts of growth are expressed on a financial year on financial year basis. Currently, the Econtech 2008/09 escalation factor for EGW labour represents the change in real wages between the average of four quarters of 2007/08 and the average of four quarters of 2008/09.

36. As a result, the 2008/09 Econtech escalator estimates the percentage increase in wages between the 12 months to June 2008 and the 12 months to June 2009. By contrast, the EBA escalator for 2007/08 is based on an estimate of increase in wages from June 2007 to June 2008. The problem caused by this approach is shown diagrammatically in Figure 2 below:

Figure 2: Timing of AER EGW labour escalation factors



37. The effect of the AER's approach is to double-count inflation during the 2007/08 financial year. That is, the 2007/08 escalator is deflated for cumulative inflation from June 2007 to June 2008, whereas the 2008/09 escalator is deflated using a measure of inflation from a base year that includes quarters which have already been accounted for in the previous escalator.

38. Put another way, by using the June to June CPI movement for 2007/08 combined with the Econtech forecast for 2008/09, the AER is estimating two years of inflation based on what is, on average, one and a half years of data (June 2007 to average financial year 2009) and is filling this data gap by double counting inflation throughout the financial year 2008. This causes the AER to overestimate total inflation over the two years because actual inflation over the 2008 financial year is significantly higher than that which is expected over the 2009 financial year.

39. We demonstrate this double-counting using three very simple examples of a CPI index in Table 1 below.

Table 1: Examples of CPI double-counting

	Example A	Example B	Example C
June 2007	100	100	100
September 2007	100	105	105
December 2007	100	110	110
March 2008	100	115	115
June 2008	120	120	120
September 2008	120	120	125
December 2008	120	120	130
March 2009	120	120	135
June 2009	120	120	140
AER 07/08	**20%**	**20%**	**20%**
Econtech 08/09	**14%**	**7%**	**18%**
Total implied CPI[1]	**37%**	**28%**	**41%**
Total actual CPI	**20%**	**20%**	**40%**

Notes: 1. Calculated as the AER 07/08 and Econtech 08/09 CPI changes using the Fisher equation.

40. The results in Table 1 indicate that the problem largely disappears when the inflation rate is largely constant (example C), since the overlapping periods used by the AER do not cause an estimation problem.

41. This issue cannot be resolved without recognition that the 4.5% actual CPI used by the AER and the Econtech forecasts it employs are estimated on a different basis.

3.3.3. Resolution to timing issues for EGW wages

42. The solution to resolution of these timing issues surrounding the integration of the EBA with Econtech forecasts of EGW wages growth is to create a single index of

wages based on both the EBA and Econtech forecasts of real wage costs. This index starts at 100 and then applies the percentage increase in EBA wage costs evenly over the financial year to June. Thus, if EBA wages increased by 5% in 2005/06 we start the nominal index at 100 in June 2005. We then multiply this by $(1+0.05)^{1/4}$ in each of the following four quarters to estimate the quarterly value of nominal wage cost index. We then divide this by the actual value of the CPI index in that quarter to derive a real wage index based on the EBA.

43. The EBA projections allow us to derive an index that ends in June of a particular year – say June 2008. This must then be 'married up' with Econtech forecasts for 2008/09 that are based on a comparison of the four quarters to June 2009 with the four quarters to June 2008. To do this we assume that the 2008/09 Econtech forecast can be used to estimate the quarterly growth in wages in the September and December quarters of 2008. We then use the Econtech 2009/10 forecasts to escalate wages in the four quarters to December 2009 and so on. This is consistent with interpretation of Econtech forecasts as December to December forecasts (where December is the middle of each financial year Econtech uses to derive its average escalation forecasts)[11].

44. In our view this indexed approach is superior to the method applied by the AER to the businesses in its draft determinations, since it combines the EBA and Econtech wage movements in a consistent manner that avoids either double-counting or omissions. Our recommended EGW wages escalation factors are derived utilising this approach.

3.4. EGW wages and construction – sole reliance on Econtech forecasts

45. The AER draft decision has provided updated estimates of EGW wages and construction costs from Econtech. At the same time the AER has:

- rejected the approach used by CEG to average Econtech and Macromonitor forecasts for the purpose of estimating EGW labour and construction escalation factors; and

- undertaken to update escalator forecasts where possible closer to the beginning of the regulatory period.

[11] We note that the Econtech forecasts are **not** forecasts of changes from one quarter to quarter (they are changes from one financial year average to the next). However, in order to mesh these forecasts with the EBA data that ends in a particular month we must attribute the Econtech average growth rate to a change between particular quarters.

46. Econtech is a reputable economic forecaster and the forecasts from Econtech are similar to the forecasts received from Macromonitor. The Econtech forecasts also have the advantage of being more recently developed. For these reasons we accept the AER's use of these forecasts in its draft determinations as reasonable and we recommend their adoption in the businesses' revised regulatory proposals.

47. However, we consider that it is unreasonable for the AER proposal to have sole reliance on Econtech forecasts *and* update these *after* the businesses have lodged their revised regulatory proposals.

48. The AER proposes to update escalator forecasts, where possible, closer to the beginning of the next regulatory period. Forecasts include:

- the opinions of Econtech with respect to wages and construction cost movements; and
- forecasts for raw commodities (such as copper, aluminium crude oil and steel).

49. The AER draws no distinction between these two types of updates. In our opinion there is a relevant distinction. In the case of raw materials, a forecasting methodology has been largely agreed and 'bedded down' in the draft decision process. This involves updating two different data sources:

i. Prices from futures markets - which are the outcome of a large number of trades between a large number of market participants; and

ii. Consensus forecasts – the average of a large number of professional forecasters.

50. In the case of wage and construction forecasts the process is very different, in that there is a degree of judgment involved in assessing the many variables involved. The AER's proposal is to rely solely on the opinions of a single forecaster, namely, Econtech. If the AER was to seek wages and construction cost forecasts from Econtech this would be best described as re-doing a forecast, rather than 'updating' a forecast in accordance with an agreed methodology

51. Ultimately, Econtech's forecasts are the outcome of their professional judgement.[12] This judgment can only be assessed and consulted on in the context of a given forecast. It is pointless to consult on one set of forecasts (the forecasts in the draft decision) if those forecasts are to be changed by Econtech at a later date without consultation.

52. As we understand it, the basis for the consultation process is to give businesses the ability to provide input on matters of importance in the regulatory decision making process. Nominating a single forecaster for the most important cost forecasts and then sourcing a new forecast *after* the consultation process is complete does not appear to meet this purpose. Any forecast will be based on matters of economic judgment. It is these matters of economic judgement that, it would appear, are intended to be the subject of consultation. Updating a forecast after the end of the consultation period therefore results in a failure to consult on those matters that go into the updated forecast.

53. Consequently, it is our view that it would not be reasonable for the businesses to subscribe to, nor the AER to attempt to impose without further consultation, whatever future amendments Econtech may apply.

3.5. Producer margins and producer wages

54. In our original reports CEG advised the businesses that the prices they would need to pay for electrical equipment would reflect changes in the costs of suppliers and the overall tightness of the markets for each equipment type. We therefore argued that forecasts of equipment prices needed to be 'built up' from forecasts of:

- the prices for commodities used to make electrical equipment;
- the price of labour used in transforming those commodities into equipment; and
- the margin on variable costs that market conditions would allow equipment producers would be able to extract (to recover their fixed costs).

[12] See also discussion in Appendix A on the nature of economic forecasts and the important role of professional judgment.

55. The AER responded as follows:[13]

> *"The AER has concerns that these additional cost factors represent a departure from the AER's intention to account for the effects of the recent commodities boom and skilled labour shortages in Australia. The effect of their addition would be to offset the expected declines in commodities prices and the symmetry of the cost escalators envisaged by the AER and set out in its decision for SP AusNet. Moreover, they represent a move towards compensation for all input costs at a fine level of detail and go beyond the AER's general obligation to provide businesses a reasonable opportunity to recover efficient costs, and in this sense are also inconsistent with the incentive frameworks for capex and opex.*
>
> *Notwithstanding these general concerns, the AER also considers that these additional proposed real cost factors do not meet the underlying objective for inclusion in forecast costs under clause 6.5.7(c) of the transitional chapter 6 rules. Specifically, given the inherent uncertainties around the existence of and estimation of real movements in these cost factors, the AER does not consider that further departures from CPI are warranted. It is important to note that the AER accepts that such costs are likely to be included in base (unit) cost estimates. However, what is questionable is the extent to which real growth is expected and whether it can be forecast on a reasonable basis."*

56. We disagree with the logic provided in the first of these paragraphs. We do not believe that it is relevant that the inclusion of labour and producer margin forecasts would *"offset the expected declines in commodities prices and the symmetry of the cost escalators envisaged by the AER and set out in its decision for SP AusNet"*. What is relevant is whether the inclusion of wage and producer margin forecasts will lead to more accurate estimates of equipment prices. If this offsets the impact the AER is expecting from declines in commodities prices then this is 'neither here nor there'.

57. Similarly, the fact that this involves a more detailed analysis than the AER has previously adopted does not mean that the AER can reasonably ignore this analysis. If it is materially relevant to accurately forecasting equipment costs the AER has an obligation to have regard to it. There is nothing inconsistent about having accurate forecasts and giving businesses an incentive to reduce costs below those forecasts.

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[13] AER, *Draft Decision: New South Wales draft distribution determination 2009-10 to 2013-14*, 21 November 2008, p.532.

58. The second AER paragraph is, in our view, more reasonable. Here the AER essentially argues that it is not convinced that the forecasts for real increases in labour costs and producer margins for equipment manufacturers can be estimated sufficiently accurately. We agree with the AER that these forecasts are likely to subject to a substantial margin for error. However, we note that the error on these forecasts is likely to be lower than the error on commodity prices.[14]

59. Thus, an extension of this logic would suggest that no forecasts should ever be used for the purposes of cost escalation and the AER should simply adopt an assumption of no real growth for all cost elements – including commodity prices.

60. Nonetheless, we have been instructed by the businesses that they intend to adopt the AER's preferred position in resubmissions. We therefore have not updated forecasts of producers' margin and producers' labour costs.

3.6. Exchange rates

61. CEG's original methodology applied exchange rate adjustments only to the US dollar (USD) price of raw materials (whose forecasts were all in USD prices). However, in our report we noted that movements in exchange rates were also likely to affect the total price of imported equipment (and domestically produced equipment that competes with imports). Nonetheless, we determined not to attempt to model this impact on the basis that exchange rates are notoriously difficult to forecast and that the forecast change in the Australian dollar (AUD) by Econtech was small.

62. However, since writing our report there has been dramatic (not previously forecast) reduction in the value of the Australian dollar against major international currencies. In March and April 2008 (at the time of finalising our report) one Australian dollar (AUD) purchased 93 US cents. On 2 January 2009 one AUD bought 70 US cents. This is a 25% reduction. Similarly, the RBA reports a 20% reduction in the value of the AUD against a trade weighted index of exchange rates.

63. This will almost certainly make not just the raw commodity component of tradeable electric equipment, but the entire value of these items, more expensive. For example, importers of transformers will not just demand a higher AUD price on the copper component of transformers but on the entire cost of those transformers.

[14] For example, neither the recent 60%+ fall in crude oil prices nor the halving in copper prices within six months would have been accurately forecast using the CEG/AER methodology.

64. To account for this we recommend that businesses estimate the dollar value of equipment spend is purchased from the 'tradeable sector' (being imports and domestic production that competes closely with imports). This dollar value should then be escalated in full for the impact of actual exchange rate movements over the last six months.

3.7. Inflation

65. In converting nominal forecasts for costs over the regulatory period there is a need to deflate by expected inflation over the same period. We largely agree with the AER's approach in its spreadsheet. However, the adjustment before June 2009 multiplies future index by (1 – % change in inflation). We consider that a superior adjustment is to divide by (1 + % change in inflation) – a small difference but nonetheless appropriate. This adjustment should also be applied to US inflation calculations.

66. In forecasting real escalation factors for raw commodities over the regulatory period we have, consistent with the AER's method, relied on RBA forecasts of inflation.

3.8. Lags

67. The AER states that CEG recommended the use of a one year lag to copper and aluminium:[15]

> *"In its latest report CEG has recommended applying a one year lag to copper and aluminium, consistent with the AER's decision for SP AusNet. CEG also recommended applying a lag to crude oil prices, and EnergyAustralia has applied a one year lag to labour costs."*

68. The relevant discussion by CEG is as follows:[16]

> *In using the above escalation factors it is also important to recognise that a change in commodity prices (such as copper, aluminium, and oil) will not immediately feed through into higher equipment prices. The AER has recognised this in its SP AusNet draft decision where it states:*

[15] AER, *Draft Decision: New South Wales draft distribution determination 2009-10 to 2013-14*, 21 November 2008, p.561.

[16] CEG, *Escalation factors affecting capital expenditure forecasts: A report for Transend*, April 2008, p.42.

"On the balance of the available information SKM's assumption of a lag between movements in base metals prices and transmission equipment prices appears reasonable, however the AER considers that the lag is not likely to be greater than one year over the forthcoming regulatory control period."

We agree with the AER's analysis and recommend that a six month to one year lag is applied when using the above escalation factors for commodities. For example, when attempting to estimate the impact of the -2.6% real reduction in oil prices in the year ended June 2007 on, say, transformer prices, this should be assumed to impact consumer prices in either December 2007 (six months lag) or June 2008 (12 months lag).

69. It worth noting that our recommendation was not for a 12 month lag but for a 6 to 12 month lag – based on the businesses own views (including in relation to their own supply contracts) of how fast commodity prices will be reflected in their own prices. It is also worth noting that this recommendation was based on established AER practice.

70. In section N.6 of its draft decision (for the NSW businesses) the AER revisits this issue and notes that CEG did not provide new evidence for the existence of lags and instead relied on AER precedent from ElectraNet. This is correct.

71. The AER then examines a time series of quarterly average copper and aluminium prices against ABS series of producer price indices (PPI data). It concluded, on the basis of 'eyeballing' that at the most this suggested a lag of three to six months and on this basis rejected the inclusion of a lag.

72. In our view, the AER's analysis does not provide any new or relevant information on which to revise the precedent that it established on the ElectraNet determination.

73. The AER analysis compares movements in copper/aluminium raw commodity prices and movements in movements in the ABS copper/aluminium PPI index. It finds that:[17]

"Any lag between movements in base metals and movements in the PPIs selected for analysis appears to be, at most, three to six months."

[17] AER, *Draft Decision: New South Wales draft distribution determination 2009-10 to 2013-14*, 21 November 2008, p.564.

74. But this is entirely to be expected because the PPI indices measure the cost of copper/aluminium that has only undergone moderate transformation from its raw state. For example, the ABS PPI for copper measures the change in the cost of "Copper materials used in the manufacture of electrical equipment".[18] That is, the PPI measures the price paid for copper by electrical manufacturers. One would expect there to be a relatively small lag between the price of raw copper and that price paid by electrical equipment manufacturers for what is essentially little different to raw copper. The relevant question is how quickly this price is reflected in higher/lower costs of electrical equipment.

75. If, as the AER states, one could justify 3-6 months between raw copper prices and prices paid for copper products by electrical equipment manufacturers, then the most reasonable assumption would appear to be that a further 3 to 6 month lag is likely by the time the supply chain is fully completed. In total, this justifies a 6 to 12 month lag which is entirely consistent with CEG recommendation and the AER precedent on this issue.

76. Finally, we note that the appropriate definition of a lag in this context is one that reflects contract terms as well as transportation, manufacturing, lead times etc. In rejecting lags for crude oil and steel, the AER is essentially assuming that an overnight change in commodity prices flows through into the price of electrical equipment the next day.

77. Accordingly, we do not consider that the arguments put forward by the AER provide any new basis on which revise its previous views. The evidence provided by both the AER and CEG suggests a lag of 6 to 12 months is likely to be an appropriate lag for the incorporation of raw copper, aluminium, crude oil and steel prices into finished prices paid by the businesses for electrical equipment. We have assumed a lag of 6 months for each of these materials in formulating the recommended escalation factors in this report except for Transend whom accepted the AER's Draft Decision and has applied no lags in their Revised Revenue Proposal.

3.9. Land escalation

78. CEG originally proposed a real 4.1% escalation factor for land based on BIS Shrapnel forecasts. In section N.4 (C.4) for the NSW distribution businesses (TransGrid) the AER arrives at the same escalator based on historical price movements. We therefore continue to recommend the adoption of 4.1% real land escalation.

[18] ABS, *Producer Price Indexes*, Catalogue No. 6427.0, Table 35.

4. Tables of Escalation Factors

79. The alterations to the AER's methodology for determining escalation factors, described in the body of this report, do not give rise to identical escalation factors for all the NSW and Tasmanian electricity businesses. This is because the dates at which each business has costed its base planning objects, which serve as the point from which escalation of costs begin, are different.

80. For this reason, we report the escalation factors for each business separately and document the assumed base for escalation in each case. On the instructions of the businesses we have produced escalation factors that are expressed both on a June to June basis (or average calendar year to average calendar year) and on a December to December basis (or average financial year to average financial year).

4.1. Country Energy

81. We have been instructed that the base period for Country Energy is the financial year ending 30 June 2007. That is, its base planning objects have been costed based on average prices prevailing over this period.

82. On this basis, CEG recommends that the escalation factors set out in Table 2 and Table 3 below be applied by Country Energy for the purpose of escalating these base planning objects.

Table 2: June to June escalation factors for Country Energy

	June 2007	June 2008	June 2009	June 2010	June 2011	June 2012	June 2013	June 2014
Copper	0.0%	-6.7%	-14.8%	-4.1%	7.1%	5.6%	-6.0%	-6.4%
Aluminium	-0.8%	-15.9%	5.3%	7.6%	6.6%	3.5%	-0.8%	-1.1%
Crude oil	-6.2%	29.4%	-0.2%	0.9%	6.8%	2.9%	0.3%	-1.0%
Steel	-1.1%	5.8%	42.9%	-8.2%	2.1%	-3.8%	-4.7%	-5.0%
EGW wages	2.4%	1.4%	3.3%	3.6%	3.2%	2.9%	2.4%	2.0%
General labour	0.6%	0.9%	0.7%	1.3%	1.7%	1.7%	1.4%	0.8%
Construction	0.5%	1.1%	0.4%	1.0%	2.3%	1.1%	-0.8%	-0.7%

Table 3: December to December escalation factors for Country Energy

	Dec 2007	Dec 2008	Dec 2009	Dec 2010	Dec 2011	Dec 2012	Dec 2013
Copper	-7.2%	-5.1%	-13.7%	0.0%	14.9%	-4.4%	-6.2%
Aluminium	-9.6%	-5.4%	6.9%	5.9%	7.4%	-0.1%	-0.9%
Crude oil	-0.6%	33.2%	-12.5%	9.7%	4.9%	1.3%	-0.4%
Steel	-8.1%	50.0%	1.8%	-0.5%	-1.2%	-4.6%	-4.9%
EGW wages	3.7%	1.5%	3.9%	3.4%	3.0%	2.8%	2.1%
General labour	1.2%	0.6%	0.9%	1.8%	1.7%	1.7%	1.1%
Construction	1.1%	1.1%	-0.3%	2.4%	2.2%	-0.1%	-1.5%

4.2. EnergyAustralia

83. We have been instructed that the base period for EnergyAustralia is the month of December 2006. That is, its base planning objects have been costed based on average prices prevailing in this month.

84. On this basis, CEG recommends that the escalation factors set out in Table 4 and Table 5 below be applied by EnergyAustralia for the purpose of escalating these base planning objects.

Table 4: June to June escalation factors for EnergyAustralia

	June 2007	June 2008	June 2009	June 2010	June 2011	June 2012	June 2013	June 2014
Copper	-8.4%	-6.7%	-14.8%	-4.1%	7.1%	5.6%	-6.0%	-6.4%
Aluminium	1.0%	-15.9%	5.3%	7.6%	6.6%	3.5%	-0.8%	-1.1%
Crude oil	-12.6%	29.4%	-0.2%	0.9%	6.8%	2.9%	0.3%	-1.0%
Steel	-7.3%	5.8%	42.9%	-8.2%	2.1%	-3.8%	-4.7%	-5.0%
EGW wages	1.2%	1.4%	3.3%	3.6%	3.2%	2.9%	2.4%	2.0%
General labour	0.6%	0.9%	0.7%	1.3%	1.7%	1.7%	1.4%	0.8%
Construction	0.5%	1.1%	0.4%	1.0%	2.3%	1.1%	-0.8%	-0.7%

Table 5: December to December escalation factors for EnergyAustralia

	Dec 2007	Dec 2008	Dec 2009	Dec 2010	Dec 2011	Dec 2012	Dec 2013
Copper	-15.0%	-5.1%	-13.7%	0.0%	14.9%	-4.4%	-6.2%
Aluminium	-7.9%	-5.4%	6.9%	5.9%	7.4%	-0.1%	-0.9%
Crude oil	-7.4%	33.2%	-12.5%	9.7%	4.9%	1.3%	-0.4%
Steel	-13.9%	50.0%	1.8%	-0.5%	-1.2%	-4.6%	-4.9%
EGW wages	2.5%	1.5%	3.9%	3.4%	3.0%	2.8%	2.1%
General labour	1.2%	0.6%	0.9%	1.8%	1.7%	1.7%	1.1%
Construction	1.1%	1.1%	-0.3%	2.4%	2.2%	-0.1%	-1.5%

4.3. Integral Energy

85. We have been instructed that the base period for Integral Energy is the month of December 2007. That is, its base planning objects have been costed based on average prices prevailing in this month.

86. On this basis, CEG recommends that the escalation factors set out in Table 6 and Table 7 below be applied by Integral Energy for the purpose of escalating these base planning objects.

Table 6: June to June escalation factors for Integral Energy

	June 2008	June 2009	June 2010	June 2011	June 2012	June 2013	June 2014
Copper	-4.3%	-14.8%	-4.1%	7.1%	5.6%	-6.0%	-6.4%
Aluminium	-8.6%	5.3%	7.6%	6.6%	3.5%	-0.8%	-1.1%
Crude oil	25.5%	-0.2%	0.9%	6.8%	2.9%	0.3%	-1.0%
Steel	12.0%	42.9%	-8.2%	2.1%	-3.8%	-4.7%	-5.0%
EGW wages	0.1%	3.3%	3.6%	3.2%	2.9%	2.4%	2.0%
General labour	0.3%	0.7%	1.3%	1.7%	1.7%	1.4%	0.8%
Construction	0.5%	0.4%	1.0%	2.3%	1.1%	-0.8%	-0.7%

Table 7: December to December escalation factors for Integral Energy

	Dec 2008	Dec 2009	Dec 2010	Dec 2011	Dec 2012	Dec 2013
Copper	-9.6%	-13.7%	0.0%	14.9%	-4.4%	-6.2%
Aluminium	-6.2%	6.9%	5.9%	7.4%	-0.1%	-0.9%
Crude oil	36.7%	-12.5%	9.7%	4.9%	1.3%	-0.4%
Steel	47.5%	1.8%	-0.5%	-1.2%	-4.6%	-4.9%
EGW wages	1.5%	3.9%	3.4%	3.0%	2.8%	2.1%
General labour	0.6%	0.9%	1.8%	1.7%	1.7%	1.1%
Construction	1.1%	-0.3%	2.4%	2.2%	-0.1%	-1.5%

4.4. Transend

87. We have been instructed that the base period for Transend is the month of June 2007. That is, its base planning objects have been costed based on average prices prevailing in this month.

88. We also understand that Transend does not intend to apply any lag to its cost escalators. On this basis, CEG calculates the escalation factors set out in Table 8 and Table 9 for the purpose of escalating Transend's base planning objects.

Table 8: June to June escalation factors for Transend

	June 2008	June 2009	June 2010	June 2011	June 2012	June 2013	June 2014
Copper	-9.6%	-13.7%	0.0%	14.9%	-4.4%	-6.2%	-6.6%
Aluminium	-6.2%	6.9%	5.9%	7.4%	-0.1%	-0.9%	-1.2%
Crude oil	36.7%	-12.5%	9.7%	4.9%	1.3%	-0.4%	-1.5%
Steel	47.5%	1.8%	-0.5%	-1.2%	-4.6%	-4.9%	-5.2%
EGW wages*	2.4%	3.9%	3.6%	3.5%	2.4%	2.1%	1.8%
General labour	0.9%	0.7%	1.3%	1.7%	1.7%	1.4%	0.8%
Construction	1.1%	0.4%	1.0%	2.3%	1.1%	-0.8%	-0.7%

* EGW numbers reflect Transend's methodology for estimating EGW escalation factors from its EBA. These figures have been supplied by TransGrid.

Table 9: December to December escalation factors for Transend

	Dec 2007	Dec 2008	Dec 2009	Dec 2010	Dec 2011	Dec 2012	Dec 2013
Copper	-6.7%	-14.8%	-4.1%	7.1%	5.6%	-6.0%	-6.4%
Aluminium	-15.9%	5.3%	7.6%	6.6%	3.5%	-0.8%	-1.1%
Crude oil	29.4%	-0.2%	0.9%	6.8%	2.9%	0.3%	-1.0%
Steel	5.8%	42.9%	-8.2%	2.1%	-3.8%	-4.7%	-5.0%
EGW wages*	3.9%	2.6%	3.4%	3.9%	2.5%	2.4%	1.9%
General labour	1.2%	0.6%	0.9%	1.8%	1.7%	1.7%	1.1%
Construction	1.1%	1.1%	-0.3%	2.4%	2.2%	-0.1%	-1.5%

* EGW numbers reflect Transend's methodology for estimating EGW escalation factors from its EBA. These figures have been supplied by TransGrid.

4.5. TransGrid

89. We have been instructed that the base period for TransGrid is the financial year ending 30 June 2007. That is, its base planning objects have been costed based on average prices prevailing over this period.

90. On this basis, CEG recommends that the escalation factors set out in Table 10 and Table 11 below be applied by TransGrid for the purpose of escalating these base planning objects.

Table 10: June to June escalation factors for TransGrid

	June 2007	June 2008	June 2009	June 2010	June 2011	June 2012	June 2013	June 2014
Copper	0.0%	-6.7%	-14.8%	-4.1%	7.1%	5.6%	-6.0%	-6.4%
Aluminium	-0.8%	-15.9%	5.3%	7.6%	6.6%	3.5%	-0.8%	-1.1%
Crude oil	-6.2%	29.4%	-0.2%	0.9%	6.8%	2.9%	0.3%	-1.0%
Steel	-1.1%	5.8%	42.9%	-8.2%	2.1%	-3.8%	-4.7%	-5.0%
EGW wages	1.5%	0.5%	3.3%	3.6%	3.2%	2.9%	2.4%	2.0%
General labour	0.6%	0.9%	0.7%	1.3%	1.7%	1.7%	1.4%	0.8%
Construction	0.5%	1.1%	0.4%	1.0%	2.3%	1.1%	-0.8%	-0.7%

Table 11: December to December escalation factors for TransGrid

	Dec 2007	Dec 2008	Dec 2009	Dec 2010	Dec 2011	Dec 2012	Dec 2013
Copper	-7.2%	-5.1%	-13.7%	0.0%	14.9%	-4.4%	-6.2%
Aluminium	-9.6%	-5.4%	6.9%	5.9%	7.4%	-0.1%	-0.9%
Crude oil	-0.6%	33.2%	-12.5%	9.7%	4.9%	1.3%	-0.4%
Steel	-8.1%	50.0%	1.8%	-0.5%	-1.2%	-4.6%	-4.9%
EGW wages	2.3%	1.1%	3.9%	3.4%	3.0%	2.8%	2.1%
General labour	1.2%	0.6%	0.9%	1.8%	1.7%	1.7%	1.1%
Construction	1.1%	1.1%	-0.3%	2.4%	2.2%	-0.1%	-1.5%

Appendix A. Rejection of Macromonitor Forecasts

A.1. Reasons for rejecting Macromonitor

91. The AER has argued that it does not believe that it is appropriate to adopt CEG's proposal to average Econtech and Macromonitor forecasts because:

i. Macromonitor's forecasts are productivity adjusted labour costs and it is inappropriate to average these with Econtech's forecasts which are not productivity adjusted. The AER relies on advice from Econtech when making this argument, specifically it states:[19]

> *"In particular, the AER notes Econtech's advice that the Macromonitor and Econtech forecasts are not comparable and that averaging the two forecasts is methodologically unsound and likely to provide inappropriate forecasts of labour cost escalation."*

We note that in the NSW distribution draft decision this paragraph is repeated twice (on pages 179 and 537). However, in the TransGrid draft decision this paragraph is changed the second time it is reproduced (on page 253) it is changed to remove the words *"and that averaging the two forecasts is methodologically unsound"*. Moreover, the same paragraph appears three times in the Transend draft determination (pages 116, 175 and 361) and each time does not include the words *"and that averaging the two forecasts is methodologically unsound"*.

ii. Macromonitor did not provide a description of the methodology used to forecast wages growth or productivity growth. For example, the AER states:[20]

> *"The AER also does not consider it appropriate to rely on the forecasts presented by Macromonitor because there is no description of the methodology used to forecast wages growth or productivity."*

This appears to be the AER's opinion rather than simply a restatement of advice from Econtech. Nonetheless, the AER does earlier refer to Econtech advice which the AER paraphrases as follows:[21]

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[19] AER, *Draft Decision: New South Wales draft distribution determination 2009-10 to 2013-14*, 21 November 2008, p.537; and AER, *Draft Decision: Transgrid transmission determination 2009-10 to 2013-14*, 31 October 2008, p.118.

[20] AER, *Draft Decision: New South Wales draft distribution determination 2009-10 to 2013-14*, 21 November 2008, p.537.

> *"The report prepared by Macromonitor does not contain any description of the methodology used to forecast wages growth, which makes it difficult to evaluate the labour cost growth forecasts produced by Macromonitor. Further, Macromonitor does not use any econometric techniques to derive its forecasts."*

The full relevant quote from Econtech appears to be as follows:[22]

> *"The report does not contain any description of the methodology used to forecast wages growth. It is therefore difficult to assess or evaluate the forecast results provided. For instance, it is unclear as to the extent with which the Macromonitor forecasts for wages in the utility industry are consistent with the outlook for broad macro-economic factors nationally, and across industries and states. This is in contrast to Econtech s methodology where the labour cost forecasts are derived from MM2, an economy-wide forecasting model. What is made clear by Macromonitor is that they do not use any econometric techniques to derive their forecasts"*

92. However, in our view the reasons provided by the AER are in error, as is set out below.

A.2. Macromonitor and Econtech provide full descriptions of methodology

93. There are three Macromonitor reports relied on by us each and which the AER references in its draft decisions (although the AER only references the last of these three in the Transend draft decision) which describes the basis on which Macromonitor has derived its forecasts.

- Macromonitor, Australian Construction Outlook 2008, November 2007;
- Macromonitor, Forecasts of Cost Indicators For The Electricity Transmission Sector, New South Wales & Tasmania, February 2008; and
- Macromonitor, Forecasts of Cost Indicators for the Electricity Transmission Sector: Forecasting Methodology, 1 September 2008.

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[21] AER, *Draft Decision: New South Wales draft distribution determination 2009-10 to 2013-14*, 21 November 2008, p.536.

[22] Econtech, *Labour Cost Growth Forecasts, 2007/08 to 2016/17*, 19 September 2008, p.39.

94. The first of these is a report that Macromonitor provides forecasts for in input costs for the EGW and construction sectors. This report was not commissioned by CEG or the regulated businesses; rather it was aimed primarily at construction companies and those interested in costing their own projects (much as Econtech's standard forecasts are). This report is 178 pages long and it provides detailed description of Macromonitors' views on the drivers of unit costs and the basis on which Macromonitor has projected forecast forward these drivers.

95. CEG asked Macromonitor to update and extend these forecasts out to the end of the regulatory period.[23] Macromonitor accepted this engagement and provided the second report. The AER then sought from Transend a further description of Macromonitor's methodology. While we felt that Macromonitor has already fully described their methodology we nonetheless sought a clarification of this from Macromonitor and the result was the third report listed above.

96. We therefore consider that the AER is incorrect to state: "…*there is no description of the methodology* [used by Macromonitor] *used to forecast wages growth or productivity*."

97. Both Macromonitor and Econtech's forecasts are based on:

- an analysis of historical trends in costs;
- identification of the historical drivers of unit costs;
- the development of *expert opinion* on the likely future movements in those cost drivers; and
- the development of *expert opinion* relating to any changes in the future relationship between cost drivers and costs.

98. The only major methodological difference between Macromonitor and Econtech's forecasts is that Econtech attempts to formalise this process by feeding its expert opinions into a formal mathematical model of the Australian economy to derive its forecast. Macromonitor, consistent with most economic forecasters, does not attempt to do this.

99. We believe that Econtech is a reliable source of forecasts. However, this is less because Econtech use a mathematical model and more simply because they are

[23] CEG also approached Econtech to perform a similar task but were told by Econtech that they were conflicted by work with the AER.

professional economists with an expertise in this field. Indeed, it is, well known that mathematical models do not necessarily provide better forecasts than those based on professional opinion. For example, David Hendry (a Professor of Economics at the University of Oxford who is himself a proponent of the development of mathematical models) states:

> "*The historical track record of econometric systems is both littered with forecast failures, and their empirical out-performance by 'naive devices': see, for example, many of the papers reprinted in Mills (1999).*"[24]

100. Separately, Hendry has stated:

> *"While economic forecasts from econometric systems have a poor historic track record and face many potential and real problems, the recently extended theory of economic forecasting offers a vehicle for understanding and learning from failures, and for consolidating our growing knowledge of economic behaviour. Consequently, despite their present travails, econometric systems provide the best long-run hope for successful economic forecasting, especially as suitable methods are developed to improve their robustness to unanticipated breaks."*[25]

101. On a similar vein Hendry states:

> *"What is required is professional analysis and opinion - not blind reliance on mathematical technique and inherently limited and often inaccurate data. Economics is, after all, a "profession" - like law and accounting - a "practical art" - not a "science." Total reliance on mathematical forms of reasoning constitutes professional incompetence."*

102. The problems with using econometric models in the forecasting process is also reflected in the teaching of students. For example, the course description for "ECON332: Econometric Models" at Macquarie University states:[26]

> *"Policy simulation using economy wide models is discussed extensively in ECON332. Along with forecasting, policy simulation is the major reason why*

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[24] Hendry, D. *Unpredictability and the Foundations of Economic Forecasting*, 11 July 2005, p.2. Available online at: http://www.nuffield.ox.ac.uk/economics/papers/2004/w15/ForcBasis.pdf. The Mills paper referred to is Mills, T. C. (ed.)(1999). *Economic Forecasting*. Cheltenham, UK: Edward Elgar. 2 vols.

[25] Quoted in a book review of a series of papers edited by David Hendry and Neil Erricson entitled "Understanding Economic Forecasts", available online at http://www.futurecasts.com/book%20review%208-3.htm

[26] http://www.efs.mq.edu.au/EFS_docs/unit_outlines/ug/2008/econ/ECON332_S2_2008.pdf

economy wide models are constructed. ***The policy simulation aspects are more important and arguably more reliable than the forecasting aspects, but the two are very closely related.****"*

103. In any event, the main purpose of mathematical models of the entire economy is not to forecast the future in general but to analyse the impact of particular shocks on different sectors of the economy – often shocks related to changes in Government policy. This is a much more tractable problem for these models to deal with as, unlike economic forecasting for the economy, this analysis can be sensibly performed by analysing the shock under the assumption of 'all else constant'. Naturally, forecasting cannot be performed in this way as forecasts are intended to capture the impact of all the relevant changes in the economy over the period.

104. Moreover, and importantly for the current context, the use of such models does not add to the transparency of the forecasting process. Benjamin Mitra-Kahn in a recent paper states:[27]

> *"Computable General Equilibrium (CGE) models are probably the most utilized tool globally for development planning and macro policy analysis. Despite this their history is not available in the literature, their theoretical grounding is never explained, and the mechanics of the models remain hidden under layers of rhetoric, myths and hand gestures at various theoretical structures. … Furthermore, this paper gives the history of the model and identifies its (relatively) few key variables, in order to explain how model builders construct CGE models, and consciously impose causality, while choosing exogenous variables that define results. CGE models can be a very useful policy tool, but only by understanding that it is a static fixed output model, not built for dynamic analysis …"*

105. It is not possible for us to 'back engineer' the assumptions used by Econtech to arrive at their forecasts. Econtech uses a proprietary 'black box' model which we do not have access to. Similarly, we assume that the AER has not had access to this model and has not devoted resources to assessing the reasonableness of its assumptions. Indeed, we do not believe the AER should do this. Ultimately, such a process would be pointless because the drivers Econtech's forecasts is not 'the model' *per se* but the choice of "*exogenous variables that define results".*

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[27] Mitra-Khan, B. *Debunking the Myths of Computable General Equilibrium Models*, March 2008, p.2. Available online at:

http://www.newschool.edu/cepa/publications/workingpapers/SCEPA%20Working%20Paper%202008-1%20Kahn.pdf.

Consequently, the main basis for having regard to Econtech forecasts is not that they use a mathematical model but that their professional opinion (some of which is embedded in their model and some of which is exogenous to it) has value.

106. This is a statement of the obvious. Mathematical models require the human modeller to impose their professional opinion in the form of choosing the values for the key exogenous variables that define the results. This reliance on professional opinion cannot be avoided – with or without mathematical models. In this regard, we find Econtech's description of their methodology no more detailed than that of Macromonitor. As noted in the review of Hendry and Ericson's book on forecasting:

> *"To repeat, economics is a profession - not a science. Professional analysis and opinion is not mere "guesswork" and "hunches," and can be far more reliable in the hands of a knowledgeable professional than mathematical forms of analysis based on the faulty theory and the inaccurate statistics generally available to the mathematical economics technicians that rely on them."*[28]

107. We note that Econtech's discussion of its methodology is similarly general, and refers to concepts such as 'a Keynesian short-run", "neo-classical long-run" and "econometric techniques". These could refer to any number of modelling methodologies and certainly do not provide a basis on which to conclude that its forecasts are more reliable than those of Macromonitor.

108. In conclusion, the use by Econtech of a mathematical model of the Australian economy neither invalidates Econtech forecast (which ultimately are dependent on Econtech's professional opinion about exogenous variables and beliefs imposed on the model form) nor does it make it superior to Macromonitor's forecasts (which are similarly dependent on Macromonitor's professional opinion).

109. The validity of forecasts that are not derived solely from the output of mathematical models is implicitly acknowledged by the AER's use of Reserve Bank of Australia inflation forecasts in preference to Econtech inflation forecasts when determining inflation forecasts as an input into the PTRM. These forecasts reflect the professional opinion of the Reserve Bank staff and are not a mechanistic output of a mathematical model of the Australian economy. Similarly, the use of Consensus Forecasts also reflects reliance on the average forecast of experts who, in general, do not attempt to use a mathematical model of the world economy to forecast commodity prices.

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[28] Quoted in a book review of a series of papers edited by David Hendry and Neil Errricson entitled, Understanding Economic Forecasts available at http://www.futurecasts.com/book%20review%208-3.htm

110. Finally we note that the AER has stated (eg page 253 of the TransGrid draft decision):

> *"Further, Macromonitor does not use any econometric techniques to derive its forecasts."*

111. This is not an accurate restatement of Macromonitor's reports. Macromonitor stated that:[29]

> *"Our next step is to examine the historical time series of wages, along with time series of the factors which influence wages, and to form a view about the historical determinants, and likely future determinants, of wages growth.*
>
> *One method for doing this is to use econometric regression techniques to estimate the equations which have in the past related the influencing factors to the variable to be forecast (in this case wages). The draw backs of using this approach include:*
>
> - *Difficulty in capturing the complexity of the wage formation process in equation form,*
> - *Changes over time in the relative importance of the various factors, and*
> - *Changes between the future and the past with regard to the relative importance of different factors influencing wages growth.*
>
> *It should also be remembered that, ultimately, any forecasts derived from a set of equations are only as good as the forecasts of the other, independent variables (the determining factors) and other assumptions, being inputted into those equations.*
>
> *Our approach is to carefully examine the historical data and build explanations of the trends observable in those data that match all of the available evidence. It is particularly important to build explanations of notable changes which have taken place in the historical data, changes either in the rate of growth, or in the direction of change, or in the apparent relationships between variables. These explanations are the basis of the model which we use to forecast.*
>
> *We do not use econometric techniques to estimate forecasting equations."*

[29] Macromonitor, Forecasts of Cost Indicators for the Electricity Transmission Sector: Forecasting Methodology, 1 September 2008

112. This is not consistent with the AER's statement that *"Further, Macromonitor does not use any econometric techniques to derive its forecasts."* Macromonitor does not say that they do not have regard to econometric results when forming their judgments about historical relationships between variables. They simply state that such econometric techniques do not form the basis of their forecasting equations.

A.3. Comparability of forecasts

113. The AER has noted that CEG explicitly assumed that Econtech forecasts were adjusted for changes in productivity and hence averaged these with Macromonitor's productivity-adjusted forecasts.[30] Econtech has since made clear that its forecasts are not adjusted for productivity – that is, its forecast growth is not for unit labour costs, but for average earnings. The AER cites this as a reason for not relying on an average of Macromonitor and Econtech's forecasts – and implicitly for excluding Macromonitor's forecast.

114. However, Econtech and the AER appear not to have considered which measure of EGW wages growth would be most appropriate to apply to EGW wages. In accepting the Econtech forecasts, the AER has implicitly accepted that forecasts of wages growth should not be adjusted for productivity growth.

115. CEG's understanding of the derivation of the businesses' underlying costings is that these are based on the number of units of labour required for each project, based on technology and productivity as at 2007. A project that requires 100 equivalent full time workers in 2010 will require more/fewer workers if productivity reduces/increases over the intervening period.

116. Accordingly, productivity adjustments can be an important factor in forecasting the actual costs of the businesses in the future and it is reasonable to account for this in estimates of escalation factors.

[30] Here we refer to a productivity adjustment as the 'netting out' of productivity growth from average wage growth – yielding growth costs per constant unit of labour.

Appendix B. Instructions to CEG

117. CEG has received instructions from the businesses in a letter from Matt Cooper to CEG dated 5 January 2009. Schedule 1 to this latter states that:

> 1. *EnergyAustralia instructs CEG to respond to the Cost Escalation issues raised in the AER's Draft Decision for the NSW Distribution Businesses.*
>
> 2. *CEG is instructed to adopt the AER's approaches in respect of:*
>
> - *Removing the adjustment to the Long Term Consensus forecast previously applied by CEG;*
> - *Using the HRC as the relevant price for determining steel escalation, rather than fabricated steel; and*
> - *Excluding producer margin escalation from forecasts.*

Appendix C. CEG Personnel

118. The Competition Economists Group (CEG) is an international firm of economic consultants specialising in the application of economics to industry structure, financial analysis, regulation, and competition. CEG was established in 2007 and has economists in Melbourne, Sydney, London, Brussels and Silicon Valley.

119. In Australia, CEG has particular expertise in relation to the regulation of infrastructure businesses, including in pricing, cost estimation, cost of capital issues and general regulatory issues.

120. Dr Tom Hird is recognised as one of Australia's leading practitioners in the economics of regulation and has advised regulators, regulated businesses and government agencies in this area. Dr Hird's expert advice has been influential in Australian regulatory determinations, particularly in relation to the regulation of electricity and gas networks. Dr Hird has been assisted in preparing this report by Daniel Young, an Economist at CEG's Sydney office. Brief curricula vita for both Dr Hird and Mr Young are attached below.

Tom Hird

Tom Hird is a founding Director of CEG's Australian operations. Tom has a Ph.D. in Economics from Monash University. He is also an Honorary Fellow of the Faculty of Economics at Monash University and has 16 years professional experience in the economic analysis of markets.

Prior to forming CEG 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 and merger clearance processes.

Tom's industry experience spans the aviation, electricity and gas transport, electricity generation, finance, mining, 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.

Recent selected assignments include:

2008

Advising on appropriate forecasts for costs faced by Australian electricity businesses over the forthcoming regulatory period. Used as an input into their regulatory cost modelling.

Advising Optus and Terria on the regulatory framework for their bids to build a national broadband network

Advising on forecasts of inflation to be used by Australian electricity businesses as inputs to their regulatory submissions.

Advising the Energy Networks Association on cost of capital issues in the context of the AER five year review of the cost of capital in the NER.

Advising Queensland Rail on its cost of capital submission to the QCA.

Advising all of the eight electricity businesses making submissions in this period to the Australian Energy Regulator (AER) on cost of capital issues. These include businesses from NSW, South Australia, the ACT, Queensland and Tasmania.

2007

Advising the Victorian gas distributors in relation to their response the ESCV's draft decision on the cost of capital (four reports).

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

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

2006

Advise the Macau regulator (GDSE) on efficient tariff reform for the vertically integrated generation and network provider.

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

2005

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

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

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

2004

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.

Tom Hird | Director | C E G

| T: + 61 3 9504 6027 | M: 0422 720 929
| E: tom.hird@ceg-ap.com

Daniel Young

Daniel Young is an Economist with CEG, based in its Sydney office. Daniel has a Masters degree in Economics and a Bachelors degree in Operations Research from Auckland University. He has worked as a professional economist for 4 years. Prior to joining CEG, Daniel was an Analyst at NERA Economic Consulting.

Daniel has extensive experience across a wide range of matters relating to economic regulation, antitrust issues and commercial damages in Australia and overseas. He has worked for clients in the electricity, gas, mining, telecommunication, and finance sectors.

Daniel has particular expertise in relation to the implementation of economic principles in computer modelling and has created models for electricity pricing, demand response and competition in electricity generation that have been applied in Australia and overseas.

Recent selected assignments include:

2008

Assisting in the preparation of reports for Australian electricity network businesses estimating the rate of inflation for regulatory purposes and calculating and forecasting materials escalators.

Econometric testing using Australian data of the specification of the Sharpe CAPM equation for the ENA in relation to the AER's cost of capital review.

Calculating the long run cost of providing a termination access service for a mobile telecommunications firm.

Providing advice to British Energy regarding the implications on competition in the UK electricity generation market of a number of proposed corporate transactions; and

2007

Estimating the likely response in the demand for electricity to the increased proliferation of time of day and critical peak tariffs as part of the MCE's cost/benefit analysis of the introduction of smart meters.

Analysing the results of the 2006 household survey of electricity, gas and water consumption in the Sydney region and preparing a report summarising these on behalf of IPART.

2006

Advising the electricity regulator in Macau about efficient tariff reform using modelling of the short run and long run marginal cost of supply in Macau.

Assisting in determining the market gas price on behalf of Santos in arbitration for two major gas supply contracts.

Conducting modelling of the hypothetical cost of entry using alternative technologies to determine Telecom NZ's service obligation.

2005

Developing a modelling framework for the ACCC to understand the increased incentives of merged generators in the NEM to engage in strategic withholding of capacity.

Estimating the long run marginal cost of Integral Energy's distribution network and applying this to improve the efficiency of tariffs.

Assisting in a modelling capacity by scenario-testing the ESC's proposed regulatory framework for electricity distribution.

Daniel Young | Economist | C E G

| T: + 61 2 9282 0451 | M: 0405 170 291
| E: daniel.young@ceg-ap.com