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Updated cost escalation factors

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December 2014

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1 Introduction

1. CEG has been commissioned by Ausgrid, Endeavour Energy, Essential Energy and ActewAGL (collectively the NSPs) to provide an update on cost escalation factors provided in December 2013.[1] To assist in forecasting future operating and capital expenditure based on changes in unit costs, the NSPs have requested updated cost escalation factors for:

   - aluminium;
   - copper;
   - steel;
   - crude oil;
   - labour, including utilities industry , professional services and general labour; and
   - construction – both engineering and non-residential.

2. Where possible, the methodology that we have adopted in this update is consistent with the approach taken in our December 2013 report. However changes in information availability have driven a need to rely on different input data to estimate cost escalation factors for construction. Details of our methodology and use of input data, which are characterised by a high degree of transparency, can be found in the December 2013 report. Details of the revised methodology applied in this update to calculate construction cost escalation factors are provided in section 4.4 below.

3. We have sourced predictions of future prices for these inputs, whether in the form of futures prices or expert forecasts, and rely on these data to develop escalation factors. Where futures prices are available and are sufficiently liquid, we have used these in preference to forecasts on the basis that these represent the best forecast of prices by informed market participants.

4. Issues of consistency in timing are important to the development of escalation factors, because their function is to project forward prices or costs from one period to another. We report escalation factors based on:

   - the forecast change in average prices between financial years (which we call 'financial year' escalators); and
   - the forecast change in average prices between each calendar year (which we call 'calendar year' escalators).

[1] CEG, *Escalation factors affecting expenditure forecasts,* December 2013

5. Each business has estimated over a particular period the base price of the units that it seeks to escalate. This is important to escalation because each business' escalation factors must consistently commence escalation of prices from the correct base period. The base periods have not changed from those set out in our December 2013 report.[2]

6. The remainder of this update is set out as follows:

   - Section 2 describes our updated labour cost escalation factors;
   - Section 3 describes our updated materials cost escalation factors; and
   - Section 4 compares the updated cost escalation factors to those provided in December 2013.

[2] CEG, *Escalation factors affecting expenditure forecasts,* December 2013, section 2.5

2 Exchange and inflation rate forecasts

7. The NSPs require estimates of cost escalation factors expressed in real Australian dollar terms. For many of the cost escalation factors that we estimate, raw input data on futures or forecast prices are available in nominal terms and/or in foreign currency terms. In order to develop real Australian dollar cost escalation factors we need to express forecast prices in these terms. This requires generating estimates of movements in foreign exchange rates and in future inflation.

2.1 Forecasting foreign exchange movements

8. Commodity prices are typically expressed in United States dollars. To convert historical and future prices into Australian dollar terms, we have established a forecast exchange rate series for the value of the Australian dollar against the United States dollar out to October 2024.

9. To do this we source forward rates from Bloomberg ranging from one month to 10 years. We have averaged daily historical foreign exchange forward rates over October 2014. Historical estimates of the Australian dollar – United States dollar exchange rate are sourced directly from the Reserve Bank of Australia (RBA). This methodology remains consistent with our December 2013 report.

2.2 Forecasting inflation

10. Many of our underlying price inputs, such as futures prices, are expressed in nominal terms. However, the terms of reference require escalation factors to be expressed in real terms.

11. Unless otherwise stated we have deflated nominal Australian dollar prices by an inflation forecast based on RBA data. The derivation of this forecast is very simple and is explained in our December 2013 report, with data updated using the RBA's August 2014 Statement of Monetary Policy.[3]

12. For wage costs, we have relied on Independent Economics' forecasts of changes to state-specific nominal wage prices. In our previous report we deflated these to real terms using Independent Economics' forecast of Australian CPI. For this report, Independent Economics directly provide forecast changes to real wage prices.

3 CEG, *Escalation factors affecting expenditure forecasts,* December 2013, p 11.

3 Forecasts of labour cost inputs

13. In the December 2013 report, we estimated escalation factors using committed and history salary increases as well as real wage price index forecasts sourced from Independent Economics.[4] The NSPs commissioned forecasts from Independent Economics for the growth of average annual wages in different sectors in New South Wales and the Australian Capital Territory. Labour forecasts were sought for three different sectors: utilities, professional services and general.

14. In the current report we update this information relying on the NSPs' current (as at October 2014) committed and historic salary increases as well as real wage price index forecasts sourced from Independent Economics in November 2014.

3.1 Utilities labour

15. Table 1 below presents financial and calendar year escalation factors based upon actual and committed EBA increases spliced with Independent Economics forecasts for utilities sector wage price index growth. The issues raised by the transition from EBA rates to Independent Economics forecasts and how these are addressed in our estimates of escalation factors are set out in section 3 and Appendix A of our December 2013 report.

Table 1: Escalation factors for utilities sector labour, real

Financial year	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**
ActewAGL		2.2%	1.8%	1.3%	1.7%	1.5%	1.5%
Ausgrid	1.1%	0.0%	1.8%	1.8%	1.7%	1.5%	1.4%
Endeavour Energy		0.0%	1.8%	1.8%	1.7%	1.5%	1.4%
Essential Energy		0.0%	0.5%	1.1%	1.7%	1.5%	1.4%
Calendar year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ActewAGL	1.2%	1.9%	2.4%	1.9%	1.6%	1.5%	1.5%
Ausgrid	1.2%	0.1%	1.6%	1.8%	1.6%	1.4%	1.4%
Endeavour Energy	0.1%	0.1%	1.6%	1.8%	1.6%	1.4%	1.4%
Essential Energy	0.1%	0.1%	2.0%	1.8%	1.6%	1.4%	1.4%

Source: CEG analysis, NSPs and Independent Economics data.

3.2 General labour

16. Table 2 below presents financial and calendar year escalation factors based upon Independent Economics forecasts for general labour wage price index growth.

4 CEG, *Escalation factors affecting expenditure forecasts,* December 2013, pp. 15-16

Table 2: Escalation factors for general labour, real

Financial year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
ActewAGL		-0.3%	0.3%	1.5%	1.4%	1.3%	1.3%
Ausgrid	0.0%	-0.2%	0.7%	1.3%	1.3%	1.2%	1.2%
Endeavour Energy		-0.2%	0.7%	1.3%	1.3%	1.2%	1.2%
Essential Energy		-0.2%	0.7%	1.3%	1.3%	1.2%	1.2%
Calendar year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ActewAGL	0.0%	-0.5%	1.2%	1.5%	1.3%	1.2%	1.2%
Ausgrid	-0.1%	0.1%	1.1%	1.4%	1.2%	1.2%	1.2%
Endeavour Energy	0.0%	0.1%	1.1%	1.4%	1.2%	1.2%	1.2%
Essential Energy	0.0%	0.1%	1.1%	1.4%	1.2%	1.2%	1.2%

Source: CEG analysis and Independent Economics data.

3.3 Professional services labour

17. Table 3 below presents financial and calendar year escalation factors based upon Independent Economics forecasts for professional services wage price index growth.

Table 3: Escalation factors for professional services, real

Financial year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
ActewAGL		-1.1%	0.2%	1.7%	1.6%	1.4%	1.3%
Ausgrid	-0.2%	-1.3%	0.7%	1.7%	1.5%	1.3%	1.3%
Endeavour Energy		-1.3%	0.7%	1.7%	1.5%	1.3%	1.3%
Essential Energy		-1.3%	0.7%	1.7%	1.5%	1.3%	1.3%
Calendar year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ActewAGL	-0.3%	-1.0%	1.4%	1.7%	1.4%	1.3%	1.3%
Ausgrid	-0.6%	-0.4%	1.4%	1.7%	1.4%	1.3%	1.3%
Endeavour Energy	-0.4%	-0.4%	1.4%	1.7%	1.4%	1.3%	1.3%
Essential Energy	-0.4%	-0.4%	1.4%	1.7%	1.4%	1.3%	1.3%

Source: CEG analysis and Independent Economics data.

4 Forecasts of materials cost inputs

4.1 Aluminium and copper

18. In our December 2013 report, we estimated escalation factors for aluminium and copper using historical prices based on the London Metals Exchange (LME) spot, LME futures out to 27 months and the long term Consensus Economics forecasts.[5]

19. In the current report we have updated this information to reflect LME prices averaged over October 2014 and Consensus Economics' October 2014 forecasts. [6] The LME's longest dated future for these products is 27 months, allowing us to forecast prices out to and including January 2017 by interpolating between the future prices. Beyond January 2017, we have relied on Consensus Economics' long-term forecast, applied to a horizon of 7.5 years from October 2014, i.e. April 2022. Price forecasts between January 2017 and April 2022 were interpolated between the two points.

20. We use the approach described above to produce a monthly series of aluminium and copper prices, which may then be averaged to estimate financial and calendar year escalators out to 2019/20 and 2019, respectively. These escalators are shown in Table 4 and Table 5 below.

Table 4: Escalation factors for aluminium, real

Financial year	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**
ActewAGL		-0.9%	12.9%	1.5%	1.0%	2.7%	2.8%
Ausgrid	-5.6%	-0.9%	12.9%	1.5%	1.0%	2.7%	2.8%
Endeavour Energy		-0.9%	12.9%	1.5%	1.0%	2.7%	2.8%
Essential Energy		-0.9%	12.9%	1.5%	1.0%	2.7%	2.8%
Calendar year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ActewAGL	0.3%	4.1%	8.3%	0.9%	1.8%	2.9%	2.8%
Ausgrid	-5.4%	4.1%	8.3%	0.9%	1.8%	2.9%	2.8%
Endeavour Energy	0.3%	4.1%	8.3%	0.9%	1.8%	2.9%	2.8%
Essential Energy	0.3%	4.1%	8.3%	0.9%	1.8%	2.9%	2.8%

Source: CEG analysis, LME and Consensus Economics data.

5 CEG, *Escalation factors affecting expenditure forecasts,* December 2013.

6 Consensus Economics, *Energy & Metals Consensus Forecasts,* October 2013.

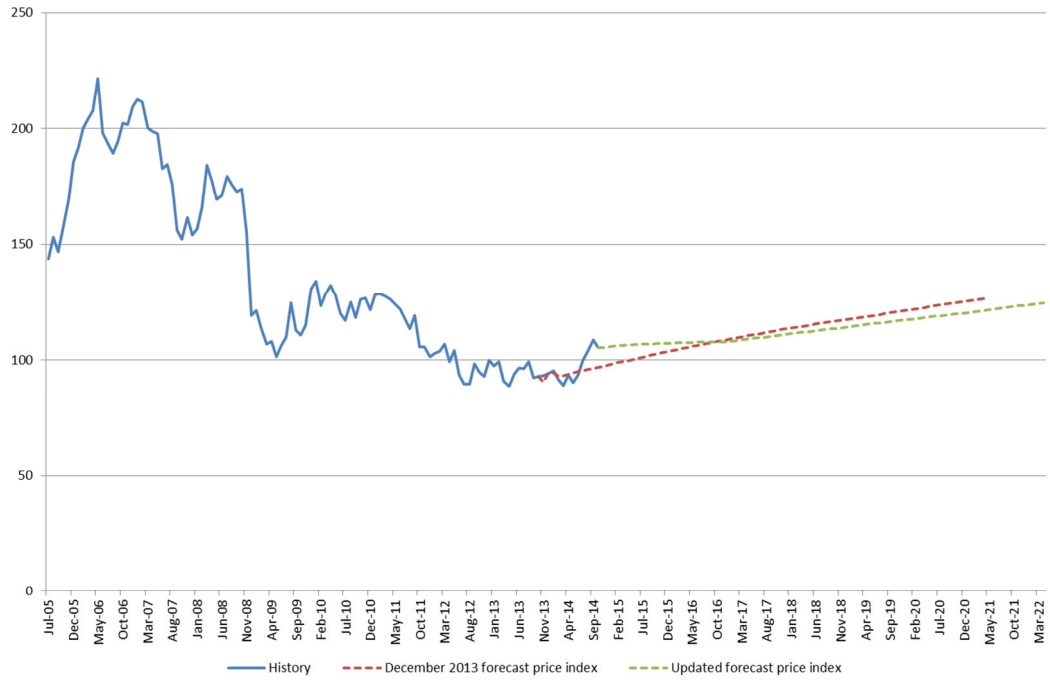
Table 5: Escalation factors for copper, real

Financial year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
ActewAGL		-0.3%	-2.6%	-1.6%	-1.4%	0.8%	1.1%
Ausgrid	-2.3%	-0.3%	-2.6%	-1.6%	-1.4%	0.8%	1.1%
Endeavour Energy		-0.3%	-2.6%	-1.6%	-1.4%	0.8%	1.1%
Essential Energy		-0.3%	-2.6%	-1.6%	-1.4%	0.8%	1.1%
Calendar year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ActewAGL	0.7%	-3.1%	-1.4%	-1.5%	-0.4%	1.2%	1.1%
Ausgrid	-1.6%	-3.1%	-1.4%	-1.5%	-0.4%	1.2%	1.1%
Endeavour Energy	0.7%	-3.1%	-1.4%	-1.5%	-0.4%	1.2%	1.1%
Essential Energy	0.7%	-3.1%	-1.4%	-1.5%	-0.4%	1.2%	1.1%

Source: CEG analysis, LME and Consensus Economics data.

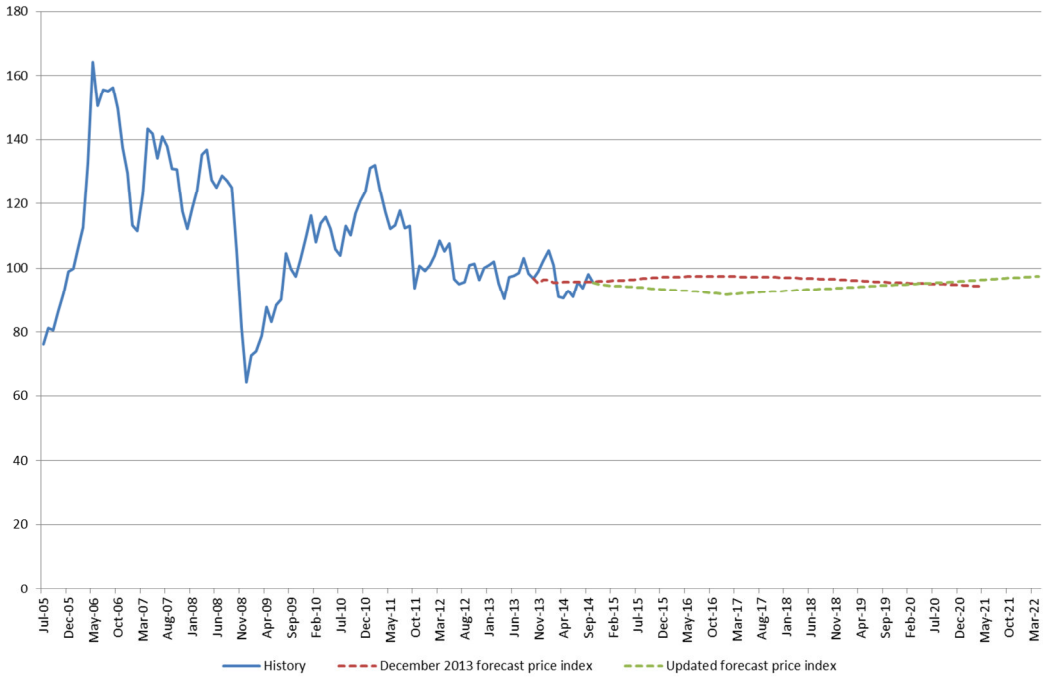
21. Figure 1 and Figure 2 below compare our December 2013 aluminium and copper escalation factors to the current updated escalation factors. Since our previous report, aluminium prices have increased while the forecast rate of price increases has decreased. Copper prices have decreased only marginally since our previous report. The updated escalation factors for copper are based on gradually declining prices out to January 2017 based on futures prices, followed by gradually increasing prices to April 2022 based on Consensus Economics' long-term forecast.

Figure 1: Indexed real aluminium price levels - comparison of forecasts



Source: CEG analysis, LME and Consensus Economics data.

Figure 2: Indexed real copper price levels – comparison of forecasts



Source: CEG analysis, LME and Consensus Economics data.

4.2 Steel

22. In our December 2013 report we estimated steel escalation factors using historical prices from Bloomberg (MEPS carbon steel products) and Consensus Economics forecasts for hot-rolled coil Asian steel prices.[7]

23. To ensure that the transition from the historical series to the forecasts does not result in a step change to the escalation factors that is not caused by changes in underlying prices, we repeat the practice used in our December 2013 report to apply the percentage changes in steel prices forecasted by Consensus Economics to the October 2014 price from the MEPS historical series.[8] The escalation factors derived on this basis are shown in Table 6 below.

7 Previous analysis conducted by CEG and accepted by the AER has relied on an average of forecasts for Hot Rolled Coil for European and US steel prices. However, Consensus Economics currently also publish forecasts specific to the Asian market, which are more relevant in this context.

8 CEG, *Escalation factors affecting expenditure forecasts,* December 2013, section 4.2

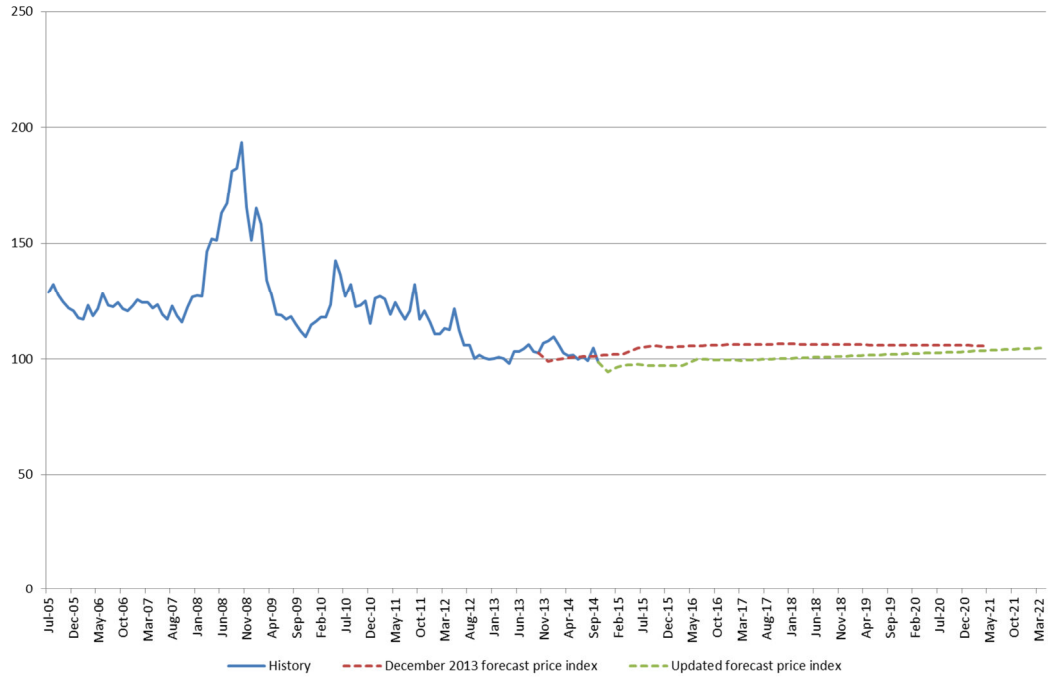
Table 6: Escalation factors for steel, real

Financial year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
ActewAGL		2.7%	-6.0%	-0.4%	2.0%	0.7%	1.0%
Ausgrid	1.7%	2.7%	-6.0%	-0.4%	2.0%	0.7%	1.0%
Endeavour Energy		2.7%	-6.0%	-0.4%	2.0%	0.7%	1.0%
Essential Energy		2.7%	-6.0%	-0.4%	2.0%	0.7%	1.0%
Calendar year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ActewAGL	1.4%	-1.6%	-4.2%	1.8%	0.9%	1.0%	1.0%
Ausgrid	3.1%	-1.6%	-4.2%	1.8%	0.9%	1.0%	1.0%
Endeavour Energy	1.4%	-1.6%	-4.2%	1.8%	0.9%	1.0%	1.0%
Essential Energy	1.4%	-1.6%	-4.2%	1.8%	0.9%	1.0%	1.0%

Source: CEG analysis, Bloomberg and Consensus Economics data.

24. Figure 3 below compares our December 2013 steel escalation factors to the current updated escalation factors. The steel escalation factors have not significantly changed since our previous report.

Figure 3: Indexed real steel price levels - comparison of forecasts



Source: CEG analysis, Bloomberg and Consensus Economics data.

4.3 Crude oil

25. In our December 2013 report we developed escalation factors based on constant real United States prices going forward, in Australian dollar terms. We have applied the same methodology in this report based on updated data.

26. We rely on a history of crude oil prices from the US Department of Energy up to October 2014 and August 2014 forecasts of US inflation from the Congressional Budget Office (CBO).[9] The CBO's most recent baseline economic forecasts include a series of inflation history and forecasts.[10] We have used history and forecasts relating to the consumer price index for all urban consumers.

27. The escalation factors developed for crude oil are shown in Table 7 below.

Table 7: Escalation factors for crude oil, real

Financial year	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**
ActewAGL		19.7%	-12.1%	-1.6%	1.1%	1.0%	0.9%
Ausgrid	6.5%	19.7%	-12.1%	-1.6%	1.1%	1.0%	0.9%
Endeavour Energy		19.7%	-12.1%	-1.6%	1.1%	1.0%	0.9%
Essential Energy		19.7%	-12.1%	-1.6%	1.1%	1.0%	0.9%
Calendar year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ActewAGL	12.3%	0.7%	-9.0%	1.2%	1.0%	0.9%	1.0%
Ausgrid	19.6%	0.7%	-9.0%	1.2%	1.0%	0.9%	1.0%
Endeavour Energy	12.3%	0.7%	-9.0%	1.2%	1.0%	0.9%	1.0%
Essential Energy	12.3%	0.7%	-9.0%	1.2%	1.0%	0.9%	1.0%

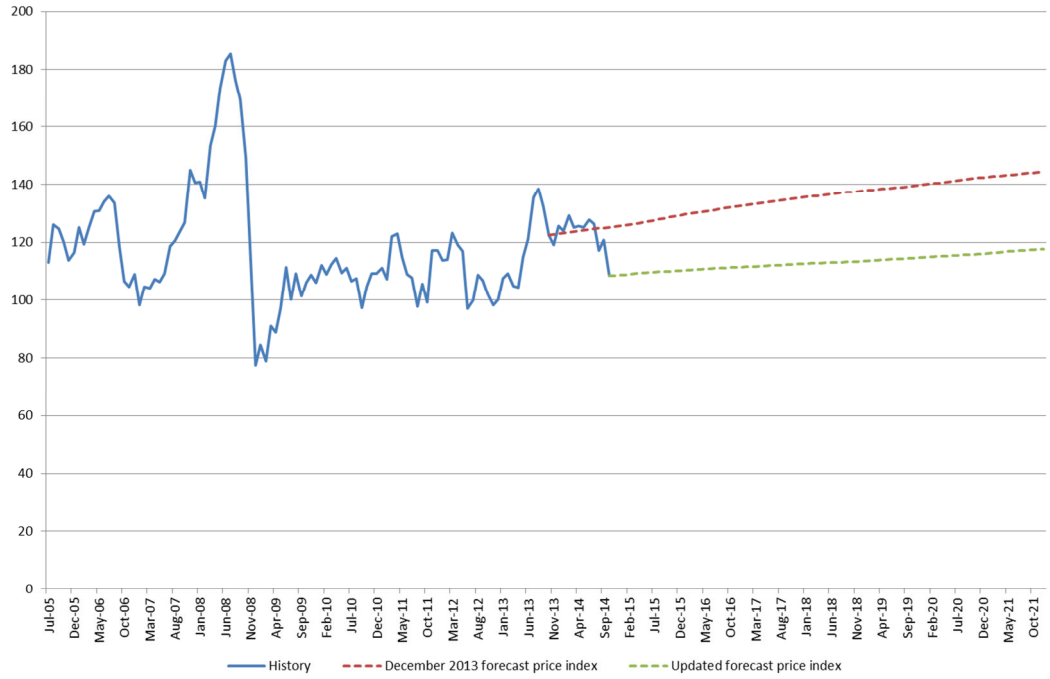
Source: CEG analysis, US Department of Energy data.

28. Figure 4 below compares our December 2013 crude oil escalation factors to the current updated escalation factors. The revised escalation factors reflect a similar upward trend due to expected depreciation of the Australian dollar against the United States dollar. However, a recent fall in the price of crude oil prices means that this trend beings from a lower level than for our December 2013 escalation factors.

9 Congressional Budget Office, August 2014, *An Update to the Budget and Economic Outlook: Fiscal Years 2014 to 2024.*

10 http://www.cbo.gov/publication/43902

Figure 4 Indexed real crude oil price levels - comparison of forecasts



Source: CEG analysis, US Department of Energy data.

4.4 Construction

29. In our December 2013 report we relied on Australian non-residential and engineering construction price forecasts developed by ACIL Allen Consulting, available at the Australian Construction Industry Forum (ACIF) website. However, these forecasts have been discontinued and are no longer available online. To update our construction escalation factors we have relied on an alternative forecast of Australian construction prices provided by BIS Shrapnel.

30. In its July 2014 report, BIS Shrapnel published a set of annual nominal forecasts for non-dwelling building.[11] We have relied on a quarterly forecast for non-dwelling building price levels supplied by BIS Shrapnel as a supplement to their July 2014 publication.

31. The annual series provided in BIS Shrapnel's report is constructed by weighting quarters by construction volumes. We relied on the supplemental quarterly series because it is consistent with our approach to calculating cost escalation factors to develop an evenly distributed series rather than an activity-weighted one. Additionally, by relying on the quarterly series, we are able to deflate BIS Shrapnel's nominal series using its forecast of CPI.

[11] BIS Shrapnel (July 2014) *Building in Australia 2014-2029*.

32. Escalation factors for total engineering and non-residential construction are shown in Table 8 below.

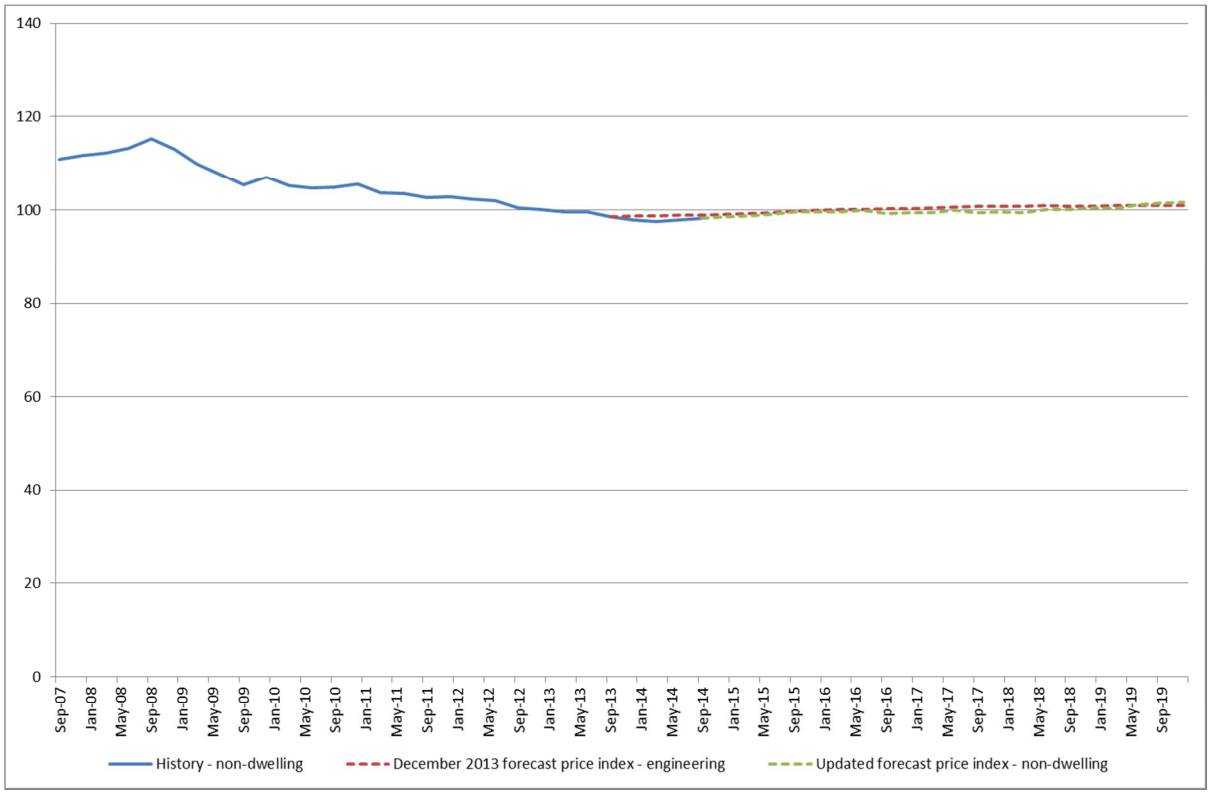
Table 8: Escalation factors for construction, real

Financial year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
ActewAGL		-1.9%	0.7%	1.1%	-0.2%	0.1%	0.8%
Ausgrid	-0.1%	-1.9%	0.7%	1.1%	-0.2%	0.1%	0.8%
Endeavour Energy		-1.9%	0.7%	1.1%	-0.2%	0.1%	0.8%
Essential Energy		-1.9%	0.7%	1.1%	-0.2%	0.1%	0.8%
Calendar year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ActewAGL	-1.0%	-0.9%	1.2%	0.4%	0.0%	0.4%	1.1%
Ausgrid	-1.1%	-0.9%	1.2%	0.4%	0.0%	0.4%	1.1%
Endeavour Energy	-1.0%	-0.9%	1.2%	0.4%	0.0%	0.4%	1.1%
Essential Energy	-1.0%	-0.9%	1.2%	0.4%	0.0%	0.4%	1.1%

Source: CEG analysis, BIS Shrapnel data.

33. Figure 5 below compares our December 2013 construction escalation factors to the current updated escalation factors. The figure suggests that, despite the change in source for construction price forecasts, there has not been a significant change to the construction cost escalation factors.

Figure 5 Indexed real construction price levels - comparison of forecasts



Source: CEG analysis, BIS Shrapnel data.