

# REAL COST ESCALATION FORECASTS TO 2023/24

SEPTEMBER 2017

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## **21 September 2017**

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# EXECUTIVE SUMMARY

On 26 July 2017, BIS Oxford Economics was engaged by ActewAGL to provide price forecasts of labour, materials and construction costs relevant to electricity distribution networks in the Australian Capital Territory. Forecasts of wages will be used by ActewAGL to develop the real price changes over its upcoming regulatory period, which, in turn, will be used by the business to construct its operating expenditure forecasts. Forecasts of price escalation factors for material costs, which are key inputs to various asset classes, and construction costs will be used by ActewAGL to develop its capital expenditure over the next regulatory period. Both capex and opex forecasts will be included in ActewAGL's revenue proposal to the AER in January 2018.

Although ActewAGL's next revenue proposal covers the five-year period from 2019/20 to 2023/24 (inclusive), BIS Oxford Economics was asked to provide seven year forecasts covering financial years 2017/18 to 2023/24 to allow for escalation over the full outlook period. Forecasts of both nominal and real price growth of the relevant inputs are provided. Our forecasts are summarised in Fig.1 and Fig 2.

**+3.9%**

Expected wage increases for  
employees in the utilities  
industry

BIS Oxford Economics expects total wage costs for the Australian Electricity, Gas, Water and Waste Services (EGWWS or 'Utilities') sector — expressed in Wage Price Index — will average 3.9% per annum over the five years to 2023/24, 0.6% higher than the national 'All Industries' average of 3.3% p.a. over the same five-year period.

Utilities wages are forecast to increase by more than the national average because of the following factors:

- the electricity, gas and water sector is a largely capital intensive industry whose employees have higher skill, productivity and commensurately higher wage levels than most other sectors.
- strong union presence in the utilities sector will ensure outcomes for collective agreements, which cover around 70% of the workforce, remain above the wage increases for the national 'all industry' average.
- increases in individual agreements (or non-EBA wages) are expected to strengthen from current weakness as broadly based economic recovery takes a foothold from early next decade.
- demand for (tight) skilled labour as investment in the sector picks up from late this decade will also be a key driver of wages going forward.
- the overall national average tends to be dragged down by the lower wage and lower skilled sectors such as the Retail Trade, Wholesale Trade, Accommodation, Cafés and Restaurants, and, in some periods, also Manufacturing and Construction. These sectors tend to be highly cyclical, with weaker employment suffered during downturns impacting on wages growth in particular. The EGWWS sector is not impacted in the same way due to its obligation to provide essential services and thus retain skilled labour.

Wages in the Australian Capital Territory utilities sector are expected to pick up slowly over the next two years (as national utilities sector wages rise) but stay below the national average due to marginally lower EBA outcomes achieved in

current agreements of major players of the territory's utilities industry. Increases in the A.C.T utilities WPI is also forecast to lag the national average over 2018/19 and 2022/23 (i.e. over ActewAGL's next regulatory control period) due to relatively weaker employment growth. This, in turn, is a result of weaker utilities-related engineering construction in the Territory compared to the rest of Australia. We are forecasting the WPI for the A.C.T utilities sector to grow by 3.7% per annum over 2018/19 to 2022/23, on average.

Of all the material escalators forecast, only steel beams and sections and non-residential building costs are expected to grow faster than the CPI inflation over ActewAGL's upcoming regulatory period.

**Fig. 1. Expected Labour Price Changes for Australia and the Australian Capital Territory**

(Per cent change, year average, year ended June)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average (g)
<b>NOMINAL LABOUR PRICE CHANGES</b>	Actuals						Forecasts		Next Regulatory Period					
Australian Capital Territory Wage Inflation														
(1) All Industries														
Average Weekly Earnings (a)	5.7	5.3	-3.7	1.1	1.9	0.5	2.6	3.3	3.1	3.3	4.1	4.3	3.7	3.7
Average Weekly Ordinary Time Earnings (b)	5.3	6.6	0.7	1.6	1.1	2.1	3.0	3.6	3.2	3.5	4.4	4.7	4.0	3.9
Wage Price Index (c)	3.3	3.7	2.4	1.7	1.7	1.8	2.4	2.8	2.6	3.1	3.6	3.8	3.3	3.3
(2) Electricity, Gas, Water and Waste Services Wages														
<b>Wage Price Index (c)</b>	<b>3.4</b>	<b>4.0</b>	<b>3.1</b>	<b>2.6</b>	<b>2.3</b>	<b>2.1</b>	<b>2.5</b>	<b>3.0</b>	<b>3.1</b>	<b>3.6</b>	<b>4.0</b>	<b>4.0</b>	<b>3.7</b>	<b>3.7</b>
Australian Wage Inflation (d)														
(1) All Industries														
Average Weekly Earnings	4.1	4.3	2.7	1.3	1.7	1.6	2.5	2.8	3.0	3.2	3.4	3.6	3.8	3.4
Average Weekly Ordinary Time Earnings	4.3	4.6	3.0	2.4	1.9	2.0	2.6	3.4	3.3	3.9	4.5	4.4	3.8	4.0
Wage Price Index	3.6	3.3	2.6	2.4	2.1	2.0	2.3	2.6	2.6	3.3	3.7	3.8	3.4	3.3
(2) Electricity, Gas, Water and Waste Services Wages														
Wage Price Index	3.5	4.2	3.2	2.8	2.4	2.2	2.6	3.2	3.3	3.8	4.1	4.2	3.9	3.9
Consumer Price Index (headline) (e)	2.3	2.3	2.7	1.7	1.4	1.7	2.0	2.2	2.5	2.5	2.5	2.5	2.5	2.3
<b>REAL LABOUR PRICE CHANGES (f)</b>														
Australian Capital Territory Wage Inflation														
(1) All Industries														
Average Weekly Earnings	3.4	3.0	-6.4	-0.6	0.5	-1.2	0.6	1.0	0.6	0.8	1.6	1.8	1.2	1.3
Average Weekly Ordinary Time Earnings	3.0	4.3	-2.0	-0.1	-0.3	0.4	1.0	1.3	0.7	1.0	1.9	2.2	1.5	1.6
Wage Price Index	1.0	1.4	-0.3	0.0	0.4	0.1	0.4	0.5	0.1	0.6	1.1	1.3	0.8	0.9
(2) Electricity, Gas, Water and Waste Services Wages														
<b>Wage Price Index</b>	<b>1.1</b>	<b>1.7</b>	<b>0.4</b>	<b>0.9</b>	<b>0.9</b>	<b>0.4</b>	<b>0.6</b>	<b>0.7</b>	<b>0.6</b>	<b>1.1</b>	<b>1.5</b>	<b>1.5</b>	<b>1.2</b>	<b>1.4</b>
Australian Wage Inflation														
(1) All Industries														
Average Weekly Earnings	1.8	2.0	0.0	-0.4	0.3	-0.1	0.5	0.5	0.5	0.7	0.9	1.1	1.3	1.1
Average Weekly Ordinary Time Earnings	2.0	2.3	0.3	0.7	0.5	0.3	0.6	1.2	0.8	1.4	2.0	1.9	1.3	1.6
Wage Price Index	1.3	1.0	-0.1	0.7	0.7	0.2	0.3	0.3	0.1	0.8	1.2	1.3	0.9	1.0
(2) Electricity, Gas, Water and Waste Services Wages														
Wage Price Index	1.2	1.9	0.4	1.1	1.0	0.5	0.7	0.9	0.8	1.3	1.6	1.7	1.4	1.5

Source: BIS Oxford Economics, Department of Employment, RBA, ABS Data

- (a) Average Weekly Earnings (AWE) for all employees (i.e. for both full-time and part-time employees). Includes overtime earnings but excludes bonus payments. It is derived by dividing weekly earnings of all adult employees by the number of employees. It is not a strict wage inflation measure but a long historical series allows for the calculation of how employee earnings has changed over time.
- (b) Average Weekly Ordinary Time Earnings for full-time adult persons. Excludes over-time earnings but includes bonuses.
- (c) Wage price index for total hourly rates of pay excluding bonuses. This is the only series published by the ABS at the state by industry level. It measures quarterly change in combined ordinary time and overtime hourly rates of pay.
- (d) Australian wages provided for comparison.
- (e) Reserve Bank of Australia forecasts to December 2019. Beyond that, we have used the mid-point of the Reserve Bank's 2 to 3 per cent inflation target range as preferred by the AER in their recent revenue determinations.
- (f) Real price changes are calculated by deducting the inflation rate from nominal price changes.
- (g) Expected average wage change for ActewAGL's next revenue determination period i.e. from 2019/20 to 2023/24 inclusive. Average inflation is calculated as a geometric mean of Reserve Bank's inflation forecasts for the next two years and assuming an inflation of 2.5% (the mid-point of the bank's 2 to 3 per cent inflation target) for the next eight years. This methodology has been adopted by the AER in their recent revenue determinations.

**Fig. 2. Material Cost Escalators**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average <sup>(2)</sup>
NOMINAL PRICE CHANGES	Actuals						Forecasts		Next Regulatory Period					
Aluminium <sup>(1)</sup>	-12.9	-10.1	1.8	16.9	-5.6	10.9	3.9	5.1	-1.6	0.7	0.5	0.8	9.7	2.0
Copper <sup>(1)</sup>	-9.4	-5.9	2.2	-0.3	-11.3	6.2	3.7	7.4	2.3	2.0	-1.8	-1.3	7.5	1.7
Oil (Brent) <sup>(1)</sup>	10.5	-1.4	12.5	-25.8	-32.3	11.2	9.7	8.4	3.3	2.5	-1.7	-1.3	7.6	2.1
Steel beams and sections PPI	1.6	2.2	-4.7	4.1	0.1	4.4	2.4	-0.5	0.0	3.7	5.5	5.8	3.7	3.7
Non-hydro electricity construction IPD: Australia <sup>(1)</sup>	3.2	2.5	2.0	-0.2	1.6	3.8	1.0	1.7	0.7	1.6	1.1	1.3	2.7	1.5
Non Residential Building Work Done IPD: A.C.T <sup>(1)</sup>	0.6	-0.3	1.8	1.5	1.5	2.4	2.5	2.8	2.8	2.9	3.3	3.3	3.0	3.1
Consumer Price Index (headline) <sup>(3)</sup>	2.3	2.3	2.7	1.7	1.4	1.7	2.0	2.2	2.5	2.5	2.5	2.5	2.5	2.5
REAL PRICE CHANGES														
Aluminium <sup>(1)</sup>	-14.8	-12.1	-0.9	15.0	-6.9	9.1	1.9	2.8	-4.0	-1.8	-2.0	-1.6	7.0	-0.5
Copper <sup>(1)</sup>	-11.5	-8.0	-0.5	-2.0	-12.5	4.4	1.7	5.1	-0.2	-0.5	-4.2	-3.7	4.9	-0.7
Oil (Brent) <sup>(1)</sup>	8.1	-3.6	9.5	-27.1	-33.2	9.4	7.6	6.1	0.8	0.0	-4.1	-3.7	4.9	-0.4
Steel beams and sections PPI	-0.7	-0.1	-7.3	2.3	-1.2	2.7	0.4	-2.7	-2.4	1.2	2.9	3.2	1.2	1.2
Non-hydro electricity construction IPD <sup>(1)</sup>	0.8	0.2	-0.7	-1.9	0.2	2.0	-0.9	-0.5	-1.8	-0.9	-1.3	-1.2	0.2	-1.0
Non Residential Building Work Done IPD <sup>(1)</sup>	-1.7	-2.6	-0.9	-0.2	0.1	0.7	0.6	0.5	0.3	0.4	0.8	0.7	0.5	0.5

Source: BIS Oxford Economics, RBA, ABARES, LME, ABS Data

(1) 2017 values are estimates

(2) Expected average wage change for ActewAGL's next revenue determination period i.e. from 2019/20 to 2023/24 inclusive.

(3) Reserve Bank of Australia forecasts to December 2019. Beyond that, we have used the mid-point of the Reserve Bank's 2 to 3 per cent inflation target range as preferred by the AER in their recent revenue determinations.

# 1. INTRODUCTION

*Project background,  
motivation and research  
agenda*

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Although ActewAGL's next revenue proposal covers the five-year period from 2019/20 to 2023/24 (inclusive), BIS Oxford Economics was asked to provide seven year forecasts covering financial years 2017/18 to 2023/24 to allow for escalation over the full outlook period. Forecasts of both nominal and real price growth of the relevant inputs are provided.

In keeping with my instructions, I confirm that I have undertaken this engagement having regard to the Guidelines for Expert Witnesses in Proceedings in the Federal Court of Australia and the requisite statement to this effect is included in Appendix B. I have been assisted in the preparation of this report by Richard Robinson, Associate Director Economics at BIS Oxford Economics, Husam El-Tarifi (Economist) and Stella McMullen (Research Analyst) at BIS Oxford Economics. Curriculum vitas of all relevant personnel are attached in Appendix C. Notwithstanding the assistance from the other three economists, the opinions in this report are my own and I take full responsibility for them.

The Australian Bureau of Statistics is the primary data source for the consumer price index, wages, employment, real gross value added and investment (including engineering construction) data, and for a range of other economic variables shown in Fig.3 and Fig. 4. The most recent wages data is for the June 2017 quarter and the latest industry employment data is for the month of May 2017. The March 2016 quarter was the latest available data for real gross value added (at the Australian level only), investment and indeed most of the economic variables in Fig. 3. The detailed engineering construction data (by state and by category) have data up to March 2017 quarter. The latest data for Gross State Product and real gross value added for state industry sectors was 2015/16. Other inflation and interest rate data were sourced from the Reserve Bank of Australia while data and information concerning enterprise agreements were obtained from the Department of Employment.

Forecasts of the economic variables in this report were mostly sourced from BIS Oxford Economics reports, including *Economic Outlook, Long Term Forecasts: 2017 – 2032, Engineering Construction: 2016/17 to 2031/32* and *Long Term Building Work Done Forecasts*, along with other unpublished forecasts and from BIS Oxford Economics internal research and modelling.

*Structure of the report*

The previous Summary section presents an overview of the outlook for the labour, materials and construction costs including numerical forecasts which are presented in summary tables.

Section 2 provides a macroeconomic outlook for Australia and the Australian Capital Territory. This section also has forecasts of key economic variables plus a discussion of the drivers and logic underpinning the forecasts. Section 2 essentially provides a context for our Australian wage forecasts including wage forecasts by state and by industry.

Section 3 discusses BIS Oxford Economics' model of wage determinations and provides forecasts of national ('all industries') wages and CPI inflation.

Section 4 has wage forecasts for the Electricity, Gas, Water and Waste Services (EGWWS) sector at the Australia level and for the Australian Capital Territory as measured by the WPI (wage price index).

Section 5 presents material price forecasts relevant to electricity distribution networks.

Appendices, which includes CVs of project key personnel.



## 2. MACROECONOMIC OVERVIEW: AUSTRALIA AND THE A.C.T.

### 2.1 AUSTRALIAN ECONOMIC OVERVIEW AND OUTLOOK

*Offsetting investment cycles  
and slow structural change  
are keeping the  
economy soft*

This is not a steady state economy. Hence the patchy quarterly growth figures which are symptomatic of our soft economy. It'll be like this through the end of the decade before non-mining business investment builds momentum sufficiently to drive stronger growth.

The structural change being underwritten by the lower dollar is just beginning. Rebuilding growth and investment in the dollar-exposed industries, and the subsequent broadening through the non-mining economy, will take time.

This is a reversal of the structural change during the mining boom when the rise in the Australian dollar (to well above parity with the US dollar) drove activity towards industries and regions servicing high levels of mining investment at the expense of non-mining dollar-exposed industries, incidentally making room for the mining boom.

*Structural change is slow*

Structural change is in any case a slow process. The driving force will be the improved competitiveness associated with a lower dollar.

The dollar is barely low enough to underwrite structural change in some sectors. It would be faster and broader if the dollar were lower. The lower the dollar, the faster the change.

Our behavioural modelling suggests a dollar in a range around \$0.75US on current commodity prices and interest rate differentials. That leaves the dollar a little too high for our liking, crimping growth in dollar-exposed industries. Our estimate is a broad competitiveness range of \$0.60-\$0.72 US.

Even so, we've seen significant recoveries in dollar-exposed industries, particularly tourism and education services. And this is just the beginning. But they're only now starting the investment phase, let alone initiating a broadening of growth through the rest of the economy. Other dollar-exposed industries will benefit, including agriculture, finance and business services, mining and even manufacturing, particularly secondary processing of food. But with the A\$ above US75 cents (or US80 cents recently), it is still too high, hampering competitiveness and growth.

There is progress, but it's slow.

*Offsetting investment cycles  
means investment is flat*

Events have moved on, but the basic cyclical drivers in the Australian economy remain intact. To put the current state of play into perspective, we need to recognise that this is not a steady-state economy. The last 15 years have been an unusual period with major structural changes and cyclical shifts, punctuated by the global financial crisis. Just as we are nearing the end of the negative impact of the fall in mining investment, and as infrastructure expenditure and non-dwelling building are picking up pace, the residential boom is coming to an end with construction now starting to fall. Even after eight years, we still haven't recovered from the shock of the GFC. Non-mining business investment has

started to pick up, but it remains patchy. It will need a switch in business psychology to investing for growth before it picks up momentum.

- The mining boom provided a significant boost to growth, initially through the strength of mining investment with a large flow on to the rest of the economy, and later, as capacity came on stream, through the strength of mining production and exports. The end of the mining investment boom came as supply caught up to demand, reversing the investment driver and initiating the current fall in mining investment. The associated fall in the dollar is again underwriting structural change, this time a reversal of the change during the mining boom.
- We are now almost through the fall in mining investment. Equipment investment has stabilised. And we are 85% through a forecast fall of 76% from the peak in mining-related construction. (That excludes aluminium smelters and heavy industry, but includes private harbours, rail and pipelines). It still leaves a negative shock over the next two years as mining construction falls by another 31% from current (lower) levels.
- Public infrastructure investment is two years into a four-year recovery followed by a plateau in spending.
- Non-residential building will be picking up over the next few years, albeit moderately, both in the public and private sectors.
- However, after a strong boom, residential building is on the threshold of a substantial decline. Intervention by APRA and the banks have taken the head off the boom - otherwise it would have gone stronger and longer with a more severe downturn to follow. That has helped to contain the damage of oversupply. Accordingly, we expect a soft landing for the housing market. Nevertheless, we expect the number of commencements to fall by a third and work done on new dwellings to fall by 22% over the next three years, with the consequent impact on growth more than offsetting the improvement in infrastructure and non-residential building.
- The GFC provided a significant shock to the economy, switching business logic away from growth and towards cutting costs and containing non-essential expenditure, with consequent impacts on business investment.
- Non-mining business investment has started to pick up. But it's patchy, with premature surges of investment in bulky goods retail, offices and capital city hotels followed by corrections. Non-mining growth and profits remain weak, impeding the recovery in non-mining business investment. We need an improvement in demand, profits and tighter capacity utilisation to drive a switch in business psychology and for non-mining business investment to pick up momentum sufficiently to be a primary driver of growth.

**Minimal risk  
of recession**

The net effect is that construction will still be falling beyond the end of the fall in mining investment. And falling residential building will keep the economy contained for several years yet.

The negative shock to GDP growth from falling mining investment has been offset by:

- Strongly increasing mining production and exports. Fortunately for Australia, much of the mining investment boom increased capacity in high-quality low-cost reserves with demand continuing to increase as capacity came on stream, albeit at lower prices, putting a floor under growth and boosting the balance of payments. Unfortunately, mining production has little flow-on to the rest of the economy, leaving many industries and regions weaker than the aggregate GDP figures suggest. Growth in mining production remains strong, continuing to underpin GDP through this weak period.
- While subdued, private consumption expenditure has continued to underpin growth. Weak wage inflation and household income have constrained expenditure growth. But households are spending more of what they earn (reducing the savings ratio) to maintain expenditure.

The upshot is that the soft growth we've seen in the aftermath of the mining boom will continue for several years yet. Accordingly,

- The labour market is a lot weaker than the unemployment figures suggest with underemployment at historical highs. That's why wages growth remains so weak, constraining household disposable income and hence expenditure and retail sales growth.
- We expect a soft landing for residential property. But the forecast fall in housing construction over the next three years will impact on the economy.
- Inflation remains contained and won't be a problem until next decade.

Overseas, conditions are improving. The US economy remains solid. Europe is recovering after its rolling recessions. The Chinese economy continues to grow, albeit with structural change. We won't have another global financial crisis while ever we remember the last one.

The sea change in the direction of interest rates has been effectively confirmed. The long phase of falling and then low rates post-GFC has given way to a phase of rising rates, with implications for the economy and investment markets.

- The US Fed has come through the first two hesitant cash rate rises with two more rate rises confirming the phase of rising rates.
- That will underpin bond rate rises in the US, flowing on to Australia.
- But the buffer between Australian and US cash rates means that the RBA can set cash rates on domestic policy considerations.

We expect RBA cash rates to stay at current levels until 2020, particularly since housing rates have already risen as banks have (thoughtfully) expanded their margins on housing loans.

*Economic recovery will be a long slow process.*

Our forecast is that GDP growth will remain below 3% for another three years, until non-mining business investment gains sufficient momentum to become a primary driver of growth. Indeed, the expected synchronisation of investment cycles in the early 2020s will see growth lift to 3.4% in 2021/22.

Structural change and cyclical shifts mean significant industry and regional differences in the performance of different parts of the economy.

**Fig. 3. Australia – Key Economic Indicators, Financial Years**

Year Ended June	Forecasts											
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>Private Investment</b>												
– Dwellings	-1.2	4.8	7.8	10.5	1.6	-1.3	-8.3	-4.5	2.6	5.6	1.2	-3.8
– New Non-Dwelling Construction (+)	10.0	0.0	-12.3	-15.5	-12.4	-4.8	-0.7	0.0	4.2	7.4	3.8	-6.6
– New Non-Dwelling Building (+)	6.7	3.3	5.1	0.1	-5.9	8.7	7.5	0.5	2.9	6.7	1.1	-7.7
– New Engineering Construction (+)	11.5	-1.3	-19.5	-24.1	-17.2	-15.8	-9.3	-0.5	5.8	8.3	7.1	-5.4
<b>Total New Private Investment (+)</b>	<b>4.0</b>	<b>-0.8</b>	<b>-2.1</b>	<b>-4.6</b>	<b>-2.1</b>	<b>-0.5</b>	<b>-1.9</b>	<b>3.2</b>	<b>8.0</b>	<b>7.8</b>	<b>1.4</b>	<b>-2.7</b>
<b>New Public Investment (+)</b>	<b>-3.5</b>	<b>-4.0</b>	<b>-7.4</b>	<b>5.5</b>	<b>8.7</b>	<b>7.7</b>	<b>2.7</b>	<b>0.1</b>	<b>-0.1</b>	<b>2.5</b>	<b>2.8</b>	<b>2.5</b>
<b>Gross National Expenditure (GNE)</b>	<b>1.5</b>	<b>1.0</b>	<b>1.3</b>	<b>1.4</b>	<b>2.1</b>	<b>2.1</b>	<b>1.5</b>	<b>2.9</b>	<b>3.9</b>	<b>4.2</b>	<b>2.5</b>	<b>1.5</b>
<b>GDP</b>	<b>2.6</b>	<b>2.6</b>	<b>2.4</b>	<b>2.7</b>	<b>1.9</b>	<b>2.5</b>	<b>2.3</b>	<b>2.9</b>	<b>2.9</b>	<b>3.4</b>	<b>2.9</b>	<b>2.4</b>
<b>Inflation and Wages</b>												
CPI (Yr Avg)- RBA forecasts (*)	2.3	2.7	1.7	1.4	1.7	2.0	2.2	2.5	2.5	2.5	2.5	2.5
Wage Price Index (Jun on Jun)(**)	2.9	2.6	2.3	2.1	1.9	2.5	2.6	2.7	3.5	3.7	3.8	3.4
Wage Price Index (Yr Avg)(**)	3.3	2.6	2.4	2.1	2.0	2.3	2.6	2.6	3.3	3.7	3.8	3.4
AWOTE (Annual Avg)(^)	4.6	3.0	2.4	1.9	2.0	2.6	3.4	3.3	3.9	4.5	4.4	3.8
<b>Employment</b>												
– Employment Growth (Yr Avg)	1.2	0.5	1.2	2.2	1.3	2.0	0.9	1.1	1.8	2.2	1.4	0.9
– Employment Growth (May on May) (%)	0.8	0.5	1.9	1.7	2.0	1.3	0.8	1.3	2.1	2.0	1.0	1.0
– Unemployment Rate (May) (%)	5.6	5.9	5.9	5.6	5.4	5.9	6.0	5.7	5.1	4.7	5.1	5.2
<b>Labour Productivity Growth</b>												
– Total	1.3	2.1	1.2	0.5	0.6	0.5	1.4	1.8	1.0	1.2	1.6	1.4
– Non-farm	1.4	2.1	1.3	0.7	0.2	0.7	1.5	1.8	1.0	1.3	1.6	1.4

Source: BIS Oxford Economics, ABS and RBA

+Expenditure on new assets (or construction work done). Excludes sales (or purchases) of second hand assets.

\*Headline CPI forecasts based on Reserve Bank of Australia's forecasts to December 2019 quarter. Beyond this, we've used the mid-point of Reserve Bank's 2 to 3 per cent inflation target range.

\*\* Based on Ordinary Time Hourly Rates of Pay Excluding Bonuses.

^ Average Weekly Ordinary Time Earnings for Full-Time Adult Persons.

In the medium to longer term, we expect a resumption of reasonably strong population growth to underwrite a higher growth rate in the Australian economy.

Over the next 20 years, implementation of technical advances associated with integration of advances in computing, communications and robotics will cause considerable disruption, improving productivity but providing challenges to the redeployment of displaced workers.

But in the near term, for businesses operating in this overall slow growth context, there are opportunities, but also risks. There is no choice but to carefully navigate our way through a cyclical and structurally changing environment.

## 2.2 AUSTRALIAN CAPITAL TERRITORY: CURRENT STATE OF PLAY AND OUTLOOK

The ACT economy staged a healthy recovery over 2015/16. Year-on-year growth was 3.4%, a marked improvement on 1.2% in 2014/15 and 0.8% in 2013/14. The key driver of growth over 2015/16 was a reversal of government's austerity drive as government consumption (or recurrent) expenditure lifted 3.5%. The austerity drive had resulted in little growth in government consumption expenditure over the previous three years, falls in employment and weak private consumption expenditure (PCE).

Government expenditure dominates the economy of the ACT, unlike the other states (except the Northern Territory). In 2015/16, government recurrent spending and public investment constituted around two-thirds of state final demand (SFD) – compared to the more usual figure of around 22% for other states.

The rebound in government spending flowed onto a pick-up in employment growth and higher PCE growth (+3.5%) in 2015/16. This momentum ran out of puff in 2016/17 as PCE growth slowed to 1.9%. However, with government consumption expenditure forecast to rise by 3.7% in 2017/18, we expect PCE to bounce back (+3.3%) this year. Meanwhile, employment growth is forecast to increase by 1.3% in 2017/18 before easing to 0.9% and 0.8% over the following two years.

Public investment lifted strongly by 11% in 2016/17 due to a strong increase in public non-dwelling building led by higher schools and university building activity, the \$110 million University of Canberra Hospital and the \$100 million ACT Supreme Court redevelopment. Public building activity will be maintained at a relatively high level in 2017/18 as work commences on two separate ACT government office developments. Partially offsetting the increases in public building will be sharp falls in public engineering construction, dragged down by lower roads, water and sewerage construction.

On the other hand, after declining over the past four years, private non-dwelling construction is set to boom, boosted by \$700 million Canberra Light Rail project (stage 1), higher electricity and telecommunications work, and increases in private non-dwelling building. This, combined with some increases in government employment, will add jobs to the economy supporting overall consumption expenditure in the state.

Meanwhile, new dwelling building rose strongly by 25.6% last year despite a significant oversupply of housing stock. As this will just worsen the oversupply, we anticipate a major downturn in dwelling investment over the next three years, which will weigh on SFD and GSP.

Overall, falls in dwelling investment and slower public investment growth should see both SFD and GSP ease over the next three years, see Fig.4. Stronger growth is forecast from early next decade as government budgets are expected to be in a better shape over this period supporting equipment and intellectual property investment (mainly software and R&D), and increased public sector employment.

**Fig. 4. Australian Capital Territory – Key Economic Indicators, Financial Years**

Year Ended June	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>Australian Capital Territory</b>														
Total Construction Activity(*)	22.6	2.4	-10.0	-12.3	-2.7	1.1	14.9	-3.6	-5.7	-15.6	2.7	7.1	6.9	7.1
State Final Demand	4.9	7.0	0.2	-1.8	2.4	3.6	5.1	3.1	2.7	1.6	2.3	3.7	5.0	2.9
Gross State Product (GSP)(**)	<b>3.5</b>	<b>1.6</b>	<b>2.6</b>	<b>0.8</b>	<b>1.2</b>	<b>3.4</b>	<b>3.5</b>	<b>2.5</b>	<b>2.3</b>	<b>2.1</b>	<b>1.9</b>	<b>3.1</b>	<b>3.8</b>	<b>2.6</b>
Employment Growth (Year Average)	2.2	0.6	1.5	-1.1	0.2	0.5	3.0	1.3	0.9	0.8	1.0	2.1	2.6	1.0
<b>Australia</b>														
Total Construction Activity(*)	6.9	14.5	5.8	1.1	-6.3	-4.9	-4.3	-2.0	-3.6	-3.2	1.3	5.3	3.2	5.3
Australian Domestic Demand	3.7	5.1	1.7	1.3	1.1	1.4	1.9	2.2	1.5	2.7	3.9	4.2	2.6	1.5
Gross Domestic Product (GDP)	2.4	3.6	2.6	2.6	2.4	2.7	1.9	2.5	2.3	2.9	2.9	3.4	2.9	2.4
Employment Growth (Year Average)	2.4	1.2	1.2	0.5	1.2	2.2	1.3	2.0	0.9	1.1	1.8	2.2	1.4	0.9

Source: BIS Oxford Economics and ABS

\* Total construction work done in constant 2014/15 prices as per the ABS Building Activity and Engineering Construction Activity in Australia surveys.

Total construction is the sum of new dwelling building (includes alterations and additions activity greater than \$10,000), new non-dwelling building and new engineering construction.

## 3. INFLATION AND WAGE FORECASTS

### 3.1 CPI INFLATION: CURRENT CONDITIONS AND FORECASTS

*Inflation contained despite large depreciation of the Australian dollar*

Consumer price inflation has been subdued for three years, despite a substantial depreciation of the Australian dollar between 2013 and 2016. Indeed, fears of deflation plastered the headlines in March 2016, as underlying inflation fell below the Reserve Bank's 2 – 3% target band for the first time since 2012. These fears were unfounded, but underlying inflation has remained below 2% since then.

Tradeables inflation has been especially weak, at just 0.4% in June 2017 and an average 0.6% over the past year. Tradeables inflation excluding the volatile categories of fuel and fruit and vegetables saw deflation of -0.1% in the June quarter. Stagnant world prices for manufactured goods, reduced transport costs, margin compression by exporters, and potential hedging by importers have combined to limit price rises for imported consumer goods. Furthermore, a slight appreciation in the Australian dollar over the past year has contributed to lower import prices, and high levels of retail and supermarket competition have reduced price growth. As a result, baseline tradeables inflation has been especially weak.

Non-tradeables inflation has shown some strength, although dismal wages growth has contained unit labour costs. Additionally, we have seen more of a pick-up in headline inflation due to increases in petrol prices since June 2016.

We do not expect inflation to approach the top of the RBA's 2-3% band for the rest of this decade. We expect the Australian dollar will depreciate over the next two years, from US 77 cents in June 2017 to US 72 cents in June 2019, as commodity prices retreat over 2017/18, the interest rate differential between the US and Australia narrows, and weaker Australian economic growth over 2018/19 weighs on the A\$. This will help stimulate inflation, as it pushes the prices of imported goods higher with a flow-on impact on final consumer prices. The headline rate will also rise at a faster pace, as oil prices come out of their troughs, pushing petrol prices higher. In addition, planned increases in tobacco excise will keep the headline rate elevated over the short to medium term.

The AUD will pick up from the end of FY 2019 as a strengthening in commodity prices is coupled with strong Australian economic growth and rising local interest rates, acting as an inflation buster by making prices of imported goods cheaper. Longer-term, we believe inflation containment will re-emerge as a policy challenge.

*Deflation in freight costs has more than offset rises in import prices, but the tide is turning*

Freight costs have generally subtracted from inflation over the past two years due to lower petrol prices resulting from sharp falls in oil prices. In the June 2014 quarter, Brent Oil was US\$110 per barrel. In less than two years, Brent Oil collapsed to hit a low of US\$35 per barrel in March 2016. This huge decline drove significant falls in petrol prices across the globe and weakened the Australian CPI.

We believe higher prices of imported consumer durables, including clothing, footwear and furniture, were largely offset by reduced freight costs of transporting these goods from ports to warehouses and to retail stores.



Accordingly, retailers were able to keep their margins despite growing price competition. Lower freight costs also helped keep a lid on increases in prices of domestically produced goods.

However, in the past year we have seen a turnaround in oil prices. In June 2016, Brent Oil prices rebounded – increasing by 33.3%. Following a slight withdrawal in September, prices rose 9.3% in the December quarter and a further 7.9% in the March quarter to reach US\$54 per barrel. The rise in oil prices in the December and March quarters led to increases in automotive fuel prices of 6.7% and 5.7% respectively, contributing 0.2 percentage points to the headline CPI in each quarter, however prices fell 2.5% in the June quarter. The increase in oil prices has also fed through to shipping and freight costs. This manifested itself in final retail prices, adding to broad based inflationary pressures. However, oil prices fell back again in the June quarter and we are expecting further declines in September, before oil and fuel prices return to growth.

*Food inflation surprisingly low*

**The supermarket price war continues to hold back food inflation, even though adverse weather conditions have driven up some fresh fruit and vegetable prices**

Adverse weather conditions in major growing areas have resulted in shortages of certain fruits and vegetables, and consequently higher prices. Vegetable prices rose 13.1% through the year to March, and fruit prices have risen 12.2% over the same period.

Despite the destruction of crops caused by Cyclone Debbie in March, fruit and vegetable prices fell 1.7% in the June quarter due to lower prices for seasonal fruits and the ongoing supermarket price war holding back price growth. High levels of competition in the retail sector are also holding back inflation. We may see further weakness in fruit and vegetable prices as some of the produce prices pushed up by Cyclone Debbie reverse in the next two quarters.

*Meanwhile, non-tradeables inflation is stronger, despite weak wages growth*

Non-tradeables inflation reached a strong 2.7% in the June 2017 quarter, despite weak demand and wages growth. The rises have largely come from one-off factors and key service sectors, including education, the recent increase in excise tax for cigarettes and tobacco, housing, and seasonal items such as pharmaceutical products. The March 2017 quarter showed the wage price index slowing to 1.9% growth through-the-year – the lowest level on record – while Average Weekly Ordinary Time Earnings increased by 2.2% in the December 2016 quarter.

### 3.1.1 CPI inflation forecasts

#### **Headline CPI expected to rise at a faster pace as oil prices rebound ...**

We are forecasting the Brent Oil price in \$US to fall for the next quarter, before continuing its slow and steady recovery. This will contribute to a measured climb in automotive fuel prices, and subsequently headline inflation. We may also see some flow on effects on underlying inflation.

#### **... significant increases in utility prices will boost headline inflation...**

We expect a significant increase in utilities prices will boost headline inflation in the September quarter, and potentially beyond as the jump in wholesale energy prices is passed on to consumers.



### **... and hefty increases in tobacco excise will keep headline rate inflation elevated**

Also putting upward pressure on the headline rate will be further planned increases in tobacco excise over the next three years. Tobacco excise are legislated to increase by 12.5% each year on September 1 2017 through to September 1 2020. This combined with the bi-annual indexation of the tobacco excise to average weekly ordinary time earnings, and aligning the tax treatment of roll your own tobacco and cigarettes, will add significantly to the headline CPI.

### **However, softness in the economy will offset pressures on headline inflation ...**

Offsetting these inflationary pressures will be soft growth in output, wages, employment and household incomes over the next two years, and contained inflationary expectations.

### **... Overall, inflation will stay within the Reserve Bank's target band for the next decade**

We are expecting inflation to stay within the Reserve Bank's target band for the next decade. Overall, soft growth in output, wages, employment, and household incomes will continue to contain underlying inflation, despite a weakening Australian dollar over the next 24 months. It is our view that inflation will gradually increase to 2.9% in June 2022 as economic growth increases, employment and wage growth strengthen, and inflationary pressures begin to build. Falling oil prices over the next quarter will slightly weaken headline inflation. However, we are forecasting a rebound beginning in the December 2017 quarter. This will result in a measured bounce back in fuel prices. Additionally, headline inflation will be boosted by further hikes in tobacco taxes and some pass through of higher import prices from the depreciation of the A\$. Accordingly, we are expecting headline CPI to rise to reach 2.9% in 2022.

*Inflation containment will re-emerge as a policy challenge in the long run*

Headline CPI inflation is forecast to average 2.6% per annum over the decade to 2032. This is slightly higher than the mid-point of the Reserve Bank's 2 to 3% target range.

In the future, declining population growth and an ageing population may result in a reduction of the labour supply. This means we may see both temporary skilled and general labour shortages emerge, as demand for labour continues to rise, and a transitory increase in wage inflationary pressures. However, in the long-term, the labour market will adjust back to equilibrium – as higher wages attract additional workers (from home and abroad) into the labour market. Hence, although demographic changes may lead to periods of cost-push inflation in the future, these periods will be transient and the labour market will adjust in the long run, especially as the progressive nature of the changes allows time for adaptation.

*Have low inflation expectations become entrenched?*

Inflation expectations influence realised inflation. Inflation rates in advanced economies have been low and under many central bank's targets since the GFC. This has caused declines in inflation expectations. Such an extended period of low inflation could result in low inflation expectations becoming entrenched, as people expect that future inflation will remain low. Furthermore, as central banks have consistently met their inflation targets, they have

increased their credibility to meet such targets and lowered long-term inflation expectations. Low and anchored inflation expectations may have changed the shape in the Phillips curve, resulting in a substantial decline in its slope. There have even been cries that the Phillips curve, which demonstrates the inverse relationship between inflation and unemployment, is “broken”. If central banks have successfully anchored inflation expectations lower, this may mean inflation remains contained in the future. However, prolonged deviations of inflation from the target may eventually de-anchor expectations. It is our view that inflation expectations are more anchored to 2.5% than they were 5-10 years ago. Hence, when inflation containment re-emerges as a policy challenge in the future, the monetary response needed to steer the economy back to equilibrium will be a lot smaller than what it once was

### 3.2 WAGES OUTLOOK

The key determinants of nominal wages growth are consumer price inflation, productivity, the relative tightness of the labour market (i.e. the demand for labour compared to the supply of labour), and compositional changes in the labour market following the end of the mining investment boom. Price inflation, in turn, is influenced by unit labour costs – referred to as ‘wage-push inflation’ or more broadly ‘cost-push inflation’. Other factors which influence price inflation include the exchange rate, the stage of the business cycle and the level of competition in markets generally.

*Wages growth now at its slowest pace in two decades – and will remain soft*

Wage growth in Australia remains very weak, due to spare capacity in the labour market and lower inflation outcomes and expectations. In March 2017, wages growth through-the-year slackened to 1.9% - its lowest recorded level. However, this suggests that we are at the bottom of the current wage cycle, with wage increases for employees stabilising in the past three quarters. In 2016/17, year average growth for the WPI is expected to have fallen to 2.0%, while Average Weekly Ordinary Time Earnings is lifted from 1.9% in 2015/16 to 2.3% in 2016/17.

Trends in wage growth by pay-setting method have diverged in recent years. Aggregate wage growth has slowed significantly since December 2012 due to a collapse in wage increases awarded to the 47% of non-managerial full-time workers who are on individual agreements (contracts) with their employers. In contrast, workers subject to collective agreements have maintained wage rises above 3% pa. However, with union membership at an all-time low, the proportion of the full-time non-managerial workforce on collective agreements has fallen from 42% in 2010 to 37% in 2016. Workers on individual agreements, whose wage rises respond more to prevailing labour market conditions, have been at the mercy of slackness in labour market and the end of the mining investment boom.

Low wages growth is both a product of and key cause of low underlying inflation. Low wages are keeping business costs down and thus muting upward price pressures, while a significant section of pay deals are being set in line with CPI inflation – especially for employees on awards.

*Spare capacity in the labour market is a fundamental contributor to low wage growth.*

The unemployment rate and underemployment rate are key indicators of the amount of slack in the labour market. The unemployment rate has been trending down in recent quarters, but it remains above the NAIRU, (the Non-

Accelerating Inflationary Rate of Unemployment or the 'natural rate of unemployment') of around 5%, and therefore represents spare capacity in the labour market. Compounding this, Australia's underemployment rate<sup>1</sup> is now at historic highs – averaging 8.7% over the past year. The high underutilisation rate – the sum of unemployment and underemployment – reflects considerable slack in the labour market, which limits the bargaining power of workers and reduces pressure on wages. Spare capacity is likely to continue due to weak demand and investment, as well as the continued casualisation of the workforce.

Spare capacity in the labour market is most apparent in the mining industry. During the mining investment boom, wages in mining and mining-related industries soared, with mining wages reaching peaks of 6.7% annual growth in 2008 and 5.2% in 2012. Since moving to the less labour intensive production phase, workers have faced pay cuts, employment has dropped, and workers have been forced to move into lower paying jobs outside of the mining industry, which has also lead to a skills mismatch between workers and jobs. This transition has caused a sharp reduction in wage growth in these industries, with growth in mining wages slowing to 0.6% y/y in March 2017 and the construction, professional services, and transport sectors also seeing steep reductions.

Additionally, the compositional shifts within the labour market following the end of the mining investment boom have weighed on total wage growth in Australia. Workers have been pushed out of mining – an industry with comparatively high wages – and into lower paid industries; this structural change in employment away from mining has weighed on total wage growth.

The latest data suggests that we are at the bottom of the current wage cycle, with wage increases for employees stabilising over the past three quarters. We are forecasting wage growth will be largely stable over the next 18 months and then begin to accelerate, in line with improvements in the labour market. WPI inflation is expected to rise 2.5% through the year to June 2018. We expect wage growth will level off over 2018/19 in response to weakening in economic growth, lower CPI and a rising unemployment rate.

Stronger growth in wages is anticipated in 2019/20 as economic growth strengthens and the unemployment rate falls – with the unemployment rate forecast to fall below 5% by the end of 2021. Indeed, we are expecting improvements in employment, profits and investment from early next decade as non-mining business investment and other positive forces drive economic growth. Reduced slack in the labour market, meaning workers can bargain for better pay rises, combined with rising price inflation next decade will push up wages growth over between 2019/20 and 2021/22. Wages growth (in year average terms) is expected to rise further and peak at 3.7% for WPI (4.5% for AWOTE) in 2021/22 – which would be the strongest result in WPI terms in nearly a decade. This is still lower than the 4.1% annual growth average for WPI over 2005/06 to 2008/09, when the unemployment rate was between 4.2% and 5.0% and employment growth was strong.

We expect  
that wage  
growth has  
levelled off,  
and we will  
now rise out  
of its trough

<sup>1</sup> Underemployment comprise all employed persons who are willing and available to work additional hours, and were not fully employed (worked less than 35 hours) in the reference week.

*In the long run, wage growth is determined by productivity growth and inflation.*

We expect that WPI growth will level off at its long run level of around 3.6% from 2022, driven by stable non-farm productivity growth of around 1.3% and inflation of around 2.6%.

Over the next decade and beyond, slowing growth in the labour supply may result in the emergence of both transient skilled and general labour shortages that temporarily drive up wages. However, these shortages will be transitory and the labour market will adjust in response to this shortage, through increased net overseas migration or a rise in the participation rate e.g. through delayed retirement.

Over the long term, there are three other key forces worth mentioning. Firstly, a greater global supply of workers and increased cross-national labour market connectedness may erode the bargaining power of workers in developed countries, contributing to lower wages. De-unionisation will also continue to decrease the bargaining power of workers, contributing to temporary periods of lower wage growth. Thirdly, there is a risk that further automation of the workforce may reduce employment and lead to wage losses. Negative effects are expected to be unevenly distributed, with blue-collar workers seeing the worst effects. However, some jobs will benefit from increased automation, so it is difficult to predict at an aggregate level what the impact will be. A literature review suggests that one more robot per thousand workers reduces wages by 0.25 – 0.5%, based on industrial robot usage between 1990 and 2007 on US local labour markets.

### **BIS Oxford Economics Wage Growth Model**

BIS Oxford Economics' model of wage determination is based on the analysis of expected future wage movements in the three main methods of setting pay, as each discrete pay setting method has its own influences and drivers (see Fig. 9). The main pay setting categories and their key determinants are:

- Employees under awards have their pay determined by Fair Work Australia in the annual National Wage case. When determining pay increases, Fair Work Australia aim to maintain the standard of living of those employed on awards by providing a safety net of fair minimum wages. Hence, they focus on the overall performance of the domestic economy, taking into account productivity, business competitiveness, inflation and employment growth. This means that increases in the Federal Minimum Wage are usually based on recent CPI growth along with Fair Work Australia's view on short term future conditions for the Australian economy. From 1 July 2016, the minimum wage has increased by 2.4% following a 2.5% rise on 1 July 2015. This brings the Australian minimum wage to \$672.70 per week. At the all industries level, 16% of all non-managerial full-time employees (data excludes those in agriculture, forestry and fishing) have their pay rises determined by this method.
- For employees under collective agreements (representing 37% of all employees), their pay is determined through enterprise bargaining, and wage increases are influenced through a combination of recent CPI, inflationary expectations, profitability levels of relevant enterprises, business conditions, and the short term economic outlook. Workers unions can also play a significant part in negotiations, especially unions with a good position in industrial relations through strong membership. With the average duration of these agreements currently two to three years, BIS Oxford Economics use the most recent agreements formalised in recent quarters as a basis for our near term forecasts. Beyond that, collective agreements are based on our expectations of economic conditions.
- The remaining 47% of employees have their pay set by individual arrangements, whether it be individual contracts or some other form of salary agreement, which may include incentive based schemes. Similar to the minimum wage and collective agreements, inflation and inflationary expectations have a strong influence on agreements, as well as the strength of the labour market. Individual arrangements are skewed towards more skilled workers, so the balance between demand and supply in skilled labour can be a large influence.

**Fig. 5. Wages and Prices: Australia, year-average growth**

Year Ended June	Average Weekly Ordinary Time Earnings <sup>(1)</sup>		Wage Price Index (All Industries)		Official Headline CPI <sup>(2)</sup>	
	\$/week	%CH	Index	%CH	Index	%CH
2000	765.4		71.7		69.4	
2001	804.2	5.1	74.2	3.5	73.6	6.0
2002	847.4	5.4	76.7	3.3	75.7	2.9
2003	890.0	5.0	79.3	3.5	78.0	3.0
2004	931.6	4.7	82.2	3.6	79.9	2.4
2005	972.9	4.4	85.3	3.7	81.8	2.4
2006	1 017.5	4.6	88.7	4.1	84.4	3.2
2007	1 054.1	3.6	92.2	3.9	86.9	3.0
2008	1 106.1	4.9	96.1	4.1	89.8	3.4
2009	1 166.5	5.5	100.0	4.1	92.6	3.1
2010	1 231.3	5.6	103.1	3.1	94.8	2.3
2011	1 282.5	4.2	107.0	3.8	97.7	3.1
2012	1 338.1	4.3	110.9	3.6	100.0	2.3
2013	1 400.3	4.6	114.6	3.3	102.3	2.3
2014	1 442.2	3.0	117.6	2.6	105.0	2.7
2015	1 477.3	2.4	120.4	2.4	106.8	1.7
2016	1 505.0	1.9	123.0	2.1	108.3	1.4
2017	1 535.8	2.0	125.4	2.0	110.1	1.7
Forecasts						
2018	1 576.3	2.6	128.3	2.3	112.3	2.0
2019	1 630.3	3.4	131.6	2.6	114.8	2.2
2020	1 683.8	3.3	135.0	2.6	117.7	2.5
2021	1 749.1	3.9	139.4	3.3	120.6	2.5
2022	1 828.5	4.5	144.6	3.7	123.7	2.5
2023	1 909.6	4.4	150.0	3.8	126.7	2.5
2024	1 982.3	3.8	155.1	3.4	129.9	2.5
Compound Annual Growth Rates <sup>(3)</sup>						
1990-2000	3.9				2.1	
2000-2010	4.9		3.7		3.2	
2010-2017	3.2		2.8		2.2	
2017-2024	3.7		3.1		2.4	
2019-2024	4.0		3.3		2.5	

Source: BIS Oxford Economics, ABS

(1) Average Weekly Ordinary Time Earnings for full-time adults. Data is year ended May (available only mid month of quarter).

(2) Headline CPI forecasts based on Reserve Bank of Australia forecasts to December 2019 quarter. Beyond this, we've taken the mid-point of the RBA's 2-3% target range as preferred by the AER.

(3) CAGR (Compound Annual Growth Rates) for 2019-2024 is CAGR for 2019/20 to 2023/24 inclusive (ie next

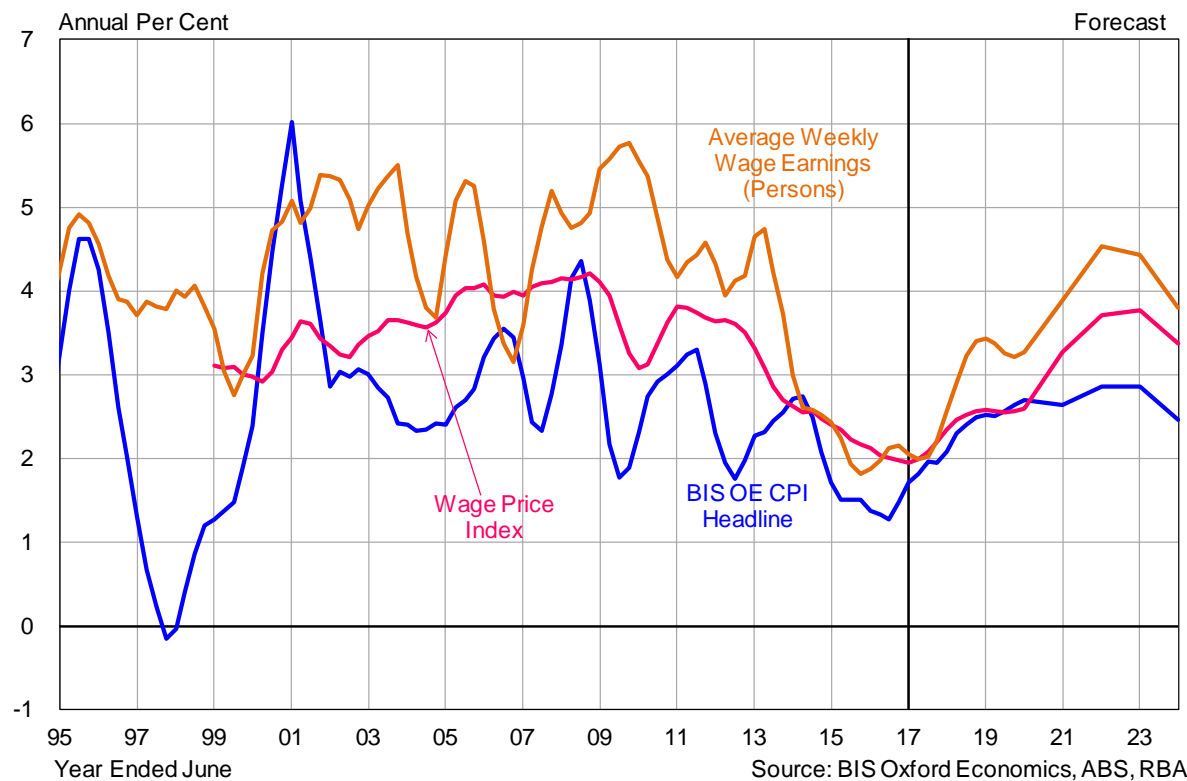
Revenue Determination period).

**Fig. 6. Methods of Setting Pay, Industry May 2010**

Proportion of Full Time Adult Employees (%)

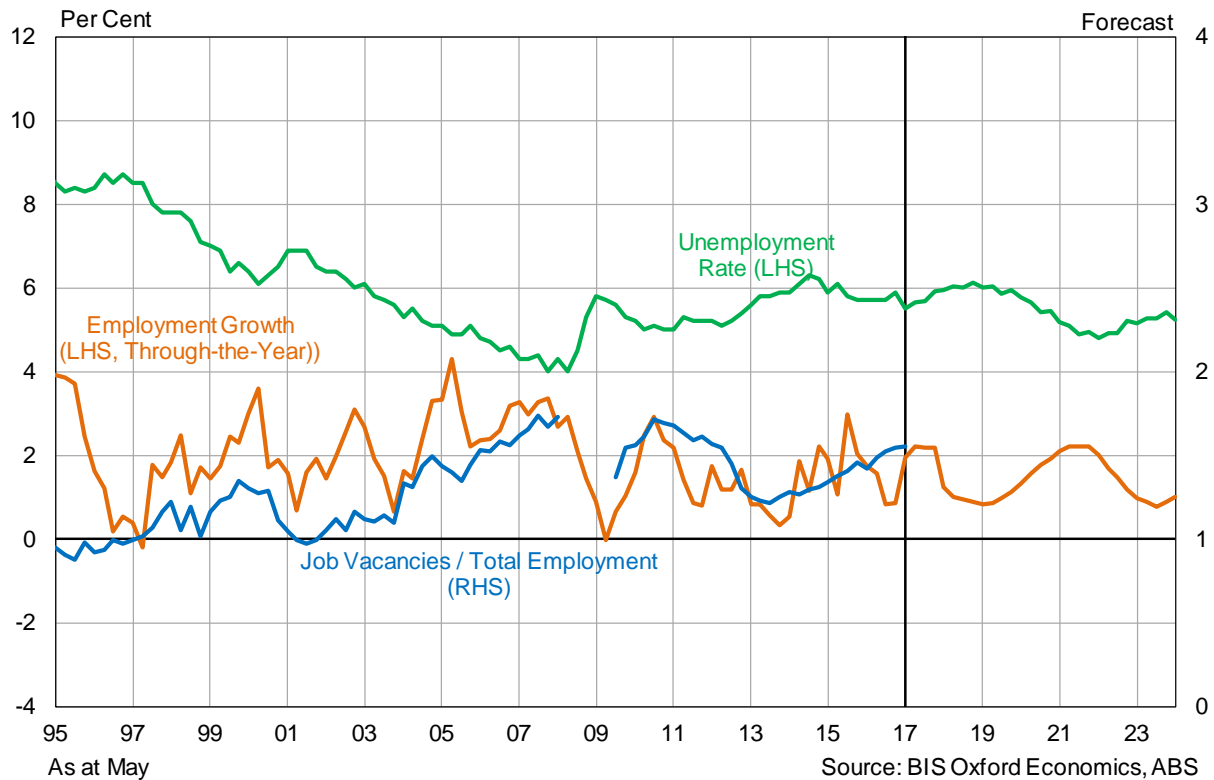
Industry (ANZSIC 2006)	Award Only	Collective Agreements	Individual Arrangements	All Methods of Pay Setting
Mining	1.8%	42.1%	56.1%	100.0%
Manufacturing	9.1%	29.3%	61.6%	100.0%
<b>Electricity, Gas, Water &amp; Waste Services</b>	<b>2.7%</b>	<b>67.7%</b>	<b>29.6%</b>	<b>100.0%</b>
Construction	6.7%	26.3%	67.0%	100.0%
Wholesale trade	7.7%	11.3%	81.0%	100.0%
Retail trade	16.6%	20.7%	62.7%	100.0%
Accommodation and Food Services	31.7%	23.0%	45.3%	100.0%
Transport, Postal and Warehousing	3.9%	55.9%	40.2%	100.0%
Information Media and Telecommunications	3.6%	29.0%	67.4%	100.0%
Finance and Insurance Services	1.5%	39.9%	58.7%	100.0%
Rental, Hiring and Real Estate Services	13.1%	10.4%	76.5%	100.0%
Professional, Scientific and Technical Services	2.2%	11.5%	86.3%	100.0%
Administrative and Support Services	15.9%	30.1%	54.1%	100.0%
Public Administration and Safety	1.2%	92.5%	6.3%	100.0%
Education and Training	2.9%	88.9%	8.1%	100.0%
Health Care and Social Assistance	12.3%	66.6%	21.1%	100.0%
Arts and Recreation Services	10.4%	40.1%	49.4%	100.0%
Other Services	15.7%	11.0%	73.3%	100.0%
<b>All Industries 2010 Survey</b>	<b>8.1%</b>	<b>41.9%</b>	<b>50.0%</b>	<b>100.0%</b>

Source: ABS

**Fig. 7. Australia: Wages and Prices**




**Fig. 8. Employment and Unemployment**



**Fig. 9. Wages Growth All Industries: Australia**

(By Workforce Segmented by Pay Setting Method)

Year Ended June	% of Workforce in 2010	Year Average Per Cent Change																
		2010 2011 2012 2013 2014 2015 2016 2017								Forecasts						Average	Average	
										2018	2019	2020	2021	2022	2023	2024	2018-24	2020-24
Wage Price Index																		
Awards Only	8.1%	0.7	3.5	3.4	2.9	2.6	3.0	2.5	2.4	3.3	2.7	2.6	2.7	2.9	3.1	2.9	2.9	2.8
Collective Agreements	41.9%	3.9	3.8	3.8	3.6	3.5	3.3	3.2	3.2	3.1	3.2	3.2	3.3	3.6	3.8	3.7	3.4	3.5
Individual Arrangements	50.0%	2.8	3.8	3.5	3.1	1.9	1.5	1.1	0.8	1.4	1.9	2.0	3.3	4.0	3.9	3.2	2.8	3.3
Wage Price Index (a)	100%	3.1	3.8	3.6	3.3	2.6	2.4	2.1	2.0	2.3	2.6	2.6	3.3	3.7	3.8	3.4	3.1	3.3
Compositional Effects + Bonuses,etc																		
		2.5	0.4	0.7	1.3	0.4	0.0	-0.2	0.1	0.3	0.9	0.7	0.6	0.8	0.7	0.4	0.6	0.6
AWOTE (b)	100%	5.6	4.2	4.3	4.6	3.0	2.4	1.9	2.0	2.6	3.4	3.3	3.9	4.5	4.4	3.8	3.7	4.0

Source: BIS Oxford Economics, Haver Analytics, Department of Employment

(a) Ordinary time hourly rates of pay for full-time adults.

(b) Average Weekly Ordinary Time Earnings for Full-time Adults (excludes overtime but includes bonuses).



## 4. EXPECTED WAGE CHANGES FOR THE EGWWS INDUSTRY

In this section, we provide an outlook for the WPI (wage price index) for the EGWWS (electricity, gas, water and waste services) sector at the national level. In addition, we provide a discussion and forecasts of the WPI for the Australian Capital Territory EGWWS industry.

*Wages growth in the EGWWS sector is invariably higher than the total Australian national (all industry) average.*

The wage price index growth has consistently been above the national average since the index's inception in 1997 and averaged 0.6% higher over the decade to 2013 (see Fig 10, Fig 14 and Fig 16). While growth in average weekly ordinary time earnings (AWOTE) of the electricity, gas, water and waste services sector has displayed considerably more volatility over the past two decades (mainly related to compositional effects), AWOTE growth in the sector has also usually been higher than the national average over the past six years (see Fig 11 and Fig 14).

To a large extent, this has been underpinned by strong capital works program in the utilities sector since the beginning of the last decade (resulting in robust employment growth over the same period), strong competition from the mining and construction workers for similarly skilled labour and the powerful influence of unions in the utilities sector.

In addition, the electricity, gas and water sector is a largely capital intensive industry whose employees have higher skill, productivity and commensurately higher wage levels than most other sectors. Further, the overall national average tends to be dragged down by the lower wage and lower skilled sectors such as the Retail Trade, Wholesale Trade, Accommodation, Cafés and Restaurants, and, in some periods, also Manufacturing and Construction (see Fig 10 and Fig 11). These sectors tend to be highly cyclical, with weaker employment suffered during downturns impacting on wages growth in particular. The EGWWS sector is not impacted in the same way due to its obligation to provide essential services and the need to retain skilled labour.

### 4.1 STRONG UNION PRESENCE IN THE UTILITIES SECTOR WILL ENSURE COLLECTIVE AGREEMENTS REMAIN ABOVE THE ALL INDUSTRY AVERAGE

*Strong Union presence in the industry.*

Despite the relative weakness of the economy over 2008/09 and 2009/10, wages remained elevated in the utilities sector due to the comparative strength of demand for skilled labour, and particularly because of the strength of unions in what is an essential service sector. The industrial relations reality is that there are powerful utilities unions such as the Communications, Electrical and Plumbing Union (CEPU) and Australian Services Union (ASU), which have a history of achieving high wage outcomes for the sector. Other unions active in the sector include the Australian Workers Union (AWU).

The key elements of the utilities wage forecast are set out in Fig 13. This shows that collective bargaining dominates the pay setting arrangements in the utilities sector, while the relative absence of workers relying on (often) low-increase awards (set in the National Wage Case) means the overall average for total

utilities wages will generally be higher than the all industries average. Over the past five years, the outcomes from collective agreements have been 0.9% higher, on average, than the all industries average, at 3.4% compared to 2.5%. We expect this trend to continue over the outlook period, with collective agreements achieving average increases of 3.7% for the utilities sector, compared to 3.1% for all industries.

BIS Oxford Economics analysis shows collective agreements in the EGWWS sector have been on average around 1.5% higher than CPI inflation over the decade to 2010 (excluding the effects of GST introduction in 2000/01). In the five years to 2010 when the labour market was very tight, collective agreements were on average 1.7% above the CPI. Given the strength of unions in the sector and a still strong demand for skilled labour over the next four years (and possibly beyond) than for most of the 2000s, collective agreements are forecast to remain around 1.2% above the 'official' CPI over the forecast period.

As well as increases in CPI, increases in collective agreements under enterprise bargaining are also influenced by a combination of inflationary expectations, the recent profitability of relevant enterprises, current business conditions and the short-term economic outlook, and, as mentioned, by the industrial relations 'strength' of relevant unions. Because the average duration of agreements runs for two-to-three years, BIS Oxford Economics bases its near-term forecasts of Enterprise Bargaining Agreement (EBA) wages on the strength of recent agreements, which have been 'formalised' or 'lodged' (i.e. an agreement has been 'reached' or 'approved') over recent quarters.

We expect EBA outcomes to show modest growth over the next two years but remain above inflation and the 'all industries' average given that the demand for skilled labour remains strong and particularly given the recent high enterprise agreement outcomes in the construction sector. This will influence negotiations in the EGWWS sector, as some skills can be transferable. A mild recovery in EBA outcomes will occur over subsequent years as the labour market begins to tighten, unemployment falls and business profitability improves. However, forecast growth in wage agreements of around 3.7% per annum remains below that experienced over much of the past decade.

#### **4.2 DEMAND FOR SKILLED LABOUR ALSO A KEY DRIVER OF UTILITIES WAGES**

Employment growth in the utilities sector over the 2003/04 to 2013/14 inclusive averaged 5.4% per annum, the second fastest growth among the 18 main industry sectors behind the Mining sector (11% per annum), with Health and Social Assistance employment growth third at 4.1% per annum.

We believe investment in the sector, particularly engineering construction, has been the key driver of employment growth in the sector over the past decade. Fig. 18 illustrates this relationship, and shows employment has a stronger relationship with utilities engineering construction rather than utilities output.

As well as the pick-up in infrastructure work, this strong growth in utilities employment has also been associated with an ongoing reversal in the sharp losses in employment seen through the 1990s. Privatisation and rationalisation were the drivers of the job cuts in the 1990s, but in some cases the desire to be

streamlined left only a 'skeleton' crew in-house for routine operations and emergency disruptions, while capital and maintenance works (both minor and major) tended to be contracted out. Capital expenditure in the utilities sector during the 1990s was also relatively low, and this may also have contributed to weaker employment.

The emergence of skilled labour shortages across many industry sectors over the 2000s encouraged utilities businesses to boost their in-house response capabilities, while increasing competition shifted the business focus towards customer service in order to enhance product differentiation with an accompanying increase in employment not directly related to the provision of electricity, gas, and water services. The entrance of new players in the sector (such as new businesses related to renewable energy provision, new private electricity and gas businesses, etc.) has also exacerbated this situation as it has increased demand for all occupations within this sector.

The strong growth in employment in the Utilities, Mining and Construction sectors, and the associated sustained strong demand for skilled labour, contributed to above average wages growth in all three sectors. At the same time, the overall labour market tightened considerably during the 2000s, with the unemployment rate falling from around 7% in 2001 to 5% by 2005, and to 4% in early 2008. This saw skilled labour shortages worsen and employers in these sectors bid up wages.

That being said, the global financial crisis and the subsequent slowing in the economy over 2008/09 reduced labour demand resulting in excess capacity. This, in turn, has since kept a lid on wage pressures.

However, with the economy expected to return to balanced and trend growth early next decade, employment growth will outpace population and labour force growth and the unemployment rate is expected to drop below 5% by early next decade. Hence, from early 2020s, we expect to again witness the re-emergence of skilled labour shortages and competition for scarce labour particularly from the construction sector, which will push up wage demands in the utilities sector.

*Individual agreements will strengthen from their current weakness*

Increases in individual agreements (or non-EBA wages) are primarily influenced by the strength of the labour market (especially the demand-supply balance of skilled labour), inflationary expectations, the recent profitability of relevant enterprises (which influences bonuses and incentives, etc.), current business conditions and the short-term economic outlook.

Wage growth from individual agreements rose by just 1.7% over the year to June 2015 and slowed to 0.3% last year, reflecting general weakness in the economy and the full-time labour market. However, this is expected to turn around from this year, albeit gradually. Stronger increases are expected from the beginning of next decade in line with a strengthening economy. Businesses will find they must 'meet the market' on remuneration in order to attract and retain staff and we expect wages under individual arrangements to continue to rise through the middle of the next decade.

Utilities wage growth is forecast to continue to outpace national 'all industries' average

Overall, BIS Oxford Economics expects total wage costs for the Australian Electricity, Gas, Water and Waste Services (EGWWS or 'Utilities') sector — expressed in Average Weekly Ordinary Time Earnings (AWOTE) — will average 4.2% per annum over the five years to 2023/24, 0.2% higher than the national 'All Industries' AWOTE average of 4% per annum over the same five-year period (see Fig.14). In terms of underlying wages growth in the 'utilities' sector for total Australia — expressed in wage price index (WPI) terms — BIS Oxford Economics is forecasting an average of 3.9% per annum (also 0.6 percentage points higher than the national 'All Industries' WPI average of 3.3% per annum) over the five years to 2023/24.

Our AWOTE forecasts are higher due to compositional effects. Apprentices, trainees and numbers of new staff have increased markedly over recent years, across the electricity, gas and water sector generally. Given slower growth in employment numbers over the next decade, it is likely that there will be overall up skilling of the existing workforce, which will see a commensurate movement by much of the workforce into higher grades (i.e. on higher pay), resulting in higher earnings per employee.

Wages in the Australian Capital Territory utilities sector are expected to pick up slowly over the next two years (in line with the national utilities sector average) but stay below the national average due to marginally lower EBA outcomes achieved in current agreements of major players of the territory's utilities industry. Increases in the A.C.T utilities WPI is also forecast to lag the national average over 2018/19 and 2022/23 (i.e. over ActewAGL's next regulatory control period) due to relatively weaker employment growth. This, in turn, is a result of weaker utilities-related engineering construction in the Territory compared to the rest of Australia.

We are forecasting the WPI for the A.C.T utilities sector to grow by 3.7% per annum over 2018/19 to 2022/13, on average.

**Fig. 10. Wage Price Index Growth by Industry Sector and by State**

Sector	% of Total Employment May'17											Five-Year Average (YE June)
		Jun'12	Jun'13	Jun'14	Jun'15	Jun'16	Sept'16	Dec'16	Mar'17	Jun'17		
Private		3.7	3.4	2.6	2.3	2.0	1.9	1.9	1.8	1.8	2.4	
Public		3.2	3.2	2.8	2.6	2.5	2.4	2.3	2.3	2.3	2.7	
Industry												
Mining	1.9%	4.4	4.5	2.8	2.3	1.6	1.3	1.2	1.0	1.0	2.4	
Manufacturing	7.4%	3.8	3.2	2.9	2.7	2.4	2.2	2.1	2.0	2.0	2.6	
Electricity, Gas, Water and Waste Services	1.0%	3.5	4.2	3.3	2.8	2.4	2.4	2.3	2.3	2.2	3.0	
Construction	9.0%	4.1	3.3	3.0	2.1	1.6	1.6	1.6	1.6	1.7	2.3	
Wholesale Trade	3.3%	4.4	4.4	2.2	2.2	1.9	1.9	1.9	2.0	1.8	2.5	
Retail Trade	10.1%	2.9	2.5	2.6	2.2	2.4	2.4	2.2	2.0	1.9	2.3	
Accommodation and Food Services	7.3%	3.4	2.5	2.3	2.6	2.3	2.3	2.3	2.3	2.3	2.4	
Transport, Postal and Warehousing	5.1%	3.5	3.5	2.5	2.4	2.2	2.2	2.1	2.1	2.0	2.5	
Information Media and Telecommunications	1.8%	3.7	2.9	2.4	2.5	2.2	2.1	2.0	1.9	1.9	2.4	
Finance and Insurance Services	3.6%	4.0	3.2	2.7	2.7	2.6	2.4	2.2	2.1	2.1	2.6	
Rental, Hiring and Real Estate services	1.7%	3.8	2.8	2.7	2.3	1.6	1.4	1.3	1.3	1.3	2.1	
Professional, Scientific and Technical Services	8.5%	4.5	3.5	1.9	1.9	1.6	1.6	1.5	1.5	1.4	2.1	
Administration and Support Services	3.3%	3.3	3.3	2.5	1.9	1.4	1.3	1.3	1.3	1.4	2.1	
Public Administration and Safety	6.6%	3.1	3.5	2.9	2.2	2.2	2.1	2.1	2.2	2.2	2.6	
Education	8.0%	3.7	2.8	2.9	3.0	2.7	2.5	2.5	2.4	2.4	2.8	
Health Care and Social Assistance	13.0%	2.9	3.3	2.9	2.7	2.5	2.4	2.4	2.4	2.4	2.8	
Arts and Recreation Services	1.8%	3.7	2.9	2.7	3.0	2.4	2.2	2.1	2.0	2.0	2.6	
Other Services	4.1%	4.2	3.2	2.4	2.2	2.2	2.2	2.1	2.0	1.9	2.4	
State/Territory												
New South Wales	31.7%	3.6	3.1	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.4	
Victoria	25.8%	3.5	3.3	2.7	2.7	2.3	2.2	2.0	1.9	1.9	2.6	
Queensland	19.7%	3.7	3.0	2.7	2.4	2.0	1.9	1.9	1.9	2.0	2.4	
South Australia	6.7%	3.4	3.3	3.3	2.5	2.3	2.3	2.2	2.2	2.2	2.7	
Western Australia	11.2%	4.3	4.0	2.8	2.2	1.9	1.8	1.7	1.5	1.4	2.4	
Tasmania	2.0%	3.4	3.2	2.3	2.5	2.2	2.2	2.2	2.2	2.2	2.5	
Northern Territory	1.1%	3.8	3.3	2.7	2.6	2.2	2.2	2.1	2.1	2.2	2.6	
Australian Capital Territory (ACT)	1.8%	3.3	3.7	2.4	1.7	1.7	1.8	1.9	1.9	1.8	2.3	
Total All <sup>(1,2)</sup>	100%	3.6	3.3	2.6	2.4	2.1	2.0	2.0	2.0	2.0	2.5	

Source: BIS Oxford Economics, Haver Analytics

(1) Measures changes in the price of labour. Ordinary hourly rates of pay (excludes overtime and bonuses)

(2) Excludes Agriculture, Forestry &amp; Fishing

**Fig. 11. AWOTE Growth by Industry Sector: Australia**

Industry Sector	% of Total Employment Jun'17	Average Weekly Earnings <sup>(1)</sup>												Five-Year YE Jun Average	
		\$ / Week Jun'17	Annual Percent Change (year-on-year)												
			Jun '07	Jun '08	Jun'09	Jun'10	Jun'11	Jun'12	Jun'13	Jun'14	Jun'15	Jun'16	Jun'17		
Mining	1.9%	2 551	6.5	8.1	7.3	7.2	6.5	6.2	6.8	4.2	1.5	1.7	0.6	3.0	
Manufacturing	7.4%	1 329	4.7	4.2	5.3	1.8	2.8	2.3	3.9	4.8	4.3	1.0	-1.5	2.5	
<b>Electricity, gas, water and waste services</b>	1.0%	<b>1 783</b>	<b>3.7</b>	<b>2.7</b>	<b>6.1</b>	<b>7.6</b>	<b>9.1</b>	<b>2.5</b>	<b>6.1</b>	<b>2.0</b>	<b>0.7</b>	<b>3.5</b>	<b>4.3</b>	3.3	
Construction	9.0%	1 555	4.9	9.2	7.8	7.7	5.0	3.5	4.3	2.1	2.2	1.4	2.2	2.4	
Wholesale trade	3.3%	1 490	3.7	3.8	5.9	2.2	3.9	11.3	4.6	0.5	0.3	0.9	2.5	1.8	
Retail trade	10.1%	1 124	3.4	5.6	2.7	5.5	0.9	3.2	4.0	2.5	4.0	4.2	0.8	3.1	
Accommodation and food services	7.3%	1 099	8.2	3.8	2.5	4.5	3.5	3.7	5.5	3.9	-0.1	2.3	2.6	2.8	
Transport, postal and warehousing	5.1%	1 557	0.6	0.5	4.5	5.3	8.9	7.0	5.9	1.8	2.8	5.2	1.4	3.4	
Information media and telecommunications	1.8%	1 851	6.3	7.7	4.3	5.4	4.6	3.0	4.8	1.7	1.0	4.2	4.3	3.2	
Finance and insurance	3.6%	1 833	3.4	3.8	2.8	4.6	6.1	2.0	4.3	1.1	4.3	4.6	1.6	3.2	
Rental hiring and real estate services	1.7%	1 433	2.4	8.6	6.5	3.8	-2.1	0.4	6.6	-1.1	-1.7	5.7	5.1	2.9	
Professional, scientific and technical services	8.5%	1 806	2.5	7.8	5.8	5.6	4.5	4.3	3.2	3.8	2.7	-1.1	2.2	2.2	
Administration and support services	3.3%	1 352	1.6	7.2	7.1	7.4	-0.1	-1.9	7.9	1.7	-1.5	-0.4	4.9	2.5	
Public administration and defence	6.6%	1 592	3.7	3.7	5.4	6.7	5.7	3.2	4.7	3.5	0.9	1.8	1.5	2.5	
Education and training	8.0%	1 682	3.7	3.0	4.6	5.6	4.8	4.6	3.8	3.3	2.7	2.4	3.6	3.2	
Health and social assistance	13.0%	1 508	3.6	4.4	4.7	6.2	2.5	2.8	5.3	3.9	2.4	2.5	3.4	3.5	
Arts and recreational services	1.8%	1 459	-0.6	6.4	7.2	4.1	5.6	3.5	5.5	4.6	-1.0	3.6	6.0	3.7	
Other services	4.1%	1 206	2.0	3.3	6.8	3.1	3.6	2.7	4.2	-0.4	0.8	5.5	3.8	2.8	
Total All Industries <sup>(2)</sup>	100%	1 543	3.6	4.9	5.5	5.6	4.2	4.3	4.6	3.0	2.4	1.9	2.0	2.8	

(1) Average weekly ordinary time earnings for full-time adult persons.

Source: BIS Oxford Economics, ABS

(2) Excludes Agriculture, Forestry and Fishing sector

**Fig. 12. Federal Wage Agreements – Collective Agreements by Industry**

Average Annualised Wage Increase, Year-ended December

Selected Industry (ANZSIC 2006)													Average 2005-2016
	Average Annualised Wage Increase <sup>(1)</sup>												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
<b>Electricity, Gas, Water and Waste Services</b>	<b>4.3</b>	<b>4.3</b>	<b>4.3</b>	<b>4.6</b>	<b>4.6</b>	<b>4.5</b>	<b>4.2</b>	<b>4.1</b>	<b>3.7</b>	<b>3.6</b>	<b>3.3</b>	<b>2.9</b>	<b>4.0</b>
Agriculture, Forestry and Fishing	2.8	3.0	2.9	3.4	3.7	3.3	3.5	3.5	3.5	3.1	2.9	2.8	3.2
Mining	3.6	3.7	3.9	4.2	4.2	4.1	4.2	4.4	4.3	4.1	3.2	2.7	3.9
Manufacturing	4.2	4.1	4.1	4.0	3.9	3.7	3.7	3.8	3.6	3.3	3.0	2.8	3.7
Construction	4.5	4.7	4.7	4.6	5.1	5.2	4.5	5.0	5.0	4.9	4.0	3.1	4.6
Wholesale Trade	4.1	3.5	3.6	4.0	4.0	3.7	3.6	3.6	3.6	3.2	3.0	4.4	3.7
Retail trade	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.2	3.2	3.0	3.1	2.9	3.3
Accommodation and Food Services	3.3	3.4	3.2	3.4	3.9	3.7	3.7	3.5	3.3	3.0	2.9	3.0	3.4
Transport , Postal and Warehousing	3.9	3.8	3.9	4.0	4.1	3.8	3.6	3.7	3.7	3.5	3.3	3.2	3.7
Information Media and Telecommunications	3.1	3.1	3.2	3.6	3.6	3.4	3.3	3.4	3.4	3.3	2.8	2.8	3.2
Financial and Insurance Services	4.2	4.1	3.7	3.8	3.6	3.4	3.4	3.1	3.1	3.1	3.0	2.9	3.4
Rental, Hiring and Real Estate Services	4.4	4.5	4.6	4.3	3.5	3.7	3.8	4.2	4.2	4.1	3.4	3.4	4.0
Professional, Scientific and Technical Services	4.0	3.7	3.9	4.3	4.2	4.1	4.0	4.0	4.0	3.9	3.5	3.1	3.9
Administrative and Support Services	3.5	3.4	3.5	3.6	3.5	3.6	3.6	4.1	4.0	3.9	3.6	3.2	3.6
Public Administration and Safety	4.4	4.0	4.0	4.1	3.9	3.6	3.5	3.6	3.5	3.5	3.2	2.8	3.7
Health Care and Social Assistance	3.9	4.1	3.9	3.9	4.0	3.8	3.8	3.2	3.0	3.1	3.0	3.3	3.6
Education and Training	5.0	4.5	4.8	4.2	4.3	4.3	4.4	3.9	3.5	3.7	3.7	3.4	4.1
Arts and Recreation Services	3.8	3.6	3.8	4.0	3.8	3.3	3.2	3.3	3.2	3.3	3.2	2.8	3.4
Other Services	3.4	3.7	3.8	3.6	3.6	3.6	3.6	4.0	3.6	3.2	2.9	2.9	3.5
ALL INDUSTRIES	4.2	4.0	4.0	3.9	3.9	3.9	3.8	3.6	3.5	3.4	3.2	3.2	3.7

1) Current agreements in December of each year.

Source: Department of Employment

**Fig. 13. Electricity, Gas, Water and Waste Services Forecasts – Australia**

Year Ended June	% of Workforce in 2010	Year Average Per Cent Change (a)																		
											Forecast								Average	Average
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2018-24	2020-24		
Awards Only	2.7%	0.7	3.2	3.4	2.9	2.6	3.0	2.5	2.4	3.3	2.7	2.6	2.7	2.9	3.1	2.9	2.9	2.8		
Collective Agreements	67.7%	4.6	4.2	4.1	3.9	3.6	3.3	3.2	3.0	3.1	3.5	3.5	3.7	4.0	4.2	4.0	3.7	3.9		
Individual Arrangements	29.6%	4.2	4.1	2.1	5.0	2.4	1.7	0.5	0.3	1.4	2.5	2.7	4.0	4.6	4.4	3.8	3.3	3.9		
<b>Wage Price Index (Ord. Time)</b>	<b>100%</b>	<b>4.3</b>	<b>4.2</b>	<b>3.5</b>	<b>4.2</b>	<b>3.3</b>	<b>2.8</b>	<b>2.4</b>	<b>2.2</b>	<b>2.6</b>	<b>3.2</b>	<b>3.3</b>	<b>3.8</b>	<b>4.1</b>	<b>4.2</b>	<b>3.9</b>	<b>3.6</b>	<b>3.9</b>		
Compositional Effects + Bonuses,etc		3.2	4.9	-1.0	1.9	-1.2	-2.2	1.1	2.1	0.5	0.5	0.4	0.2	0.4	0.3	0.3	0.4	0.3		
<b>AWOTE (Persons)(a)</b>	<b>100%</b>	<b>7.6</b>	<b>9.1</b>	<b>2.5</b>	<b>6.1</b>	<b>2.0</b>	<b>0.7</b>	<b>3.5</b>	<b>4.3</b>	<b>3.1</b>	<b>3.7</b>	<b>3.7</b>	<b>4.0</b>	<b>4.5</b>	<b>4.5</b>	<b>4.2</b>	<b>4.0</b>	<b>4.2</b>		

(a) Average Weekly Ordinary Time Earnings for Full-time Adult Persons (excludes overtime but includes bonuses).

**Fig. 14. Average Weekly Ordinary Time Earnings and Wage Price Index Total Australia and Electricity, Gas, Water and Waste Services Sector (Year Average Growth)**

Year Ended June	Average Weekly Ordinary Time Earnings <sup>(1)</sup>				Wage Price Index <sup>(2)</sup>			
	All Industries		Electricity, Gas, Water and Waste Services		All Industries		Electricity, Gas, Water and Waste Services	
	\$	%CH	\$	%CH	Index	%CH	Index	%CH
1999	741.4	3.5	827.1	3.9	69.6	3.1	65.7	3.0
2000	765.4	3.2	866.8	4.8	71.7	3.0	68.2	3.8
2001	804.2	5.1	918.5	6.0	74.2	3.5	70.8	3.8
2002	847.4	5.4	981.0	6.8	76.7	3.3	73.8	4.2
2003	890.0	5.0	1,001.3	2.1	79.3	3.5	76.8	4.1
2004	931.6	4.7	1,056.7	5.5	82.2	3.6	79.9	4.1
2005	972.9	4.4	1,090.6	3.2	85.3	3.7	83.3	4.3
2006	1 017.5	4.6	1,110.9	1.9	88.7	4.1	87.6	5.2
2007	1 054.1	3.6	1,151.9	3.7	92.2	3.9	91.8	4.8
2008	1 106.1	4.9	1,182.8	2.7	96.1	4.1	95.7	4.2
2009	1 166.5	5.5	1,255.5	6.1	100.0	4.1	100.0	4.5
2010	1 231.3	5.6	1,350.8	7.6	103.1	3.1	104.4	4.3
2011	1 282.5	4.2	1,473.9	9.1	107.0	3.8	108.7	4.2
2012	1 338.1	4.3	1,510.0	2.5	110.9	3.6	112.5	3.5
2013	1 400.3	4.6	1,602.5	6.1	114.6	3.3	117.3	4.2
2014	1 442.2	3.0	1,635.0	2.0	117.6	2.6	121.1	3.2
2015	1 477.3	2.4	1,646.0	0.7	120.4	2.4	124.5	2.8
2016	1 505.0	1.9	1,704.4	3.5	123.0	2.1	127.5	2.4
2017	1 535.8	2.0	1,777.3	4.3	125.4	2.0	130.3	2.2
Forecasts								
2018	1 576.3	2.6	1,832.8	3.1	128.3	2.3	133.7	2.6
2019	1 630.3	3.4	1,900.5	3.7	131.6	2.6	137.9	3.2
2020	1 683.8	3.3	1,970.4	3.7	135.0	2.6	142.5	3.3
2021	1 749.1	3.9	2,048.3	4.0	139.4	3.3	147.8	3.8
2022	1 828.5	4.5	2,140.8	4.5	144.6	3.7	154.0	4.1
2023	1 909.6	4.4	2,237.2	4.5	150.0	3.8	160.5	4.2
2024	1 982.3	3.8	2,331.7	4.2	155.1	3.4	166.8	3.9
Compound Annual Growth Rates <sup>(2)</sup>								
2000-2010	4.9		4.5		3.7		4.3	
2010-2017	3.2		4.0		2.8		3.2	
2017-2024	3.7		4.0		3.1		3.6	
2019-2024	4.0		4.2		3.3		3.9	

Source: BIS Oxford Economics, ABS

(1) Earnings per person for full-time adults. Data is year ended May (available only mid month of quarter).

(2) CAGR (Compound Annual Growth Rates) for 2019-2024 is the annual growth for 2019/20 to 2023/24 inclusive i.e. next Revenue Determination period.



**Fig. 15. EGWWS WPI – A.C.T. versus Australia, Year Average Growth**

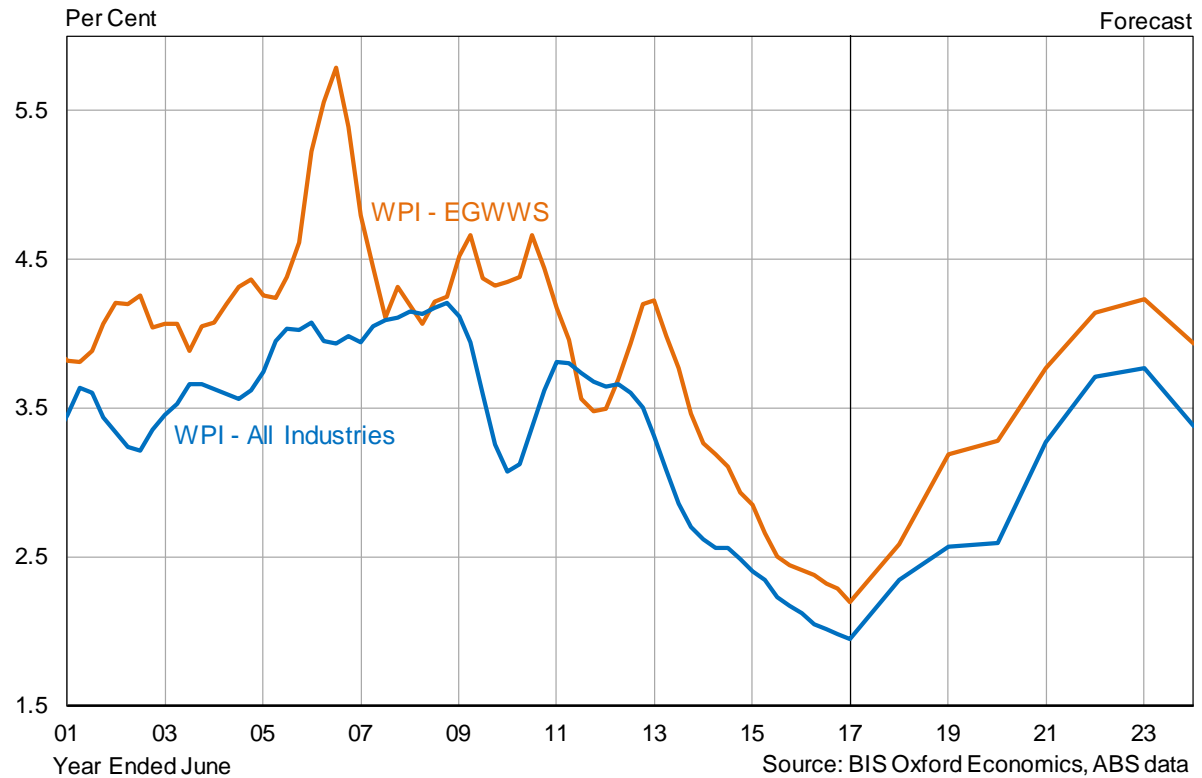
Year Ended June	EGWWS Wage Price Index		EGWWS Wage Price Index		Consumer Price Index (^)	
	Australian Capital Territory		Australia		Australia	
	Index	%CH	Index	%CH	Index	%CH
1999			65.7	3.0	67.8	1.3
2000			68.2	3.8	69.4	2.4
2001			70.8	3.8	73.6	6.0
2002			73.8	4.2	75.7	2.9
2003			76.8	4.1	78.0	3.0
2004			79.9	4.1	79.9	2.4
2005			83.3	4.3	81.8	2.4
2006			87.6	5.2	84.4	3.2
2007			91.8	4.8	86.9	3.0
2008			95.7	4.2	89.8	3.4
2009	100.0		100.0	4.5	92.6	3.1
2010	104.1	4.1	104.4	4.3	94.8	2.3
2011	108.2	3.9	108.7	4.2	97.7	3.1
2012	111.9	3.4	112.5	3.5	100.0	2.3
2013	116.3	4.0	117.3	4.2	102.3	2.3
2014	119.9	3.1	121.1	3.2	105.0	2.7
2015	123.1	2.6	124.5	2.8	106.8	1.7
2016	125.9	2.3	127.5	2.4	108.3	1.4
2017	128.5	2.1	130.3	2.2	110.1	1.7
Forecasts						
2018	131.8	2.5	133.7	2.6	112.3	2.0
2019	135.7	3.0	137.9	3.2	114.8	2.2
2020	139.9	3.1	142.5	3.3	117.7	2.5
2021	144.9	3.6	147.8	3.8	120.6	2.5
2022	150.8	4.0	153.9	4.1	123.7	2.5
2023	156.8	4.0	160.5	4.2	126.7	2.5
2024	162.7	3.7	166.8	3.9	129.9	2.5
Compound Annual Growth Rates						
2000-2010			4.3		3.2	
2010-2017	3.1		3.2		2.2	
2017-2024	3.4		3.6		2.4	
2020-2024	3.7		3.9		2.5	

Source: BIS Oxford Economics, ABS

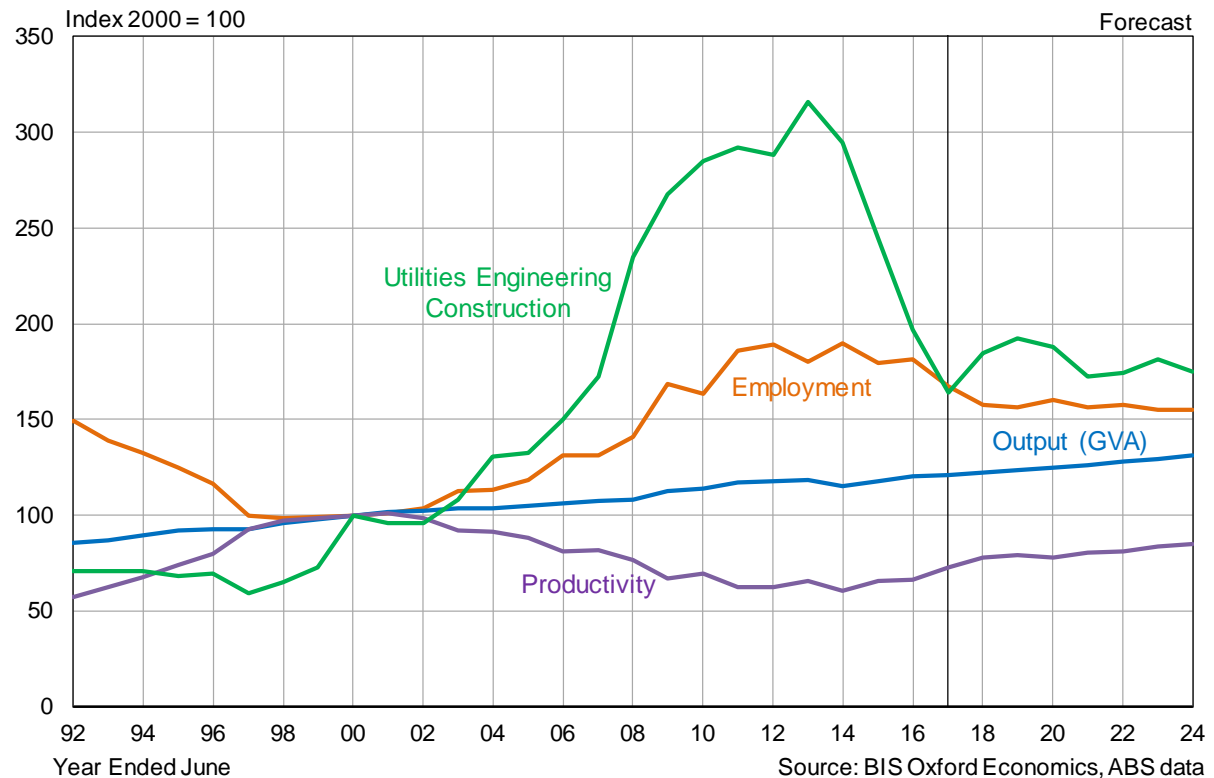
(^\*) Headline CPI forecasts based on Reserve Bank of Australia forecasts to December 2019 quarter. Beyond this, we've taken the mid-point of the RBA's 2-3% target range.



**Fig. 16. Wage Price Index - Australia All Industries and Electricity, Gas, Water and Waste Services**



**Fig. 17. Australia – Utilities Employment, Output and Investment**



## 5. MATERIALS COST FORECASTS

ActewAGL asked BIS Oxford Economics to provide price escalation factors for key inputs to various asset classes including aluminium, copper, oil and steel. In addition, ActewAGL requested BIS Oxford Economics to generate construction (both engineering and non-residential building) cost forecasts over its upcoming regulatory period. These forecasts will be used by ActewAGL to develop its capex forecasts over the next regulatory period. Forecasts of key capex input cost categories are summarised in Fig. 19 below.

**Fig. 18. Material Cost Escalators – Summary Table**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average <sup>(2)</sup>
<b>NOMINAL PRICE CHANGES</b>	Actuals						Forecasts		Next Regulatory Period					
Aluminium <sup>(1)</sup>	-12.9	-10.1	1.8	16.9	-5.6	10.9	3.9	5.1	-1.6	0.7	0.5	0.8	9.7	2.0
Copper <sup>(1)</sup>	-9.4	-5.9	2.2	-0.3	-11.3	6.2	3.7	7.4	2.3	2.0	-1.8	-1.3	7.5	1.7
Oil (Brent) <sup>(1)</sup>	10.5	-1.4	12.5	-25.8	-32.3	11.2	9.7	8.4	3.3	2.5	-1.7	-1.3	7.6	2.1
Steel beams and sections PPI	1.6	2.2	-4.7	4.1	0.1	4.4	2.4	-0.5	0.0	3.7	5.5	5.8	3.7	3.7
Non-hydro electricity construction IPD: Australia <sup>(1)</sup>	3.2	2.5	2.0	-0.2	1.6	3.8	1.0	1.7	0.7	1.6	1.1	1.3	2.7	1.5
Non Residential Building Work Done IPD: A.C.T <sup>(1)</sup>	0.6	-0.3	1.8	1.5	1.5	2.4	2.5	2.8	2.8	2.9	3.3	3.3	3.0	3.1
Consumer Price Index (headline) <sup>(3)</sup>	2.3	2.3	2.7	1.7	1.4	1.7	2.0	2.2	2.5	2.5	2.5	2.5	2.5	2.5
<b>REAL PRICE CHANGES</b>														
Aluminium <sup>(1)</sup>	-14.8	-12.1	-0.9	15.0	-6.9	9.1	1.9	2.8	-4.0	-1.8	-2.0	-1.6	7.0	-0.5
Copper <sup>(1)</sup>	-11.5	-8.0	-0.5	-2.0	-12.5	4.4	1.7	5.1	-0.2	-0.5	-4.2	-3.7	4.9	-0.7
Oil (Brent) <sup>(1)</sup>	8.1	-3.6	9.5	-27.1	-33.2	9.4	7.6	6.1	0.8	0.0	-4.1	-3.7	4.9	-0.4
Steel beams and sections PPI	-0.7	-0.1	-7.3	2.3	-1.2	2.7	0.4	-2.7	-2.4	1.2	2.9	3.2	1.2	1.2
Non-hydro electricity construction IPD <sup>(1)</sup>	0.8	0.2	-0.7	-1.9	0.2	2.0	-0.9	-0.5	-1.8	-0.9	-1.3	-1.2	0.2	-1.0
Non Residential Building Work Done IPD <sup>(1)</sup>	-1.7	-2.6	-0.9	-0.2	0.1	0.7	0.6	0.5	0.3	0.4	0.8	0.7	0.5	0.5

Source: BIS Oxford Economics, RBA, ABARES, LME, ABS Data

(1) 2017 values are estimates

(2) Expected average wage change for ActewAGL's next revenue determination period i.e. from 2019/20 to 2023/24 inclusive.

(3) Reserve Bank of Australia forecasts to December 2019. Beyond that, we have used the mid-point of the Reserve Bank's 2 to 3 per cent inflation target range as preferred by the AER in their recent revenue determinations.

### 5.1 ALUMINIUM, COPPER AND OIL COMMODITIES

Forecasts for aluminium, copper and oil commodity prices have been sourced from the Energy & Metals Consensus Forecasts as the AER prefers the use of broad based market forecasts of commodities. This publication provides price forecasts measured in US\$ per metric tonne. Quarterly forecasts are provided for two financial years, followed by calendar year forecasts for the subsequent three years to 2021. Long term forecasts are provided as a five-year average. We have assumed linear growth beyond the final annual forecast to yield annual forecasts over the remaining three-year period (i.e. for the 2021/22 to 2023/24 period).

These forecasts are denominated in US\$. Hence, we have converted them to Australian dollars. Due to the lack of 'official' forecasts over the long-term, we have applied BIS Oxford Economics in-house exchange rate forecasts. See Fig. 20 for a comparison of exchange rate forecasts by different agencies.

**Fig. 19. US\$/A\$ Exchange Rate Forecast Comparison**

	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24
BIS Oxford Economics	0.728	0.754	0.740	0.738	0.749	0.791	0.844	0.801	0.740
ABARES <sup>1</sup>	0.728	0.754	0.733	0.738	0.740	0.740	0.740		
Office of the Chief Economist	0.728	0.744	0.740	0.735	0.720	0.720	0.720		
OECD	0.728	0.743	0.746	0.741					

1: Longer term assumptions between 2018/19 and 2021/22 are from March quarter edition of the Agricultural Commodities publication

We have sought out other exchange rate forecasts in order to provide a ‘consensus’ forecast, including exchange rate assumptions from The Office of the Chief Economist (OCE) and ABARES.

Our own exchange rate forecasts are higher than the assumptions presented from external sources. We note that this means the Australian dollar commodity forecasts would be more conservative than if ABARES or OCE assumptions were adopted.

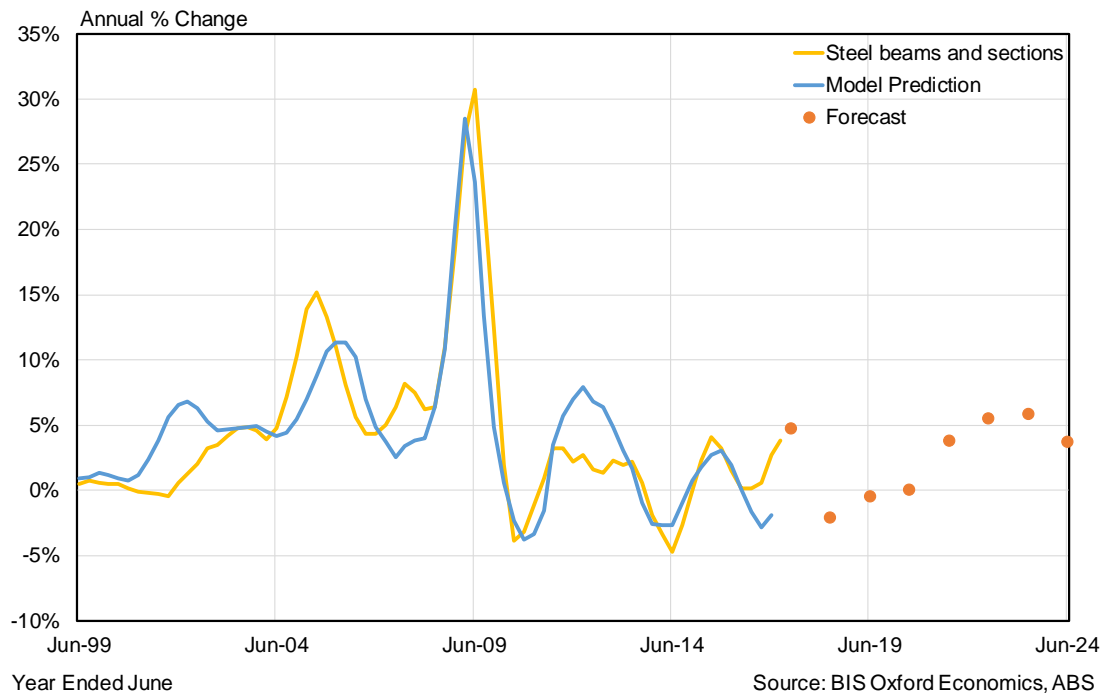
## 5.2 STEEL POLES

We selected the “Steel Beams and Sections” producer price index (PPI) as a benchmark for steel prices relevant to ActewAGL’s business. We believe this is an appropriate benchmark as it excludes reinforcing steel (used in concrete) and sheet metal products. Hence, we expect the steel products PPI to be a good proxy for the price of steel used in the construction of metal poles.

The Steel Beams and Sections PPI was forecast via the application of a statistical model, driven primarily by changes in the prices of key inputs: coking coal, iron ore, and wages.

As with other market driven commodities, we explicitly used consensus forecasts of coking coal and iron ore. We converted US\$ prices to A\$ using our own ‘in-house’ exchange rate forecasts. Similarly, we used our company wage forecast to develop steel price forecasts.

**Fig. 20. Steel Prices (nominal)**



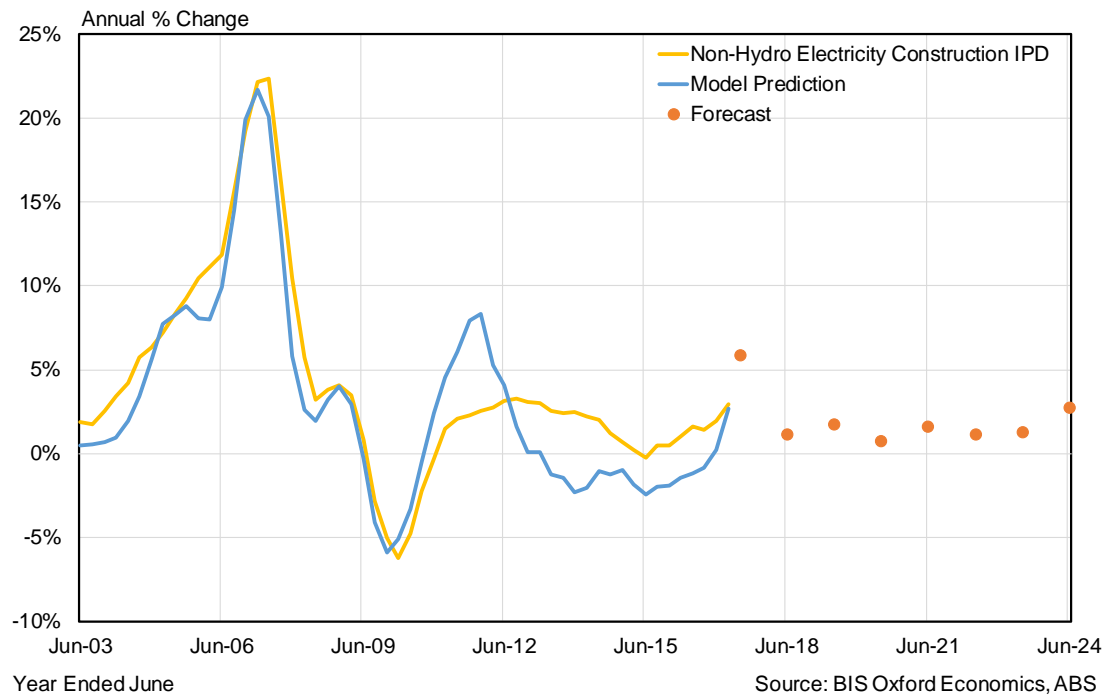
Over the 2019/20 to 2023/24 regulatory period, we forecast real price growth of 1.2% per annum. This is driven broadly by growth in iron ore, coking coal, and wage price growth.

### 5.3 CONSTRUCTION COSTS

The Non-Hydro Electricity Construction IPD obtained from the ABS as a special request is a measure of construction costs in the electricity sector (which covers transmission, distributions and generation related construction). The ABS has provided us with some guidance as to the weightings of the key inputs that one should apply in order to build the index from 'ground up'. Note that the IPD is an output index and hence includes contractor margins along the supply chain. An input based index does not include contractor margins and therefore will not correlate perfectly with the ABS IPD measure. Nonetheless, the approximation is fairly good as it picks up all the turning points in the construction cost cycles.

Forecasts of construction costs have been based on our wage forecasts for the construction sector together with our forecasts of the main raw materials for the manufacture of the other key inputs (such as copper, steel and wages) of the overall index. Where possible, we sourced the commodity price forecasts from Energy and Metals Consensus Forecasts publication.

**Fig. 21. Non-hydro electricity IPD (nominal)**



Over the 2019/20 to 2023/24 regulatory period, we forecast real price growth of -0.9% per annum for the series.

## 6. APPENDIX A: TERMS OF REFERENCE

To be inserted by ActewAGL

## **7. APPENDIX B: STATEMENT OF COMPLIANCE WITH EXPERT WITNESS GUIDELINES**

I have read the Guidelines for Expert Witnesses in Proceedings of the Federal Court of Australia and confirm that I have made all inquiries that I believe are desirable and appropriate and that no matters of significance that I regard as relevant have, to my knowledge, been withheld from the Court from this report.

## 8. APPENDIX C: CURRICULUM VITAE OF KEY PERSONNEL

### **Kishti Sen – Senior Economist**

As a senior economist, Kishti is responsible for modelling and forecasting the Australian economy at the national, state, regional and industry level. Kishti has also undertaken modelling work for a variety of bespoke projects including policy evaluation studies, industry economic contribution research, and macroeconomic consultancy for award negotiations, submissions to regulatory authorities and industry peak body proposals to government. Kishti is also the co-author of BIS Oxford Economics highly regarded subscription publications including the monthly Economic Outlook Bulletin and the annual Long Term Forecasts Report.

Prior to joining BIS Oxford Economics in 2007, Kishti was with the Reserve Bank of Fiji for 15 years where he held the position of Research Assistant/Research Analyst/Economist/Senior Economist and Senior Manager through internal rotations and staff promotions. As a senior economist, he built and managed the Reserve Bank's research and analytical work programme. In addition, he was a member of several high profile policy and forecasting committees including the Macro Policy Committee — the think tank for fiscal policy — and the Monetary Policy Committee which advised the Governor directly on interest-rate settings.

Kishti has a PhD in Economics from the University of Sydney.

### **Richard Robinson – Senior Economist and Associate Director - Economics**

Richard Robinson has been employed with BIS Oxford Economics since 1986.

Richard is the company's principal economic forecaster, being largely responsible for the short term economic forecasts presented at BIS Economics' half yearly conferences in March and September. He contributes forecasts and analysis to the regular subscription services, Economic Outlook and Long Term Forecasts.

Richard regularly analyses and forecasts resources investment and civil engineering construction activity, and production of manufactures, consumer goods and commodities. In this work, he has developed considerable industry expertise in the construction, manufacturing, agriculture, services, commodity and resources sectors of the Australian and state economies.

Richard has also been involved in a wide range of consultancy and private client projects including formulating end-use sector demand models for forecasting product demand, project evaluation studies, cost-benefit analysis, assessments of individual property markets and analysing the consistency of escalators in contracts. Some other projects have included analysing and forecasting freight tonnages; a study of the repair and maintenance market; the preparation of economic arguments for the National Wage Case for a private industry group; regular analysis and detailed short and long term forecasts of



economic variables in a number of overseas countries; and contributing discussion papers to CEDA (Committee for Economic Development of Australia).

Richard holds a Bachelor's Degree in Commerce with Honours from the University of Wollongong.

**Husam El-Tarifi – Economist**

Husam works across the Economics, the Infrastructure and Mining and the Asset Sales units at BIS Oxford Economics where he regularly contributes to the firm's renowned reports and is particularly valued in working through large datasets.

Husam has worked on privately commissioned studies for the finance, infrastructure, not-for-profit, government, utilities and mining sectors. He has been involved in the construction of a wide variety of quantitative models and has also provided model audit and validation services.

Husam joined BIS Oxford Economics in 2013 after obtaining his Bachelor of Economics degree with honours from the University of New South Wales.

**Stella McMullen – Economic Analyst**

Stella joined BIS Oxford Economics in 2016 after studying Economics and Mathematics at the University of Auckland, New Zealand. Stella works across Economics, Infrastructure and Mining and Asset Sales units.