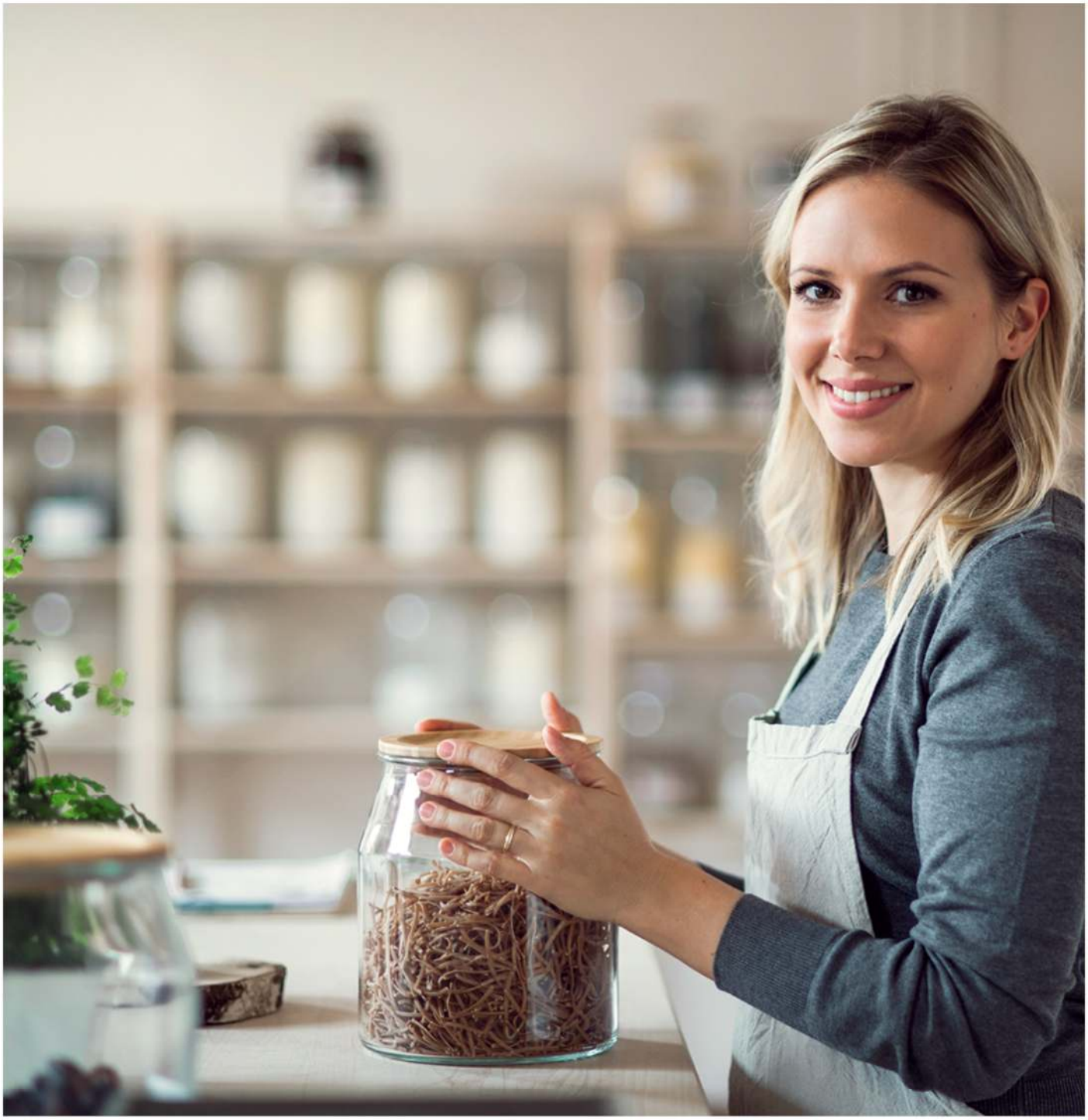

Jemena Gas Networks (NSW) Ltd

Revised 2020-25 Access Arrangement Proposal

Attachment 5.6

Response to the AER's draft decision - Labour cost escalation forecasts to 2024-25

Jemena
bringing energy to life

BIS OXFORD ECONOMICS

LABOUR COST ESCALATION FORECASTS TO 2024/25

PREPARED BY BIS OXFORD ECONOMICS FOR JEMENA GAS NETWORKS

DRAFT - DECEMBER 2019

BIS Oxford Economics

Effective March 1 2017, UK-headquartered **Oxford Economics** acquired a controlling stake in **BIS Shrapnel** which had been in continuous operation since July 1, 1964 as a completely independent Australian owned firm providing industry research, analysis and forecasting services. The new organisation is now known as **BIS Oxford Economics**.

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December 2019

The modelling and results presented here are based on information provided by third parties, upon which BIS Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

To discuss the report further please contact:

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+3.5%

Annual wage increases expected for employees in the NSW utilities industry over the 5 years to 2024/25

Nominal growth in NSW Electricity, Gas, Water and Waste Services WPI

REAL COST ESCALATION FORECASTS TO 2024/25

In November 2019, BIS Oxford Economics was engaged by Jemena Gas Networks to provide price forecasts of labour costs that are relevant to the New South Wales electricity and water distribution industry for the period 2019/20 to 2024/25. Forecasts for wage escalation will be used by Jemena Gas Networks to develop the real price changes over its upcoming regulatory period, which, in turn, will be used by the business to construct its operating and capital expenditure forecasts.

BIS Oxford Economics expects total wage costs for the Australian Electricity, Gas, Water and Waste Services (EGWWS or 'Utilities') sector — as measured in the Wage Price Index — will grow (escalate) by an average of 3.6% per annum over the five years to 2024/25, 0.4% higher than the national 'All Industries' average over the same five-year period. Over the same 5-year period to 2024/25, the New South Wales EGWWS WPI is forecast to average 3.5% p.a., 0.3% higher than the state all industries average of 3.2% p.a.

National and NSW utilities wages are forecast to increase by more than the national and state all industries averages 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 now cover 65% of the workforce, remain above the wage increases for the national 'all industry' average. In addition, with the higher proportion of employees on EBAs compared to the national average (37%), and EBAs wage rises normally higher than individual agreements, this means faster overall wage rises in the EGWWS sector.

- Increases in individual agreements (or non-EBA wages) are expected to strengthen from the current weak pace as the labour market tightens and labour productivity growth builds from around 2021/22.

- Demand for skilled labour has picked up and will strengthen with the large increases in utilities investment over 2017/18 to 2019/20, with investment levels expected to remain elevated over the medium term. This 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 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.

Given that NSW utilities employment accounts for just under 30% of total Australian utilities employment, it is not surprising that wage growth trends in

the NSW utilities sector are close to the national utilities average. However, over the 3 years to 2017/18, the average wage rises in the NSW utilities sector were well below the national average. This appears to be an aberration, and may have been related to downward pressure on wages (particularly wage increases in the areas outside collective agreements) before, during and immediately following the privatisation of the NSW electricity businesses. Prior to 2015, the NSW utilities wage increases were usually close to the national average.

Over the past six quarters, wage rises in the NSW utilities sector have recovered, back to near the quarter-on-quarter national rises. We expect this trend to continue, and for wage rises in the NSW utilities sector to track the national average. Wider pressures in the overall state labour market –we expect the state unemployment rate to remain below or close to the national average - will also ensure that wage rises will tend to track the national average at the broader (all industries) level, as well as putting pressure on certain industries such as the electricity sector with its higher skill demands.

We also expect some degree of 'catch-up' to occur, especially in relation to the Victorian utilities sector, where wage rises over recent years have significantly outpaced the NSW utilities wage increases (and national average). The NSW utilities businesses will find they need to offer higher wages to local workers 'to meet the market' and keep pace with interstate utilities wages growth, to both avoid losing workers interstate and to attract workers from interstate with the necessary requisite skills.

Other factors will also act to push up NSW utilities wages, including an acceleration in construction, mining and total wages and relatively high levels of utilities-related engineering construction over the next six years. In addition, the demand for skilled labour will also increase markedly over the next four years, due to a significant increase in mining investment from recent lows and from increases in non-residential building and civil engineering construction, the latter as a large program of transport infrastructure projects in the eastern states ramp up. The acceleration in construction sector wages growth in particular - and indeed all industries (total) wages growth – will put upward pressure on utilities wages. The construction sector, along with the mining and manufacturing sectors, tend to compete with the utilities sector for similarly skilled labour. With skilled labour shortages already starting to be reported, we expect wages in the mining and construction sectors to accelerate from here, particularly over FY22 to FY24. This will force companies in the utilities sector to push up wages to 'meet the market', in order to attract and retain skilled workers. Meanwhile, the relatively high levels of utilities-related engineering construction activity will add to labour demand in the NSW and Australian utilities sector.

This will see a marked strengthening in wages growth in the NSW utilities sector over the 2021/22 to 2023/24 period, before easing. Overall, WPI growth in the NSW utilities sector is forecast to average 3.5% over the five years to 2024/25 inclusive (i.e. Jemena Gas Networks' next regulatory period), or 1.3% in real (inflation adjusted) terms (see Summary table 1.1).

Growth in total 'all industries' wages at the state level usually depends on the relative strength of the state economy and labour markets, compared to the

national average. Over the past five years, the NSW all industries WPI has been stronger than the national average due to tighter labour markets and higher labour demand. This is in line with the NSW economy out-pacing growth in the national economy and the state unemployment rate being consistently below the national average.

Going forward, although we expect NSW economic and employment growth to slip below the national average from FY20 to FY23, we expect the state's unemployment rate will remain below or close to the national average over the long term – it has been consistently below the national average by around 0.5% over the past few years. Indeed, we expect the state unemployment rate to remain below 5% over the next six years, and approach 4% on occasion.

The tight labour markets over the next six years means there will continue to be upward pressure on wages in the state. Accordingly, we are forecasting wages growth at the all industries level will be similar to the national average over the forecast period. In the five years to 2024/25, we are forecasting the total state (all industries) WPI in New South Wales to average 3.2%, similar to the 3.2% national average. In real (inflation-adjusted) terms, the average annual increase is forecast to be 1.0% (see Table 1.1 Summary).

Table 1.1 Summary – Labour Costs Escalation Forecasts for New South Wales and Australia
(per cent change, year average, year ended June)

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	5 yr Avg (f)
						Forecasts	Next Regulatory Period					
NOMINAL PRICE CHANGES												
1. Internal Gas Network-Related Labour												
EGWWS WPI - New South Wales (a)	**3.0**	**1.3**	**1.3**	**1.3**	**2.6**	**2.7**	**3.0**	**3.3**	**3.7**	**3.8**	**3.8**	**3.5**
EGWWS WPI - Australia (b)	2.8	2.4	2.2	2.0	2.8	2.9	3.1	3.4	3.8	3.9	3.8	3.6
EGWWS AWOTE - Australia (b)	0.7	3.5	4.3	2.3	1.3	3.3	3.6	3.9	4.1	4.3	4.0	4.0
2. General Wages												
All Industries WPI - New South Wales (c)	**2.3**	**2.1**	**2.1**	**2.1**	**2.3**	**2.4**	**2.6**	**3.0**	**3.4**	**3.5**	**3.4**	**3.2**
All Industries AWOTE - New South Wales (c)	4.3	2.3	0.6	3.1	3.0	3.6	3.4	3.7	3.9	4.2	3.9	3.8
All Industries WPI - Australia (b)	2.4	2.1	2.0	2.1	2.3	2.4	2.7	3.1	3.5	3.6	3.3	3.2
All Industries AWOTE - Australia (b)	2.4	1.9	2.0	2.4	2.7	3.2	3.4	3.8	4.0	4.1	3.8	3.8
Consumer Price Index (headline) (d)	1.7	1.4	1.7	1.9	1.6	1.8	1.8	2.1	2.3	2.3	2.3	2.2
REAL PRICE CHANGES (e)												
R1. Internal Gas Network-Related Labour												
EGWWS WPI - New South Wales (a)	**1.3**	**0.0**	**-0.4**	**-0.6**	**0.9**	**0.8**	**1.2**	**1.1**	**1.3**	**1.5**	**1.4**	**1.3**
EGWWS WPI - Australia (b)	1.1	1.0	0.5	0.0	1.1	1.1	1.3	1.2	1.4	1.6	1.4	1.4
EGWWS AWOTE - Australia (b)	-1.0	2.2	2.6	0.4	-0.3	1.4	1.7	1.7	1.8	2.0	1.7	1.8
R2. General Wages												
All Industries WPI - New South Wales (c)	**0.6**	**0.7**	**0.4**	**0.2**	**0.7**	**0.5**	**0.8**	**0.8**	**1.1**	**1.2**	**1.0**	**1.0**
All Industries AWOTE - New South Wales (c)	2.6	1.0	-1.1	1.2	1.3	1.8	1.6	1.5	1.6	1.9	1.6	1.6
All Industries WPI - Australia (b)	0.7	0.7	0.2	0.1	0.7	0.5	0.9	0.9	1.2	1.2	1.0	1.1
All Industries AWOTE - Australia (b)	0.7	0.5	0.3	0.5	1.0	1.3	1.6	1.7	1.7	1.8	1.5	1.7

source: ABS, RBA, Department of Employment, BIS Oxford Economics

(a) Electricity, Gas, Water and Waste Services (EGWWS) for Wage Price Index (WPI) for New South Wales.
(b) Australian sector wage forecasts provided for comparison. AWOTE is average weekly ordinary time earnings for full itme adult persons, where overtime payments are excluded, but bonus payments are included.
(c) New South Wales WPI and AWOTE are total or "All industries' wage movements.
(d) Inflation forecasts are RBA forecasts for the next 2 1/2 years. Beyond that, forecasts are calculated as a geometric mean of the 'official' inflation forecasts over the next 10 years. This methodology has been adopted by the AER in their recent revenue decisions.
(e) Real price changes are calculated by deducting the inflation rate from nominal price changes.
(f) Average Annual Growth Rate for 2020/21 to 2024/25 inclusive ie for next regulatory period.

1. INTRODUCTION

On 14 November 2019, BIS Oxford Economics was engaged by Jemena Gas Networks (JGN) to provide updated price forecasts of labour costs relevant to electricity, gas and water distribution networks in the New South Wales from 2019/20 to 2024/25. Forecasts of wages will be used by Jemena Gas Networks to develop the real price changes over its upcoming regulatory period, which, in turn, will be used by the business to construct its operating and capital expenditure forecasts. Over the next regulatory period forecasts of both nominal and real price growth of the relevant inputs are provided.

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. The data used in the projections is the latest available as at late November 2019 and includes the September quarter 2019 WPI data release. Other inflation and interest rate data were sourced from the Reserve Bank of Australia.

Forecasts of the economic variables in this report were mostly sourced from BIS Oxford Economics reports, including *Australian Macro Service*, *Long Term Forecasts: 2019 – 2034, Engineering Construction in Australia 2019*-2034 and *Building in Australia 2019-2034*, along with other unpublished forecasts and from BIS Oxford Economics internal research and modelling.

The previous Summary section presents an overview of the outlook for the labour costs including numerical forecasts which are presented in the summary table.

Section 2 provides a macroeconomic outlook for Australia and the New South Wales. This section also has forecasts of key economic variables plus a discussion of the drivers and logic underpinning the projections, to provide context for the labour market outlook.

Section 3 discusses BIS Oxford Economics' national wage and CPI projections and discusses the use of the Reserve Bank of Australia forecasts of the Consumer Price Index (CPI) for the deflation of nominal wages. Forecasts of the New South Wales All Industries Wage Price Index are also provided in chapter 3. Not that most of the references to historical data and forecasts of wages in Sections 3 and 4 are in nominal terms unless specifically stated that the data/forecasts are in real (inflation adjusted) terms.

Sections 4 provides the forecasts and rationale of the wage projections for the Electricity, Gas, Water and Waste Services (EGWSS) sector for both Australia and the New South Wales, as measured by the Wage Price Index (WPI).

Appendices include an explanation of different wage measures and CV's of key personnel.

2. MACROECONOMIC OUTLOOK

2.1 AUSTRALIA OUTLOOK

The Australian economy has experienced 27 years of uninterrupted growth since the FY91 recession. Population growth is among the highest of the developed economies, which has helped underpin household consumption and demand for dwelling and infrastructure construction. Government debt is comparatively low by global standards, with the national (Commonwealth) government and the larger state economies of New South Wales and Victoria maintaining AAA credit ratings. Overall, economic risks are low and the Australian economy is situated in the fast growing Asia Pacific region.

Nevertheless, growth in GDP and particularly domestic demand has been lower over the past seven years than the previous two decades. The main factor dragging down growth has been a major decline in mining investment, which has coincided (and contributed to) weakness in non-mining business investment.

Australia's economic growth has slowed over the past year, with GDP growth easing to 1.4% through-the-year to June 2019, and year-average growth slipping to 2.0% for FY19. This followed a rebound in growth to 2.9% in FY18, after only 2.3% in FY17 and an average of 2.6% over the 6 years from FY13 to FY18. Annual growth is expected to remain subdued at around 2.2% in FY20, before picking up to 2.7% in FY21 and then subsequently strengthening over FY22 and FY23.

Sluggish domestic demand growth to continue

The recovery in domestic demand, which grew 3.5% in FY18, drove Australia's GDP in that year, but it is now acting as a drag on overall GDP. Domestic spending growth fell back to 1.7% in FY19 and expected to remain weak at around 1.4% in FY20.

Household spending continues to be held back by sluggish income growth; rising employment is supportive, but wage increases remain tepid and other sources of income (government transfers, rental income and interest earnings in particular) have stagnated. The low savings rate is also an impediment to further growth in consumer spending. While lower interest rates and income tax cuts will be supportive, we continue to be cautious about the near-term outlook.

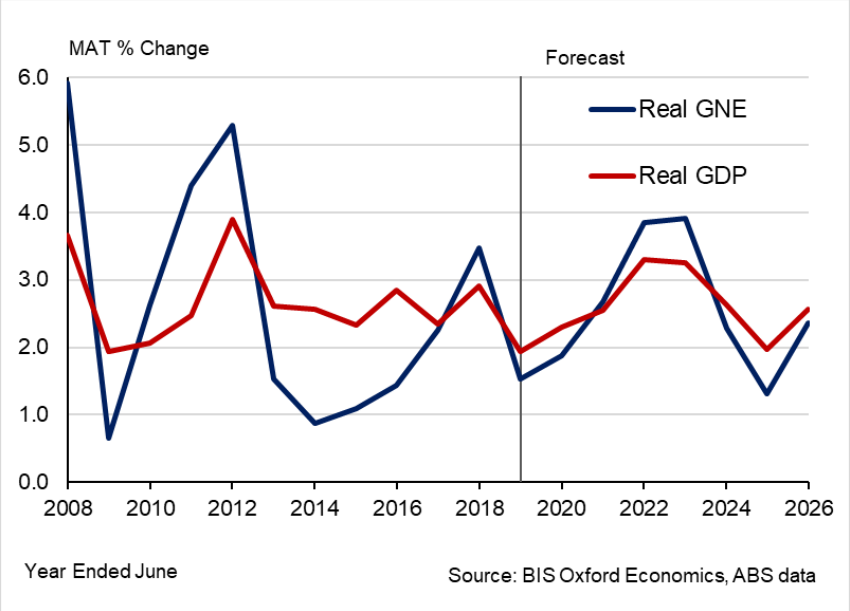
Residential construction activity has turned down sharply and the cycle has much further to run - we expect dwelling investment will be a large drag on GDP growth, and to a lesser extent employment growth, in 2019 and 2020. However, house prices have recovered in Sydney and Melbourne over recent months, and there are tentative signs that turnover is stabilising, which we expect to drive an upturn in dwelling approvals and commencements going into H2 2020.

The main sources of growth in the domestic economy will come from moderate growth in non-mining investment and a recovery in mining capital expenditure from FY20. Conditions remain conducive to a pickup in business investment – utilisation rates are high and monetary conditions are accommodative – but

deteriorating confidence and uncertainty around the global outlook may give firms reason to pause. Mining investment has now troughed after a long decline, and the absence of the drag will support growth. Mining is also starting to recover, boosted by higher commodity prices. The continued recovery in mining, concentrated in Western Australia and Queensland and supported by further commodity price rises and an improved investment climate, will contribute to net exports. Major LNG projects in Western Australia will be the key positive contributor further out.

Despite rising global economic risks, we remain cautiously optimistic about the outlook for new business investment. Public demand continues to provide support to growth, with the NDIS rollout and increased education spending boosting government consumption. Growth in public investment will slow a little as the NBN rollout winds down, but there is a strong pipeline of work in transport projects on the east coast. Growth in both export volumes and values has been strong, underpinned by resource exports and pushing the current account into surplus in Q219 and Q319.

Figure 2.1 Australia – Basic Economic Indicators



Net export to continue to underpin growth in near-term, despite global headwinds

Over the next 2 years, GDP will be boosted by net exports, with solid growth in export volumes forecast, despite some moderation in global growth. Underpinning this will be new LNG and oil capacity (as recently completed projects ramp up), and moderate increases in capacity in other key commodities. Also contributing is strong growth in services exports, led by inbound international tourism and education, which is being supported by a more competitive AUD. The outlook for manufacturing and rural exports is also positive (droughts notwithstanding), with both sectors taking advantage of Australia's comparative advantage in high quality, high value-added output.

The acceleration in global growth over 2017 and 2018 has also been supportive, boosting export volumes and initiating a recovery in commodity prices. However, the global economy has experienced a cyclical slowing in growth over the last year across both developed economies and emerging markets. To some extent the moderation was inevitable, with many developed economies experiencing faster-than-trend growth in the first half of calendar 2018, but it also reflects a number of headwinds including the US-China tariff escalation, political uncertainty in Europe, and the end of fiscal stimulus in the US.

Central banks have relaxed monetary policy since the start of the year, the Chinese authorities have intervened to support domestic growth momentum, and expansionary fiscal policy has been implemented across a number of key Asian markets. Overall, the global economy expanded by 3.6% in calendar 2018 (PPP measure). We are projecting growth of 2.9% in 2019, with the slowdown in growth in the US, China, Europe and India becoming apparent. Growth is expected to remain subdued in 2020, but thereafter, global growth is expected to improve and average 3-3.5% over 2021 to 2024.

Over the long term we maintain our view that global growth will be structurally weaker than it has been in the past. Falling population growth and limited improvements in productivity will weigh on trend growth, and we expect the world economy to expand by an average of 3.3% p.a. over the next five years.

Australia's trading partner growth (weighted by export proportions) is forecast to grow at a faster rate of 3.6% over the next five years, due to the high weights of China, East Asia and India (all of which are expected to outpace the average pace of global growth) in Australia's export mix.

Synchronisation of investment to drive stronger growth from FY22

By early next decade, the investment cycles – which are currently offsetting each other and out-of-sync – are all expected to move into upswing, although there will be differences in the strength and timing across the residential, business and public investment components. The strengthening in investment will lead to an increase in the pace of employment growth and, with the labour market tightening, an increase in wages, household incomes and consumer spending. In addition, with the government's budgetary position improving due to increased taxes, the government is expected to loosen fiscal policy – either via increased recurrent or capital spending or tax cuts, or more likely a combination of all three.

The upshot is that growth in domestic demand will strengthen to around 3.8% over FY22 and FY23, while export growth is forecast to moderate as the increase in LNG production increases hit capacity, although services and non-commodity exports are expected to continue to grow. However, much stronger imports (in line with domestic demand) will see net exports detract from growth. Nevertheless, GDP growth is forecast to lift and average above 3% over FY22 and FY23.

The labour market has performed well, but it is now beginning to turn, with job ads now falling and employment growth slowing, leading to a small tick up in the unemployment rate recently. Price pressures remain weak; wage growth is trending higher, albeit slowly and from a low rate, while CPI inflation is very

weak at 1.7%y/y Following another soft wages print in Q3 and analysis which suggests that the natural rate of unemployment is well below 5% (implying there remains significant spare capacity in the economy) the RBA Board lowered the cash rate in June and July 2019 and again in October to 0.75%. The policy statement signalled that further cuts will likely be necessary to stimulate jobs and wages growth, and with the outlook worsening globally we now expect more cuts, with the cash rate to fall to a record-low of 0.5% by mid-2020.

With wages growth well below historical averages, domestic cost push pressures are expected to remain limited in the near term. Underlying inflation is forecast to rise from 1.4% now to 1.9% in FY21. A lack of inflation and continuing slack in the labour market is expected to see the RBA hold rates at the expected record lows of 0.5% until mid-2022, before rising to 1.75% during FY24 as wages and CPI inflation rise back toward historical averages, and the unemployment rate falls back below 5%. 10-year government bond rates will also gradually rise back over 2% in FY24, from under 1% now. Australian long-term bond rates are expected to track the rise in US bonds over the next few years, with US bond rates expected to rise as a result of the deterioration in the US budget deficit.

Table 2. Australia – Key Economic Indicators, Financial Years

Year Ended June					Forecast					
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total New Private Investment (+)	**-5.3**	**-1.8**	**3.6**	**-1.9**	**-1.9**	**4.2**	**8.4**	**7.2**	**0.7**	**-3.9**
New Public Investment (+)	**8.1**	**8.5**	**11.5**	**2.3**	**0.7**	**2.2**	**5.8**	**4.5**	**1.7**	**0.5**
Gross National Expenditure (GNE)	**1.4**	**2.3**	**3.6**	**1.6**	**1.4**	**2.8**	**3.8**	**4.0**	**2.3**	**1.2**
GDP	**2.8**	**2.4**	**2.9**	**2.0**	**2.2**	**2.7**	**3.3**	**3.4**	**2.6**	**2.0**
Inflation and Wages										
CPI (Yr Avg) - RBA forecasts (*)	1.4	1.7	1.9	1.6	1.8	1.8	2.1	2.3	2.3	2.3
Wage Price Index (Jun on Jun)(**)	2.1	1.9	2.1	2.4	2.5	2.8	3.3	3.6	3.5	3.2
Wage Price Index (Yr Avg)(**)	2.1	2.0	2.1	2.3	2.4	2.7	3.1	3.5	3.6	3.3
Average Weekly Earnings (Yr Avg)(^)	1.9	2.0	2.4	2.7	3.2	3.4	3.8	4.0	4.1	3.8
Employment										
– Employment Growth (Yr Avg)	2.3	1.5	3.0	2.4	1.8	1.2	1.7	2.2	1.7	1.1
– Employment Growth (May/May)	1.9	2.1	2.6	2.8	1.1	1.4	1.9	2.3	1.3	1.2
– Unemployment Rate (May) (%)	5.7	5.5	5.4	5.2	5.3	5.2	5.0	4.7	4.9	5.1
Labour Productivity Growth										
– Total	0.5	0.8	-0.1	-0.4	0.4	1.5	1.6	1.1	0.8	0.9
– Non-farm	0.7	0.7	0.1	-0.1	0.6	1.4	1.7	1.1	0.9	0.9

Source: BIS Oxford Economics, ABS, 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 2021 quarter. Beyond this, we've use the mid-point of the 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.

e: estimate

Overall, average annual GDP growth over the six years to FY25 is forecast to be 2.7%, which will be a small improvement on the 2.5% average of the 5 years to FY19. Growth will be far more domestically oriented over the forecast period,

with Gross National Expenditure forecast to average 2.6% over the six years to FY25, compared to only 1.9% in the 5 years to FY19.

Mild slowdown in mid-2020s, before economy moves to trend growth

The tightening of monetary policy will precipitate an overall slowing of economic growth in the mid-2020s. At the same time, we also expect a cyclical slowdown in non-residential building and mining investment, as a number of large projects are completed at the same time, while the completion of some large public infrastructure projects will also see a stalling of public investment. The upshot will be a sharp deceleration in domestic investment and spending growth, leading to an easing in GDP growth back below to an average of 2.3% over FY24 and FY25. Longer term, as consumers and businesses re-adjust to the 'normalcy' of higher interest rates – although at much lower levels than the 2000s and early 2010s – investment and consumer spending will return to long term trend (or potential) rates of growth over the second half of the 2020s.

2.2 NEW SOUTH WALES ECONOMIC OUTLOOK

In New South Wales, State Final Demand (SFD) has slowed over the past year, easing from 3.4% in FY18 to 2.1% in FY19, although this pace of growth still outpaced the 1.7% growth in Australian domestic demand. This continued the out-performance of the NSW economy over the 6 years since FY14. However, the latest September National Accounts showed that through-the-year growth in SFD slowed further to 0.6%, below the 0.9% for Australian domestic demand. Meanwhile, growth in Gross State Product (GSP) slipped below Australian GDP growth in FY18 (2.5% versus 2.9%) and in FY19 (1.9% versus 2.0%). The current prolonged drought in NSW is also having an impact on state domestic output and spending.

Meanwhile, employment growth has been strong over the FY18 and FY19, averaging 3.3% over FY19, markedly ahead of overall national jobs growth of 2.4%. However, jobs growth has slowed over recent months. The state unemployment rate continues to track well below the national average and was a low 4.8% in October, compared to the national rate of 5.3%.

Over the next four years, we expect SFD and GSP growth in NSW to lag the national average. Furthermore, as growth in other states improves, New South Wales will no longer an outperformer compared with the national average. SFD and GSP are forecast to slow markedly over FY20 and FY21, before picking up from FY22. That's a result of a divergent pattern in some of the state's key drivers.

- Dwelling building has been a key driver of growth over the six years to FY18 but declined by -3.6% in FY19, as tighter lending restrictions reined in demand, prices and development feasibility. Residential investment is forecast to suffer further large declines over the next two years, before favourable fundamentals, including a significant stock deficiency and (still) low interest rates, drive the next upswing from FY22 and the sector again becomes a key contributor to growth in the state economy.

• Private non-dwelling building has been a key driver of growth over the past two years but will now ease and plateau over FY20 and FY21, before the next round of offices, shops, transport-related and institutional building (such as private prisons) lifts activity over FY22 and FY23. Meanwhile, further strong growth in private infrastructure (including electricity and telecommunications) and a recovery in mining investment in NSW will see private engineering construction make another strong contribution to growth in FY20, before declining over FY21 and FY22 as some major projects finish.

• Strength in public investment is set to continue in FY20, as work continues on a range of transport infrastructure projects – including the Metro rail projects, light rail, major urban roads projects, plus Pacific Highway roadworks – while construction of public social and institutional buildings is also rising significantly, including schools, hospitals and sports stadiums. Another major round of transport-related infrastructure will then see public investment surge over FY22 to FY24.

• Conversely, after another poor year of export growth, we expect exports to strengthen from FY2021 as rural exports recover from the current drought, as mineral and coal exports increase as new capacity comes onstream and the AUD remains in a US68-76 cent band, helping manufacturing and services exports and import substitution. Services exports, which have been a key area of strength over the past 6 years, will continue to remain buoyant. Stronger growth in other states will also see a larger contribution from interstate trade.

Meanwhile, moderate growth in household spending is projected to continue for another 2 years, held in check by weak wages growth and slower employment and population increases, compared to the five years to FY18. Subsequently, employment growth will pick up as residential and public investment recover and strengthen. Business investment is also expected to renew its strength, after a period of weakness over FY20 and FY22.

Overall, SFD is forecast to moderate over the next 2 years to around 1% in FY20 and FY21, before picking up from FY2022 and averaging 3% over the 3 years to FY24. GSP growth will be slightly weaker at 2.8% over these 3 years, but well up on the decade to FY14, when growth averaged only 1.9%.

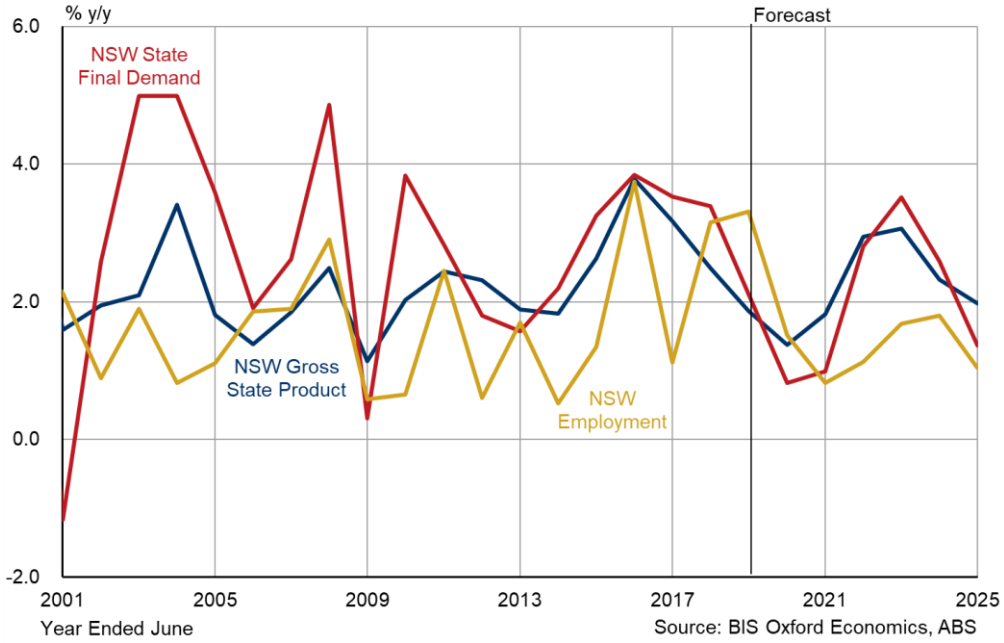
SFD and GSP growth is projected to slow over FY2024 and particularly FY25, due to modest increases in interest rates over 2023-2024 impacting housing investment and consumer demand, with NSW suffering relative to the national average due to a higher household debt burden. This is expected to be exacerbated by a cyclical downturn in non-residential building and an easing in public investment, as a number of major projects are completed. A gradual pickup in growth is then expected to ensue from FY2026, as consumer spending and housing recover and strengthen.

On a positive note, the Australian dollar is forecast to average under US$0.77 during this period, supporting trade-exposed industries. New South Wales will still derive benefits from solid economic growth in other states, given its tendency to run a positive balance on interstate trade in goods and services.

Over the next seven years to FY2025 inclusive, growth in the New South Wales economy is forecast to lag the national average, by around -0.6% on average for SFD and -0.4% for GSP. A key reason will be slower population growth

compared to the national average, with the state's population to grow at an average of almost 1.3%, -0.3% slower than the national average, and down from the 1.5% of the past 5 years when the state virtually matched national population increases. Another reason is that the mining states will return to solid growth, now that the mining investment slump has finished, with those states set to again return to above-average growth.

Figure 2.2 New South Wales Key Economic Indicators



3. WAGES AND INFLATION OUTLOOK

3.1 CPI OUTLOOK

Limited inflationary pressures in recent years

Consumer price inflation has been subdued for the past five years, with the substantial depreciation of the A$ (which would normally increase inflation) between 2013 and 2016 coinciding with a sharp correction in oil prices (which reduced both petrol prices and freight costs) and falling internal price pressures. Underlying inflation fell below the Reserve Bank's target 2-3% band in March 2016 and has stayed there, while headline inflation has also remained (mostly) below 2% since late 2014.

Tradeables inflation has been especially weak since the June quarter 2014. Stagnant world prices for manufactured goods, reduced transport costs, margin compression by exporters globally, and potential hedging by importers have combined to limit price rises for imported consumer goods. Furthermore, the appreciation in the Australian dollar over the 18 months to December 2017 reduced import prices. However, the A$ depreciation over the past two years has partially reversed this trend, leading to rises in tradeables inflation of 1.2% through-the-year to September 2019. Rises in tradeables inflation over the past year have been driven mainly by food, motor vehicles, clothing, consumer durables and overseas travel and accommodation.

Meanwhile, non-tradeables inflation – which now constitutes almost two-thirds of the CPI – averaged 3.1% through FY18, before easing to 1.9% through-the-year to September 2019. Driving non-tradeables inflation in FY18 were sharp rises in electricity and gas prices, cigarettes and tobacco (due to hikes in excise taxes), child care, house purchases, health services, education and insurance services. Over the past year, non-tradeables inflation has been contained by lower-than-usual rises in insurance services and electricity prices, while dismal wages growth (which has kept down unit labour costs) has helped limit cost-push inflationary pressures. Non-tradeables inflation has also been subdued over recent years by low increases in residential property rents (which constitute 7% of the CPI basket), with year-ended rent inflation in the Consumer Price Index in September 2019 only 0.4%, the lowest since 1994. Rental price growth is likely to stay low until the early-to-mid 2020's, when currently oversupplied markets become more balanced. Meanwhile, the neglible rise in 'new dwelling purchases by owner occupiers' (which constitutes 7.9% of the CPI basket) over the past year is also expected to reverse as strong population growth continues to outpace slower additions to the stock of dwellings.

Overall, the headline CPI inflation rate recently peaked at 2.1% in the June quarter, 2018, largely due to a spike in petrol prices, before declining through FY19 and bottoming at 1.3% in the March quarter 2019, largely due to a sharp decline in petrol prices. In the June quarter 2019, the inflation rate then increased to 1.6%, before rising to 1.7% in the September quarter 2019. Nevertheless, with inflationary pressures building globally and the economy gradually absorbing the remaining spare capacity, we expect inflation to rise from here, albeit only gradually and slowly.

Putting upward pressure on the headline rate will be further planned increases in tobacco excise duty. Tobacco excise duties are legislated to increase by 12.5% each year on September 1 of each year from 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 headline CPI – around 0.25% points to the annual rate.

In the near term, upward price increases will come from the depreciation of the A$ since early 2018, with the exchange rate declining from over US79 cents in January 2018 to around US68 cents over August to November 2019. Our forecast is for the A$ to remain below US70 cents until early 2022, before gradually rising.

The drought and higher food import prices (from the lower $A) are also expected to push up food prices over the near term, reversing a key factor which has muted prices over recent years – food accounts for over 10% of CPI basket (excluding meals out and takeaway food). Food inflation has averaged close to 3% p.a. over the past two decades but had been very weak over the past five years (averaging only 1.2% p.a.), due to intense competition between the major supermarkets and falling or weak global agricultural prices. The supermarkets cannot keep cutting prices (and either their own margins or suppliers' margins), while world agricultural prices will pick up over the medium term as global oversupply dissipates.

Offsetting these inflationary pressures will be the benign oil price outlook and soft growth in wages over the next two years. Headline CPI inflation is forecast to gradually pick up over the next two years, but still remain below 2%. It is our view that inflation will subsequently accelerate, pushing above 2% in FY22 and then rise to around the 2.5% mid-point of the RBA's band during FY23 as economic growth increases, profits, employment and wage growth strengthen, and inflationary pressures re-build. The rise in the A$ toward US77 cents in FY24 will provide some offsetting pressures between FY22 and FY24. An expected softening in the economy around mid-decade will see price and wage pressures weaken, before again rising to 2.5% over the latter half of the 2020s.

CPI inflation projected to average close to 2.5% over the long term

Headline CPI inflation is expected to sit close to the mid-point of the RBA's 2-3% target band in the long run based on the following:

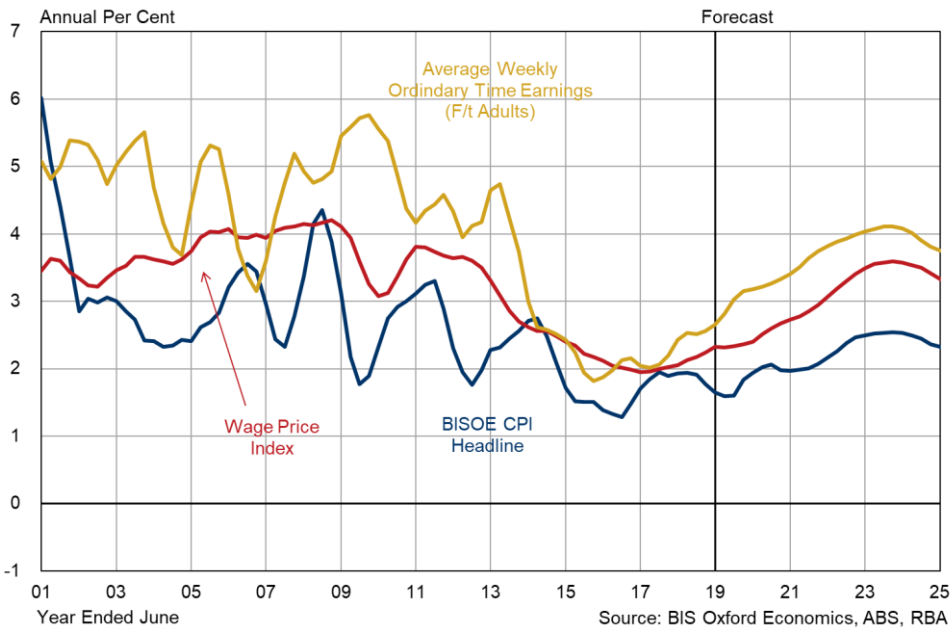
- Tradeables inflation, which constitutes around one-third of the CPI basket, is forecast to increase by an average of around 1.0% - 1.5% per annum contributing around 0.4% to 0.5% to annual inflation. Limited movements in the A$, steady (but subdued) increases in global manufacturing costs and some commodity price increases underpin this projection.
- Non-tradeables inflation (comprising the remaining two-thirds of the basket) is assumed to increase by around 3.0 to 3.3% per annum contributing around 2% to headline inflation. This is weaker than the 3.7% average achieved from 2001 to 2015 when relatively high wage inflation, lower than average productivity growth to 2009 and also large rises in utilities prices pushed non-tradeables inflation to well outside

of the RBA's 2 to 3% target range. We expect higher wages growth in the longer term will also contribute to the maintenance of relatively high non-tradeables inflation.

Taken together, we expect annual CPI inflation to increase by 2.5% per annum on average. In forecasting annual tradeables inflation of around 1.5% (compared to 1.2% on average for the past 16 years), we have assumed the following:

- We don't expect a rapid rise in the Australian dollar to mute tradeables inflation like it did in the 2000s, and early this decade. The Australian dollar rose from US 54 cents in 2000/01 to US$1.03 by 2011/12. We have a modest rise back to US77 cents by FY24 and then a drift back to the long-term average of 76 US cents.
- We don't expect a significant downward pressure on world inflation from significant increases in manufacturing productivity and rapid technological advances, as occurred particularly in China from the late 1990s to early 2010s.
- There will be upward pressure on food prices from rising demand from a growing Asian middle class.
- Oil prices will rise over the long term, due to the rising cost of extraction, as the lower cost reserves are exhausted.

Figure 3.1 Australia: Wages and Prices



3.1.1 RBA CPI Forecasts are used to calculate real wages

To calculate real wage increases, we deflate nominal wages growth by deducting expected inflation over a 10-year period, using the CPI forecasts

from the Reserve Bank of Australia (RBA). The RBA's November 2019 'Statement on Monetary Policy' forecast the headline CPI rate at "1¾ per cent" in the December quarter 2019 and 2% in the June quarter 2020 – giving an average of 1.85% for FY20. The RBA then forecasts headline CPI to ease to 1.75% in December 2020 and remain at 1.75% in the June 2021 quarter (giving a year average of 1.8% for FY21), before rising to 2% in the December quarter 2021. We then impose the mid-point of the RBA's target band, 2.5%, as the projection for the June quarter 2023, giving a year average CPI rate of 2.1% for FY22.

Expected inflation for the next 10 years is derived by using the arithmetic mean of RBA forecasts for the next three years, with the 2.5% mid-point of the RBA's inflation target band (i.e. 2 to 3%) used for the remaining 7 years – to give an average of 2.2% for FY23 to FY25+, which is then used as the wage deflator for the regulatory period. This methodology has been adopted by the AER (Australian Energy Regulator) in their recent revenue decisions. For example, see Transgrid Draft Determination 2018-23, Attachment 3, page 142.

3.2 WHOLE ECONOMY WAGE OUTLOOK

3.2.1 National Wages

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 (structural) changes in the labour market following the end of the mining investment boom.

Wages growth has slowed markedly over the past 6 years, primarily due to weaker demand for labour, caused by both cyclical and structural factors. Among the underlying structural changes causing this unspectacular wage growth are increasing market flexibility and casualisation of the work force (what is commonly coined the 'gig-economy'), falling union membership, slower productivity growth and the effects of lower inflation expectations.

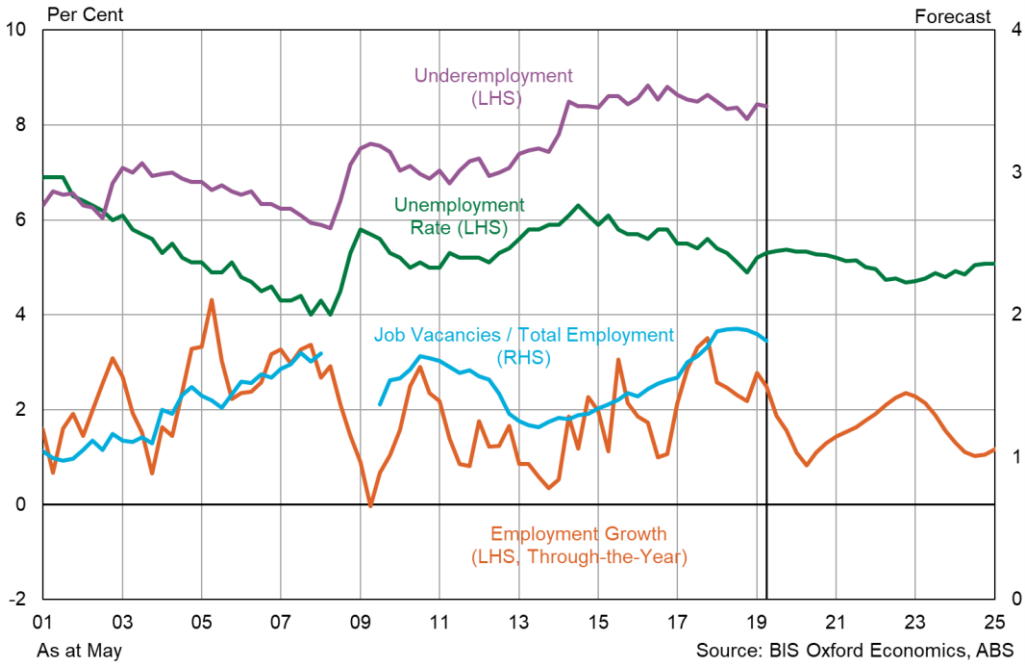
Low wages growth is both a product of and key cause of low underlying inflation. Low wages are keeping business costs down and thus muting upward price pressures, while a significant section of pay deals are being set in line with CPI inflation – especially for employees on awards.

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, falling to 5% in September 2018 and holding there since. Historically this rate was seen as close to the NAIRU, (the Non-Accelerating Inflationary Rate of Unemployment or the `natural rate of unemployment'), but our latest research suggests that the natural rate has decline in recent years, as a result of falling rates of unionisation and increasing casualisation. Given this, we still see spare capacity in the labour market. Compounding this, Australia's underemployment rate[1] remains at historic highs – averaging 8.3% over the past year. The high underutilisation rate – the sum

[1] 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.

of unemployment and underemployment – reflects considerable slack in the labour market, which limits the bargaining power of workers and reduces pressure on wages.

Figure 3.2 Employment and Unemployment



Looking ahead, we expect employment growth to weaken over the next two years. There has been a decline in the growth of job advertisements recently (a good leading indicator for employment growth), and the recent high frequency indicators have confirmed our view that the economy is growing at a solid but not spectacular pace. Jobs growth will weaken due to the worsening downturn in residential investment, slower growth in government spending and subdued consumer spending. With employment growth set to remain modest and unemployment to drift up marginally, upward pressure on wages will be limited.

The latest data suggests that we have moved off the bottom of the current wage cycle, with the wage price index (WPI) rising from its lows of 1.9% in June 2017 to 2.4% in the June quarter, 2019, although it eased to 2.2% in the September quarter 2019. The increases over FY2018 and FY2019 may have been helped by higher increases in the minimum wage decisions and collective bargaining outcomes over the past year.

3.1% increases in the National Wage Case and higher enterprise agreements over FY19 will gradually push wages up

At the Annual Wage Review in June 2019, the Fair Work Commission awarded a 3.1% increase to the National Minimum Wage (NMW) – to be effective July 1 2019 - down from the 3.5% awarded in July 2018 and 3.3% awarded in July 2017, but still higher than recent wage increases in the other pay setting segments. In its recent decisions, the panel estimated around 23% of the labour

force (including part-time and casual workers) have their pay set by awards (including around 13% of full-time workers – see Table 3.1). The minimum award rises take effect from the 1st July 2019. However, the effects may reach a much larger number of employees, potentially up to 40% in total, because wage increases in some enterprise agreements and individual arrangements are linked or benchmarked in some way to the review's outcome.

There has also been an improvement in the outcome of enterprise agreements (via collective bargaining) – under which 38% of the workforce receive their pay increases (see Table 3.1) - since the low of 2.2% set in September quarter, 2017. Average annualised wage increases (AAWIs) formalised in the enterprise agreements have averaged 2.9% over the year-to June 2019 (latest data from the Department of Jobs and Small Business). It's likely that these outcomes could have been influenced by the 2017 and 2018 national wage cases which awarded 3.3% and 3.5% (which were appreciably higher than the 2.4% and 2.5% increases awarded in the previous two years). The improving labour market may have helped lead to the higher outcomes in collective agreements over FY19. However, the recent improvement in formalised agreements will take time to manifest in overall wage outcomes. The AAWI in current operating agreements is 2.7%, and, given the average duration for the collective agreement is around 3 years, overall wage agreements in the collective bargaining segment – which cover 38% of the workforce – are likely to see limited increases on the 2.7% recorded in the latest data.

The remaining 48% 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. Aggregate wage growth has slowed significantly since December 2012 due to a collapse in wage increases awarded to the workers who are on individual agreements (contracts) with their employers. 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 by the structural and cyclical weaknesses outlined above and is the main reason why WPI increases are near record lows.

Nevertheless, we expect a continuation of the higher NMW to filter to overall improvements in pay rises in the collective bargaining and individual arrangements segments to gradually lift the wage price index (WPI) from 2.1% in FY18 to 2.3% in FY19 to 2.4% in FY20 and 2.7% in FY21 – which is in line with most other forecasters but below Commonwealth Treasury forecasts of 2.75% and 3.25% for these two years. Other wage measures – average weekly earnings (AWE) and average weekly ordinary time earnings (AWOTE) - will also pick up over the next two years, slightly faster than WPI due to compositional effects and bonuses and incentives linked to higher profits over the past three years.

Wage growth is then predicted to accelerate from FY22, as tighter conditions in the labour market feed through. The forecast increases in profits, combined with rising price inflation and declines in unemployment, will push up wages over FY22 to FY24. The WPI is projected to increase 3.1% in FY22 and peak at 3.6% in FY24, before subsequently easing as economic growth slows around the mid-2020s – while AWE and AWOTE are forecast to rise to around 4.1% in FY24.

In the long run, wage growth is determined by productivity growth and inflation. We expect that AWE growth will level off at its long run level of around 3.6%, driven by non-farm productivity growth of around 1.1% and inflation of around 2.5%. In terms of the wage price index, long run growth in the WPI is expected to be around 0.3% less than AWE, in line with the average historical trends over the past two decades since the introduction of the WPI.

Table 3.1 Australia All Industries: Wages Growth Segmented by Pay Setting Method

Year Ended June	% of Workforce in 2018	Year Average % change											
						Forecasts						Average	Average
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2019-25	2021-25
Wage Price Index													
Awards Only	13.1%	2.5	2.4	3.3	3.5	3.1	3.3	3.3	3.5	3.5	3.5	3.4	3.4
Collective Agreements	38.4%	3.2	3.1	2.8	2.7	2.8	2.9	3.1	3.5	3.6	3.6	3.2	3.4
Individual Arrangements	48.5%	1.1	0.8	1.0	1.7	1.8	2.4	2.9	3.5	3.5	3.0	2.7	3.1
Wage Price Index (a)	**100%**	**2.1**	**2.0**	**2.1**	**2.3**	**2.4**	**2.7**	**3.1**	**3.5**	**3.6**	**3.3**	**3.0**	**3.2**
Compositional Effects + Bonuses,etc		-0.2	0.1	0.4	0.3	0.8	0.7	0.8	0.5	0.5	0.5	0.6	0.6
AWOTE (b)	100%	1.9	2.0	2.4	2.7	3.2	3.4	3.8	4.0	4.1	3.8	3.6	3.8

Source: BIS Oxford Economics, Haver Analytics/ABS, 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).

3.2.2 New South Wales 'All Industries' Wage Outlook

The 'all industries' WPI for New South Wales is used to escalate JGN's general labour (i.e. non-network and non-external professional labour) costs. Growth in total 'all industries' wages at the state level usually depends on the relative strength of the state economy and labour markets, compared to the national average. Over the past five years, the NSW all industries state average has been stronger than the national average. This is in line with the NSW economy out-pacing growth in the national economy, in terms of state final demand (SFD), Gross State Product (GSP) and employment, for most of the past five years. This has seen the state unemployment rate being consistently below the national average. The tighter labour markets and higher labour demand has resulted in higher wages growth over the past five years.

Going forward, we expect NSW economic and employment growth to slip below the national average from FY20 to FY23. Although we expect state economic growth will, on average, be around 0.6% below the national average, we expect employment growth to be only 0.2% to 0.3% below the national average. However, we expect the state's unemployment rate will remain below or close to the national average over the long term – it has been consistently below the national average by around 0.5% over the past few years. Indeed, we expect the state unemployment rate to remain below 5% over the next six years, and approach 4% on occasion.

The tight labour markets over the next six years means there will continue to be upward pressure on wages in the state. Accordingly, we are forecasting wages growth at the all industries (or total state average) level will be just below or similar to the national average over the forecast period. In the five years to

2024/25, we are forecasting the total state (all industries) WPI in New South Wales to average 3.2%, similar to the 3.2% national average. In real (inflation-adjusted) terms, the average annual increase is forecast to be 1.0% (see summary table in the Executive Summary).

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 Table 3.1). 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 2019, the minimum wage was increased by 3.1%. This followed rises of 3.5%, 3.3% and 2.4% respectively in July 1 of 2018, 2017 and 2016. At the all industries level, 13% 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 38% 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 48% 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 an important influence

Note in Table 3.1, wage increases under 'individual arrangements' are calculated by deduction. Data from DEEWR (Department of Education, Employment and Workforce Relations) are used for wage increases under collective agreements.

The limitation of this methodology is that because individual arrangements are calculated as a residual, all of the compositional effects in terms of AWOTE (ie from more or less lower-paid workers being employed in the relevant year) plus all (or most) of the bonuses and incentives from those under award or collective agreements end up in the individual arrangements residual, which distorts the pay increases in this segment. However, the methodology works well for the WPI, particularly at the all industries level, although some compositional problems occur at the sectoral level, particularly

for sectors with a relatively small employment base (such as electricity, gas, water and waste services).

The 'bottom-up' approach to wage forecasting is complemented by a more formalised 'top-down' macroeconomic modelling framework – to ensure an overall macroeconomic consistency with output, employment, productivity and price variables. The top-down macroeconomic modelling methodology becomes more relevant beyond the next 2-3 years.

4. UTILITIES WAGES OUTLOOK

4.1 CHOICE OF THE WAGE PRICE INDEX AS THE MEASURE OF LABOUR COSTS

The WPI (wage price index) for the EGWWS (Electricity, Gas, Water & Waste Services or "Utilities") sector in New South Wales is used as a proxy for all of JGN's 'network' labour costs. Network labour costs includes all internal labour (i.e. all head office staff including professional and admin employees plus field employees) as well as any external labour hired to provide field services such as 'asset management' services. Businesses providing these field services are usually classified to the utilities sector. Hence, including their labour costs as part of JGN's opex 'network' labour and escalating it with the WPI for the state utilities sector will be consistent with the AER's framework. That being said, some of JGN's internal staff may be involved in project delivery such as replacement and/or augmentation capital projects. Their labour cost can be included in the capex calculations. If they are included in the capex, they should be excluded from the opex in order to avoid double counting of costs.

BISOE chose to use the Wage Price Index (WPI) as the key measure of labour costs for the forecasts of Electricity, Gas, Water and Waste Services. The key motivations for this are:

(a) Greater data availability: the EGWWS WPI is available at the national level and for some key states (NSW and Victoria), both on quarterly and annual basis. Average Weekly Earnings (AWE) and Average Weekly Ordinary Time (AWOTE) are not available by industry by state, and at the national level are only published every 6 months; and

(b) The Australian Energy Regulator (AER) prefers the WPI as it has less volatility than AWOTE and is a better measure of underlying trends.

4.2 NATIONAL EGWWS WPI FORECASTS

The EGWWS wage price index growth has consistently been above the national average since the index's inception in 1997 and averaged 0.5% higher over the past 20 years (see Table 4.3 and Fig 4.3). Since the collapse in wages growth following the end of the mining boom, the EGWWS WPI has continued to outpace the all industries average, increasing by an average of 2.6% over the past 6 years, 0.4% higher than the 2.2% national average. 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 Table 4.3).

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

To a large extent, this has been underpinned by strong capital works program in the utilities sector since the beginning of the last decade until 2012/13 (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 Retail Trade, Wholesale Trade, Accommodation, Cafés and Restaurants, and, in some periods, also Manufacturing and Construction (see table 4.1). 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.

Table 4.1. Wage Price Index Growth by Industry Sector and by State

Sector	% of Total Employment Nov'18	Year Average Increase (A%ch)							Five-Year Average (YE June)
		Jun'13	Jun'14	Jun'15	Jun'16	Jun'17	Jun'18	Jun'19	
Private		3.4	2.6	2.3	2.0	1.8	2.0	2.2	2.1
Public		3.2	2.8	2.6	2.5	2.3	2.4	2.5	2.5
Industry									
Mining	2.0%	4.5	2.8	2.3	1.6	1.0	1.3	2.0	1.6
Manufacturing	7.2%	3.2	2.9	2.7	2.4	2.0	2.2	2.1	2.3
Electricity, Gas, Water and Waste Services	1.2%	4.2	3.3	2.8	2.4	2.2	2.0	2.8	2.4
Construction	9.2%	3.3	3.0	2.1	1.6	1.7	1.9	1.9	1.8
Wholesale Trade	3.2%	4.4	2.2	2.2	1.9	1.8	1.8	2.1	2.0
Retail Trade	10.0%	2.5	2.6	2.2	2.4	1.9	1.6	1.9	2.0
Accommodation and Food Services	7.1%	2.5	2.3	2.6	2.3	2.3	2.1	2.4	2.3
Transport, Postal and Warehousing	5.1%	3.5	2.5	2.4	2.2	2.0	1.8	2.3	2.1
Information Media and Telecommunications	1.8%	2.9	2.4	2.5	2.2	1.9	2.0	1.8	2.1
Finance and Insurance Services	3.5%	3.2	2.7	2.7	2.6	2.1	2.1	2.4	2.4
Rental, Hiring and Real Estate services	1.7%	2.8	2.7	2.3	1.6	1.3	1.7	2.1	1.8
Professional, Scientific and Technical Services	8.5%	3.5	1.9	1.9	1.6	1.4	1.7	2.2	1.8
Administration and Support Services	3.2%	3.3	2.5	1.9	1.4	1.4	1.8	2.1	1.7
Public Administration and Safety	6.6%	3.5	2.9	2.2	2.2	2.2	2.2	2.5	2.2
Education	8.2%	2.8	2.9	3.0	2.7	2.4	2.4	2.5	2.6
Health Care and Social Assistance	13.3%	3.3	2.9	2.7	2.5	2.4	2.8	2.9	2.7
Arts and Recreation Services	1.9%	2.9	2.7	3.0	2.4	2.0	2.5	2.6	2.5
Other Services	3.8%	3.2	2.4	2.2	2.2	1.9	2.3	2.3	2.2
State/Territory									
New South Wales	31.9%	3.1	2.5	2.3	2.1	2.1	2.1	2.3	2.2
Victoria	26.4%	3.0	2.7	2.7	2.1	2.0	2.5	2.9	2.4
Queensland	19.7%	3.0	2.6	2.4	1.9	1.9	2.2	2.3	2.1
South Australia	6.6%	3.3	3.3	2.6	2.3	2.2	2.0	2.2	2.3
Western Australia	10.6%	3.4	2.4	2.1	1.8	1.4	1.5	1.6	1.7
Tasmania	2.0%	2.9	2.3	2.5	2.2	2.0	2.5	2.4	2.3
Northern Territory	1.1%	3.2	2.8	2.4	2.0	2.1	1.5	1.9	2.0
Australian Capital Territory (ACT)	1.8%	2.9	2.3	1.9	1.9	1.9	1.8	2.2	1.9
Total All[1,2]	100%	3.3	2.6	2.4	2.1	2.0	2.1	2.3	2.2

Source: BIS Oxford Economics, ABS

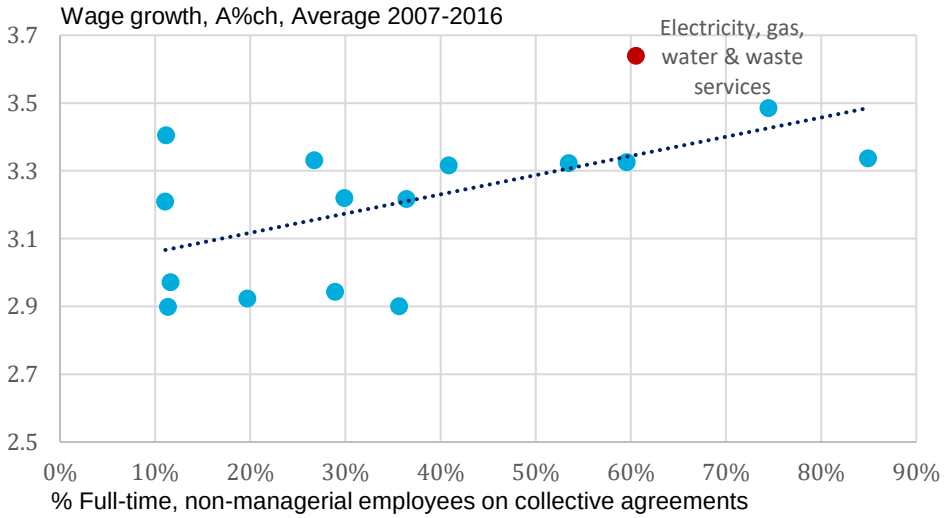
(1) Measures changes in the price of labour. Ordinary hourly rates of pay (excludes overtime and bonuses)
(2) Excludes Agriculture, Forestry & Fishing

Strong Union presence in the industry have seen collective agreements outcomes above the All Industry average.

Trade unions are typically able to negotiate higher-than-average wage outcomes for their members through collective bargaining, resulting in stronger wage growth than the all-industry average. Across the EGWWS sector, there are a number of 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).

As at May 2018, 64.6% of full-time non-managerial employees in the EGWWS industry have their wages set by collective agreements, considerably higher than the national average of 38.4%. Over the past 10 years, a higher proportion of workers on collective agreements is associated with higher wage growth, with a correlation coefficient of +0.6 (see Figure 4.1). As we expect that the EGWWS industry will continue to have higher levels of unionisation than the national average, we expect that unions in the EGWWS industry will continue to be able to negotiate for higher wages for a substantial proportion of EGWWS employees, resulting in EGWWS wages growing faster than the national average.

Figure 4.1 Average wage growth and unionisation rates by industry, 2007-2016



Year Ended June

Source: BIS Oxford Economics, ABS data

The key elements of the utilities wage forecast are set out in Table 4.2. 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 level of total utilities wages (in A$ terms) will generally be higher than the all industries average. Over the past five years, the outcomes from collective agreements in the EGWWs sector have been 0.1%pts higher, on average, than the all industries collective agreements average. We expect this trend to

continue over the outlook period, with collective agreements achieving average increases of 3.6% for the utilities sector, compared to 3.3% 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, collective agreements are forecast to remain around 1.5% above the 'official' CPI over the forecast period, which is lower than previous periods.

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.

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. 4.7 illustrates this relationship, and shows employment has a stronger relationship with utilities engineering construction rather than utilities output.

Wage increases under Individual agreements rebounded in FY19 and these and EBAs will strengthen due to stronger demand for skilled labour from Mining, Construction and defence sectors.

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 is estimated to have slowed appreciably over the three years to FY18, although we believe there were compositional effects that negatively impacted the estimation for this segment. Nevertheless, some of this reflected the general weakness in the economy and the full-time labour market at that time. However, we estimate that wage increases in the individual agreements segment rebounded in FY19 to around 2.7% as skilled labour shortages began to manifest. Indeed, recent vacancies data from the ABS has shown a marked increase in job vacancies over the past two years, with vacancies also lifting in the Mining and Construction sectors (see figure 4.2). Currently there are pressures building: a recent survey by the Australian Industry Group found that 3 in 4 employers reported an increasing

shortage of technicians and trade workers, and employees with STEM skills. These are essential workers in the utilities sector. Other business surveys are reporting similar findings in terms of increasing difficulties in sourcing skilled workers.

Although we expect the overall labour market to soften over the next 2 years, we subsequently expect an acceleration of employment growth through FY22, which will outpace population and labour force growth and the unemployment rate is expected to drop below 5% the second half of 2022. Hence, we expect to again witness the re-emergence of skilled labour shortages and competition for scarce labour particularly from the mining and construction sectors, which will push up wage demands in the utilities sector. Mining investment is now picking up and is forecast to see significant increases over the next 4 years to FY23, before easing (see figure 4.5). Meanwhile, there is similar strong growth underway in the non-residential building and civil infrastructure segments in the Construction sector, although these are somewhat offset by the current residential building downturn. However, with residential construction expected to recover over FY22 to FY24, there will be a synchronised upswing in the overall construction sector over FY22 and FY23 (see figure 4.4), leading to strong labour demand in that sector.

With strong competition for similarly skilled labour from the mining and construction industries, firms in the utilities sector will need to raise wages to attract and retain workers. In other words, the mobility of workers between the EGWWS, mining and construction industries means that demand for workers in those industries will influence employment, the unemployment rate and hence spare capacity in the EGWWS labour market. Businesses will find they must 'meet the market' on remuneration in order to attract and retain staff and we expect wages under both individual arrangements and collective agreements to increase markedly over the next few years.

Figure 4.2 Job Vacancies as % Employment by Industry

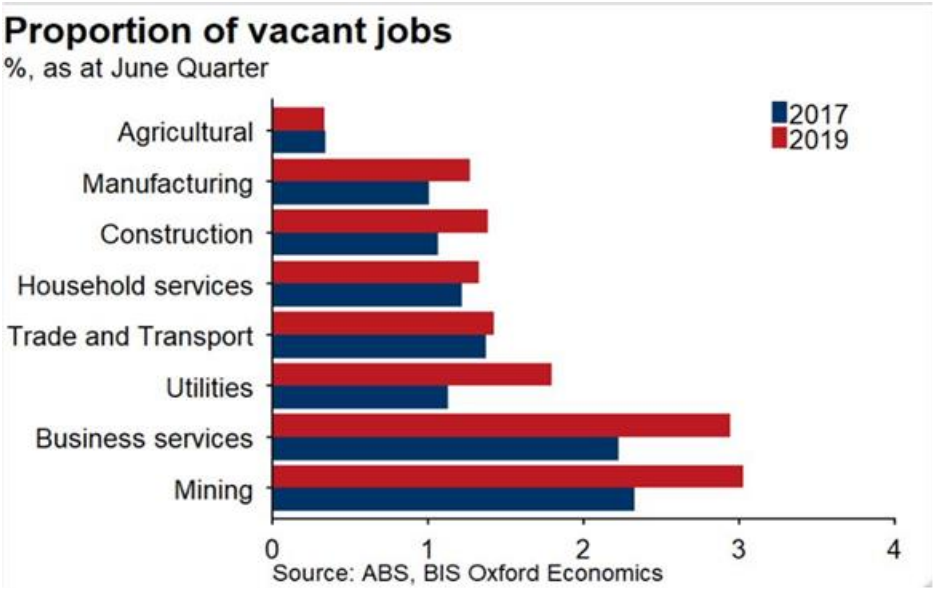


Figure 4.3. Wage Price Index - Australia All Industries, Electricity, Gas, Water and Waste Services, Mining and Construction

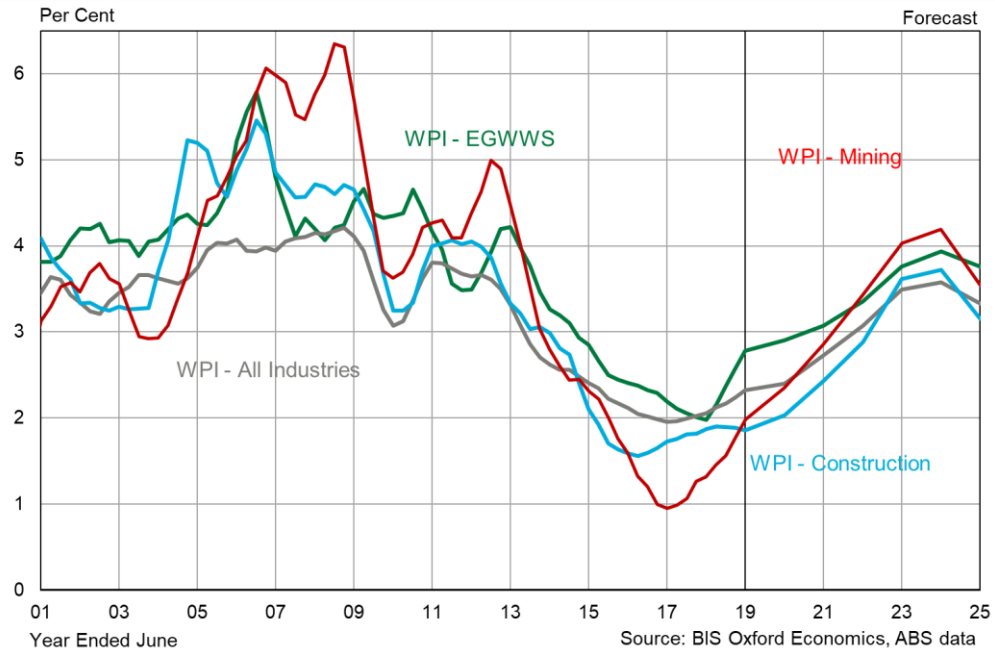


Figure 4.4. Australia – Construction Activity (2016/17 prices)

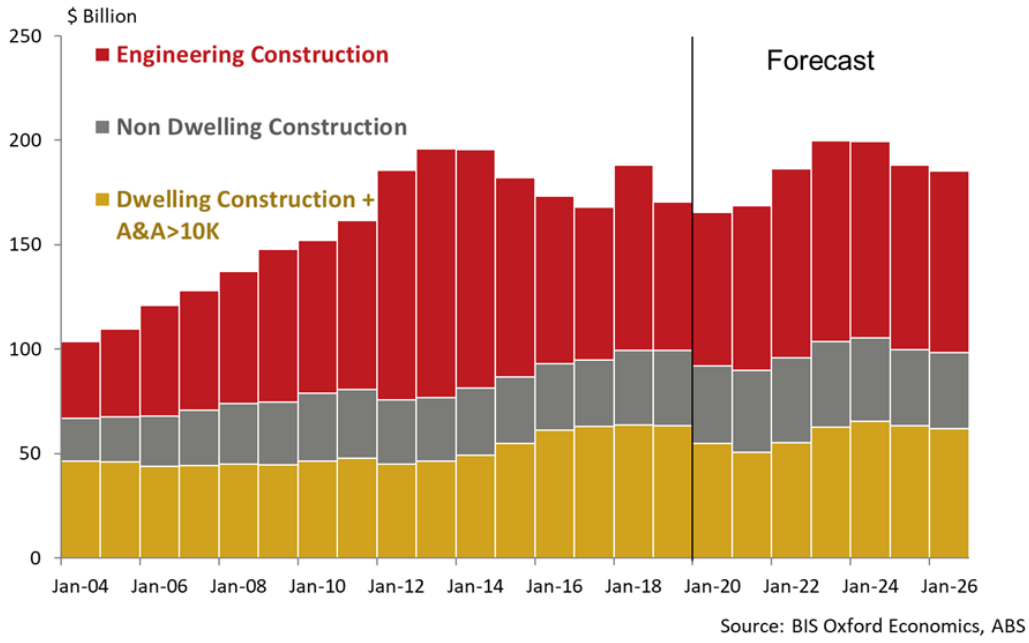
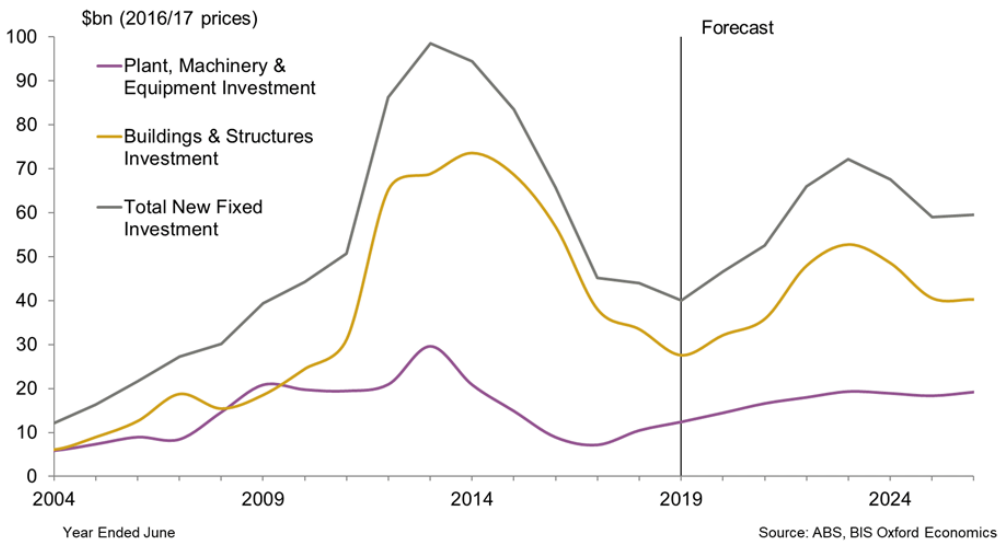


Figure 4.5. Australia – Mining Investment



Utilities wage growth is forecast to continue to outpace the national 'all industries' average over the forecast period.

Overall, 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 3.6% per annum (0.4 percentage points higher than the national all Industries WPI average of 3.2% per annum) over the five years to FY25. 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 4.0% per annum over the five years to FY25, 0.2% higher than the national All Industries AWOTE average of 3.8% per annum over the same five-year period (see Table 4.3 and Summary Table 1.1).

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.

Table 4.2 Electricity, Gas, Water & Waste Services, Australia - Wages Growth by Workforce Segmented by Pay Setting Method

Year Ended June	% of Workforce in 2018	Year Average Per Cent Change (a)											
						Forecast						Average	Average
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2019-25	2021-25
Awards Only	1.5%	2.5	2.4	3.3	3.5	3.1	3.3	3.3	3.5	3.5	3.5	3.4	3.4
Collective Agreements	64.6%	3.2	3.0	2.9	2.8	3.0	3.2	3.5	3.8	4.0	3.9	3.5	3.7
Individual Arrangements	33.9%	0.9	0.6	0.5	2.7	2.7	2.8	3.0	3.6	3.8	3.4	3.2	3.3
Wage Price Index (a)	**100%**	**2.4**	**2.2**	**2.0**	**2.8**	**2.9**	**3.1**	**3.4**	**3.8**	**3.9**	**3.8**	**3.4**	**3.6**
Compositional Effects + Bonuses,etc		1.1	2.1	0.3	-1.5	0.4	0.5	0.5	0.3	0.4	0.3	0.1	0.4
AWOTE (b)	100%	3.5	4.3	2.3	1.3	3.3	3.6	3.9	4.1	4.3	4.0	3.5	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).

Total EGWWS wages growth understates wages growth in the Electricity sub-sector.

Related to the above point, we also believe the overall wage growth forecasts for the total EGWWS sector (presented in the accompanying tables) will understate wages growth in the electricity sub-sector, particularly as the labour market tightens for workers with higher skills. Independent studies have shown that the electricity and gas sub-sectors have a larger number of specialised roles, such as electrical engineers, structural engineers, electricians and gas fitters – who have skills that are transferable across other industries such as mining, construction and manufacturing, and are often in high demand.

On the other hand, the water supply, sewerage and drainage services and waste collection, treatment and disposal services sub-sectors have a higher proportion of non-specialised occupations with lower skill levels, e.g. truck drivers, forklift drivers (Source: Victorian Department of Education and Early Childhood Development, Victorian Electricity and Gas Industry Skills & Training Needs 2013; Victorian Waste and Waste Services Skills & Training Needs 2013. May 2014). With the supply of lower skilled workers growing relatively quickly, wage increases for this group are subdued compared to higher skilled workers.

This is supported by Industry wage data for 2016/17 from the ABS, which shows that average wage levels in the electricity sub-sector are over 50% higher than employees in the waste sub-sector, and 40% higher than those in the water and sewerage sub-sector. In effect, the overall EGWWS average wage level is dragged down by the water and (particularly) waste sub-sectors. Therefore, it is likely that future labour escalation rates for electricity and gas workers will exceed those of other workers in the overall EGWWS sector.

EGWWS sector has high levels of productivity, compared to the national average, which underpins higher wages.

The EGWWS sector has one of the highest levels of sectoral productivity – as measured by real Gross Value Added (GVA) per employed person – among the 18 industry sectors, with only Mining and Finance & Insurance Services having higher productivity. Utilities' productivity is more than double the national

average according to ABS data for Australia and well above the average for the New South Wales (see figure 4.9). High productivity levels and commensurate skill levels are the key reasons why wage levels are much higher in the utilities sector than most other industries (in terms of average weekly earnings measures – see table 4.3).

However, over the past 18 years, the growth in productivity in the sector has not been a driver of higher wages growth in the utilities sector. Productivity suffered a steep decline over 2001 to 2014 due to a combination of strong employment growth (mainly due to rising investment, as previously discussed) and weak growth in GVA, both in Australia and the New South Wales (see figure 4.9). Meanwhile, utilities wages growth was relatively strong over this same period (see table 4.3). In effect, there is no clear relationship between wages growth and the traditional productivity measures (i.e. GVA/Employment) in the utilities sector. Low productivity is set to continue in part because GVA (output) growth is expected to remain low, with low output a function of low demand caused both by high prices and energy-saving (and water-saving) measures. However, employment levels are expected to remain relatively stable due to the need to maintain a skilled workforce to ensure reliability and undertake capital works to cater for population and economic growth and for capital replacement.

Table 4.3 Total Australia (All Industries) and Electricity, Gas, Water and Waste Services Average Weekly Ordinary Time Earnings and Wage Price Index (Year Average Growth)

Year Ended June	Average Weekly Ordinary Time Earnings (1)				Wage Price Index (2)			
	All Industries		Electricity, Gas, Water and Waste Services		All Industries		Electricity, Gas, Water and Waste Services	
	$	%CH	$	%CH	Index	%CH	Index	%CH
2001	804	5.1	918	6.0	74	3.5	71	3.8
2002	847	5.4	981	6.8	77	3.3	74	4.2
2003	890	5.0	1 001	2.1	79	3.5	77	4.1
2004	932	4.7	1 057	5.5	82	3.6	80	4.1
2005	973	4.4	1 091	3.2	85	3.7	83	4.3
2006	1 018	4.6	1 111	1.9	89	4.1	88	5.2
2007	1 054	3.6	1 152	3.7	92	3.9	92	4.8
2008	1 106	4.9	1 183	2.7	96	4.1	96	4.2
2009	1 166	5.5	1 255	6.1	100	4.1	100	4.5
2010	1 231	5.6	1 351	7.6	103	3.1	104	4.3
2011	1 283	4.2	1 474	9.1	107	3.8	109	4.2
2012	1 338	4.3	1 510	2.5	111	3.6	113	3.5
2013	1 400	4.6	1 602	6.1	115	3.3	117	4.2
2014	1 442	3.0	1 635	2.0	118	2.6	121	3.3
2015	1 477	2.4	1 646	0.7	120	2.4	125	2.8
2016	1 505	1.9	1 704	3.5	123	2.1	128	2.4
2017	1 536	2.0	1 777	4.3	125	2.0	130	2.2
2018	1 573	2.4	1 818	2.3	128	2.1	133	2.0
2019	1 615	2.7	1 842	1.3	131	2.3	137	2.8
Forecasts								
2020	1 666	3.2	1,903	3.3	134	2.4	140.6	2.9
2021	1 723	3.4	1,970	3.6	138	2.7	144.9	3.1
2022	1 789	3.8	2,047	3.9	142	3.1	149.7	3.4
2023	1 860	4.0	2,130	4.1	147	3.5	155.4	3.8
2024	1 936	4.1	2,223	4.3	152	3.6	161.5	3.9
2025	2 010	3.8	2,312	4.0	157	3.3	167.6	3.8
Compound Annual Growth Rates (2)								
2000-2010	4.9		4.5		3.7		4.3	
2010-2019	3.1		3.5		2.7		3.0	
2018-2025	3.6		3.5		3.0		3.4	
2020-2025	3.8		4.0		3.2		3.6	

(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 2020-2025 is the annual growth for 2020/21 to 2024/25 inclusive i.e. next Revenue Determination period.

4.2.1 New South Wales Utilities Wages Outlook

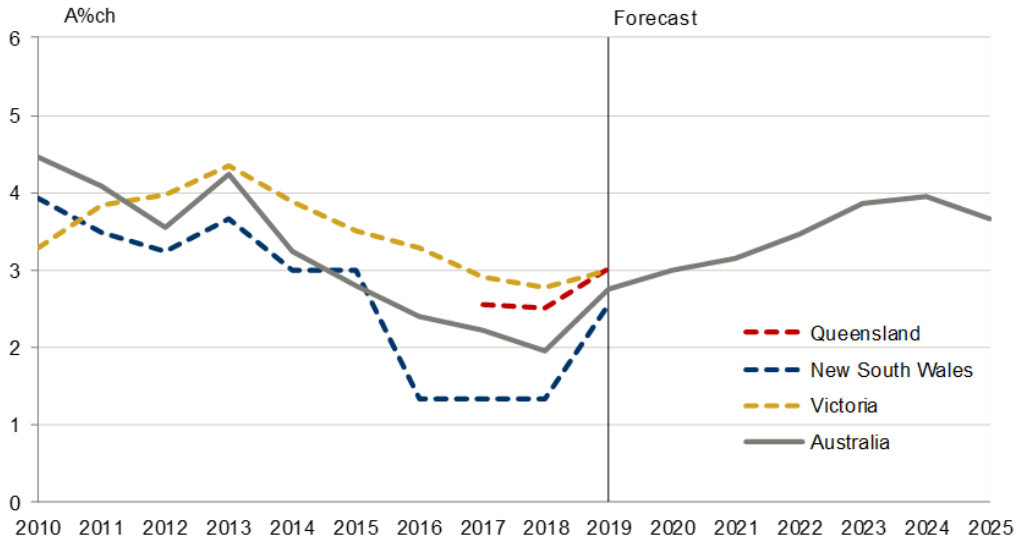
Given that NSW utilities employment accounts for just under 30% of total Australian utilities employment, it is not surprising that wage growth trends in the NSW utilities sector are close to the national utilities average. This has been the case for most of the past two decades (with earlier ABS data for AWOTE for the narrower categorised Electricity, Gas and Water sector showing the NSW utilities sector mostly outpaced the national utilities average

wage growth, until the ABS stopped publishing AWOTE by industry by state in 2011).

However, over the 3 years to FY18, average wage rises in the NSW utilities sector were well below the national average. This appears to be an aberration, and may have been related to downward pressure on wages (particularly wage increases in the areas outside collective agreements) before, during and immediately following the privatisation of the NSW electricity businesses. Prior to 2015, the NSW utilities wage increases were usually close (on average) to the national average.

Over the past four-to-six quarters, wage rises in the NSW utilities sector have recovered, back to near the q/q national rises. We expect this trend to continue, and for wage rises in the NSW utilities sector to track the national average. Wider pressures in the overall state labour market – the current NSW unemployment rate at 4.8% is well below the national average of 5.3%, and we expect the state unemployment rate to remain below or close to the national average - will also ensure that wage rises will tend to track the national average at the broader (all industries) level, as well as putting pressure on certain industries such as the electricity sector with its higher skill demands.

Figure 4.6 Electricity, Gas, Water and Waste Services Wage Price Index, Australia, New South Wales, Victoria and Queensland



Year Ended June

Source: BIS Oxford Economics, ABS data

We also expect some degree of 'catch-up' to occur, especially in relation to the Victorian utilities sector, where wage rises over recent years have significantly outpaced the NSW utilities wage increases (and national average). The NSW utilities businesses will find they need to offer higher wages to local workers and keep pace with interstate utilities wages growth to both avoid losing workers interstate and to attract workers from interstate with the necessary requisite skills.

Other factors will also act to push up NSW utilities wages, including an acceleration in construction sector and total wages and relatively high levels of utilities-related engineering construction over the next seven years. Figure 4.3 shows BIS Oxford Economics' forecasts of EGWWS and construction sector wages growth. Construction sector activity will be boosted by a large program of transport infrastructure projects in the eastern states, which will ramp up over FY22 to FY25. The acceleration in construction sector wages growth in particular - and indeed all industries (total) wages growth – will put upward pressure on utilities wages. The construction sector, along with the mining and manufacturing sectors, tend to compete with the utilities sector for similarly skilled labour. Meanwhile, the relatively high levels of utilities-related engineering construction activity will add to labour demand in the NSW and Australian utilities sector (see figure 4.8).

This will result in a marked strengthening in wages growth in the NSW utilities sector over the 2020/21 to 2023/24 period, before easing. Overall, WPI growth in the NSW utilities sector is forecast to average 3.5% over the five years to 2024/25 inclusive (i.e. Jemena Gas Networks' next regulatory period), or 1.3% in real (inflation adjusted) terms (see Summary table 1.1).

These latest EGWWS WPI forecasts for both NSW and Australia are around 0.2% lower in real terms than the forecasts delivered in mid-March 2019. Key reasons for the downward revisions to the forecasts include: weaker-than-expected growth in All Industries and EGWWS wages over 2019; slightly lower increases in recent 'approved' EBAs; lower inflation expectations (related to current low inflation); and slightly lower forecast economic and employment growth in the near-term, which pushed up the unemployment rate up a bit higher than the forecasts prepared in early March, thus reducing wage pressures.

Figure 4.7 Australia – Utilities Employment, Output and Investment

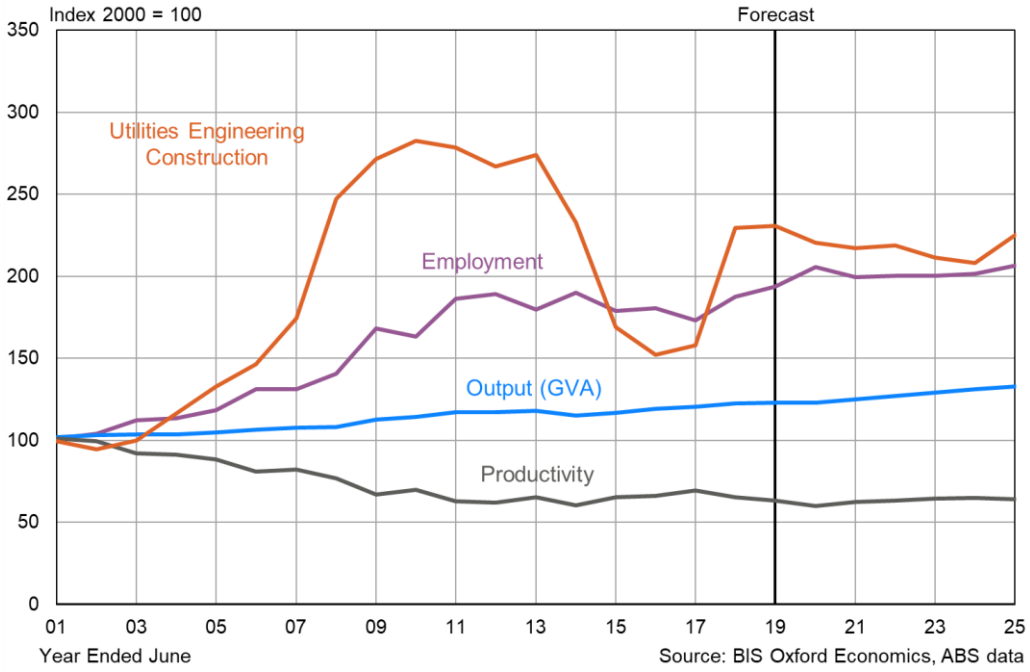


Figure 4.8 New South Wales – Utilities Employment, Output and Investment

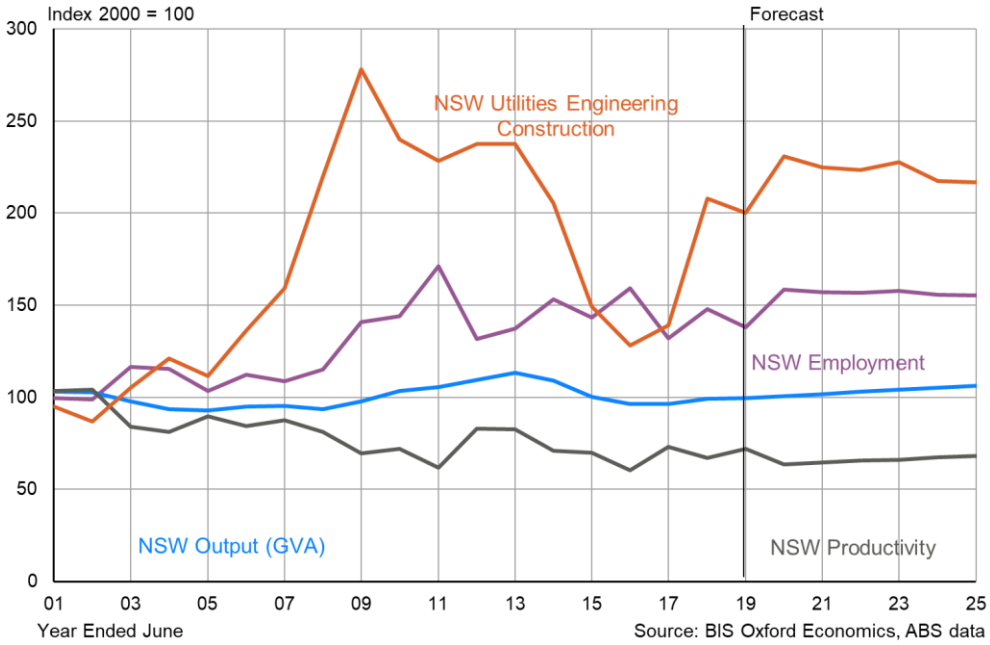
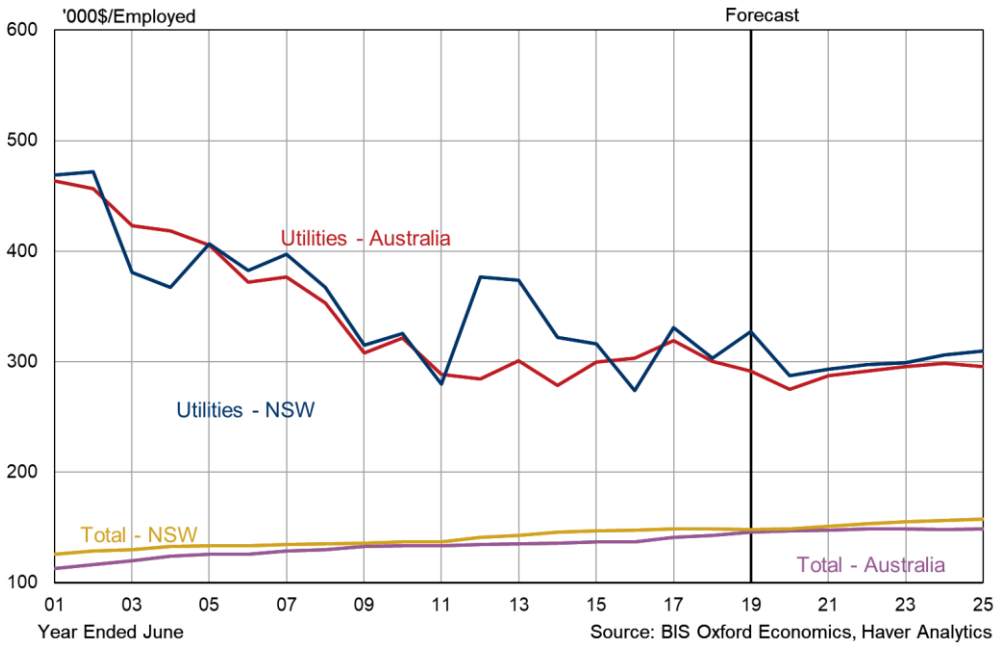


Figure 4.9 Utilities Productivity in Australia and New South Wales



APPENDIX 1: A NOTE ON DIFFERENT WAGE MEASURES

Several different measures of wages growth are referred to in this report, each differing slightly both in terms of their construction and appropriateness for measuring different aspects of labour costs. The following provides a brief summary of the main measures, what they are used for and why.

The main wage measures are:

• Average Weekly Ordinary Time Earnings (AWOTE) — earnings gained from working the standard number of hours per week. It includes agreed base rates of pay, over-award payments, penalty rates and other allowances, commissions and retainers; bonuses and incentive payments (including profit share schemes), leave pay and salary payments made to directors. AWOTE excludes overtime payments, termination payments and other payments not related to the reference period. The AWOTE measures used in this report refer to full-time adult AWOTE and are sourced from the Australian Bureau of Statistics (ABS) catalogue number 6302.0, with BIS Oxford Economics forecasts.

• Average Weekly Earnings (AWE) — represents average total gross earnings (before tax) of all employees (including full-time and part-time workers). They include weekly ordinary time earnings plus over-time payments.

• The Wage Price Index (WPI) — a CPI-style measure of changes in wage and salary costs based on a weighted combination of a surveyed 'basket' of jobs. The WPI used in this report excludes bonuses. The WPI also excludes the effect of changes in the quality or quantity of work performed and most importantly, the compositional effects of shifts within the labour market, such as shifts between sectors and within firms. The WPI figures quoted in this report are sourced from ABS catalogue number 6345.0, with BIS Oxford Economics forecasts.

Each measure provides a slightly different gauge of labour costs. However, the main distinction between average earnings measures and the wage price index relate to the influence of compositional shifts in employment. The compositional effects include changes in the distribution of occupations within the same industry and across industries, and the distribution of employment between industries. For example, a large fall in the number of lower paid employees, or in employment in an industry with lower average wages, will increase average weekly earnings (all else being equal). While this is a true reflection of the average cost of labour to businesses, it is not necessarily the best measure of ongoing wage inflation (ie trends in wage-setting behaviour in the labour market). Another compositional problem with using the 'all persons' AWOTE is variations in the proportion of male and female employees (particularly as average female AWOTE is lower than average male AWOTE). However, in practice, the data shows only minor differences in the AWOTE growth rates

between male and females (or males and all persons) — between -0.2 and +0.2 per cent — since the 1980s or basically since the equal pay legislation was enacted through the 1970s.

The wage price index was specifically designed to get around these compositional problems. It uses a weighted average of wage inflation across a range of closely specified jobs. As it measures the collective variations in wage rates made to the current occupants of the same set of specified jobs, the WPI reflects pure price changes, and does not measure variations in quality or quantity of work performed. However, like the CPI (Consumer Price Index), the weights are fixed in a base year, so that the further away from that base and the more the composition of the labour market changes over time, the more 'out of date' the measure becomes.

Importantly, the WPI does not reflect changes in the skill levels of employees within industries or for the overall workforce and will therefore understate (or overstate) wage inflation if the overall skill levels increase (or decrease). The wage price index is also likely to understate true wage inflationary pressures as it does not capture situations where promotions are given in order to achieve a higher salary for a given individual, often to retain them in a tight labour market. Average weekly earnings would be boosted by employers promoting employees (with an associated wage increase), but promoting employees to a higher occupation category would not necessarily show up in the wage price index. However, the employer's total wages bill (and unit labour costs) would be higher.

APPENDIX 2: CURRICULUM VITAES OF PERSONNEL

Richard Robinson – 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 Oxford Economics' half yearly conferences in March and September. He contributes forecasts and analysis to the regular subscription services, Australian Macro Service 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 in Economics from the University of Wollongong.

Nicholas Ng – Economist – Building and Construction

Nicholas has contributed to numerous studies and projects in infrastructure and mining & heavy industry. With a developed understanding of the trends and drivers impacting investment, production, and contracting, Nicholas been a project manager and key contributor to several editions of Mining in Australia, Engineering Construction in Australia, and Road Maintenance in Australia. His experience in the consulting realm includes an audit of capital projects for the Western Australian Department of Mines, cost escalation studies, and detailed investigations into resource investment and supply chain from ground to consumer. A track record of bespoke work has also exposed Nicholas to forecasts of domestic versus foreign engineering work, regional activity analysis, and state level coverage of residential, non-residential, and civil construction.

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