Attachment 7.8

BIS Oxford Economics Input cost escalation forecasts to 2025/26

SA Final Plan July 2021 – June 2026

July 2020

Australian Gas Networks

BIS OXFORD ECONOMICS

INPUT COST ESCALATION FORECASTS TO 2025/26

PREPARED BY BIS OXFORD ECONOMICS
FOR AUSTRALIAN GAS NETWORKS

FEBRUARY 2020

BIS OXFORD ECONOMICS

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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February 2020

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.

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EXECUTIVE SUMMARY

REAL COST ESCALATION FORECASTS TO 2025/26

In August 2019, BIS Oxford Economics (BISOE) was engaged by Australian Gas Networks (AGN) to provide price forecasts of labour and materials that are relevant to the South Australian gas distribution industry for the period 2021/22 to 2025/26 (FY22 to FY26). Forecasts for wage and other input cost escalation will be used by Australian 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.

For **gas network related labour**, BIS Oxford Economics expects total wage costs for both the Australian and South Australian Electricity, Gas, Water and Waste Services (EGWWS or 'Utilities') sector — expressed in Wage Price Index (WPI) terms — will average 3.6% per annum over the five years to 2025/26, 0.3% higher than the national (Australian) 'All Industries' average of 3.3% p.a. over the same five-year period.

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

- the electricity, gas and water sector is a largely capital intensive industry whose employees have higher skill, productivity and commensurately higher wage levels than most other sectors.
- strong union presence in the utilities sector will ensure outcomes for collective agreements, which cover 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 (38%), and EBAs wage rises normally higher than individual agreements, this means higher 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 FY22.
- demand for skilled labour has picked up and will strengthen with the high levels of utilities investment over FY18 to FY21, 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 the Retail Trade, Wholesale Trade, Accommodation, Cafés and Restaurants, and, in some periods, also Manufacturing and Construction. These sectors tend to be highly cyclical, with weaker employment suffered during downturns impacting on wages growth in particular. The EGWWS sector is not impacted in the same way due to its obligation to provide essential services and thus retain skilled labour.

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 mining and construction sectors are competitors for similar skilled workers and, 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 toFY24. This will force companies in the utilities sector to push up wages to 'meet the market', in order to attract and retain skilled workers

Over the past three years, overall WPI growth in the EGWWS sector in South Australia is estimated to have been slightly lower than the national EGWWS increase, and this is expected to persist over the next few years. South Australian EGWWS WPI growth has already moved off recent lows, rising in FY19, with a further pick up to 2.9% (nominal terms) by 2020/21.

However, a marked pick-up in economic growth in the state from around FY22 is expected to see employment growth and the labour market tighten. A key element of the ongoing strength in the state economy is the large amounts of defence-related expenditure in South Australia over the forecast period (and beyond), including the manufacture of naval ships, submarines and army vehicles. This will also increase the demand for skilled labour and see the defence manufacturing sector also compete with the utilities sector for similarly skilled workers, many of which will have transferable skills across the utilities, construction, mining and manufacturing sectors.

The pick-up in growth from 2022 is expected to be accompanied by increases in utilities related construction in the state, mining-related investment and construction activity generally. The overall strengthening in the labour market, and particularly in the Construction and Mining sectors, is expected to result in utilities WPI growth accelerating significantly over the 2022 to 2024 period, and subsequently remain elevated over the following two years to 2025/26.

South Australian utilities WPI growth is forecast to average 3.6% p.a. in nominal terms over the five years to 2025/26 inclusive (i.e. AGNs' next regulatory period) – or 1.3% in real (inflation adjusted) terms (see Table 1.1).

Given service providers outsourced labour is mostly supplied by firms in the construction industry, we proxy Australian Gas Networks' **external labour cost escalation** by wages growth (as measured by the WPI) in the South Australian construction industry. Our research has shown that construction activity (ie work done in the sector) normally has a strong influence on construction wages, although changes in wages tend to lag construction (in work done terms) by around one year. Hence, our wage forecasts are based on BIS Oxford Economics forecasts of construction activity by state (which includes residential and non-residential building, plus engineering construction) as well as predicted movements in the construction wages at the national level.

Construction wages at the national and South Australian level have weakened dramatically since 2011/12 and are well below the robust increases during the construction boom of the latter half of last decade. While collective agreements in the sector have maintained their relative high increases over the past 4 years – between 4% and 5% – wages growth in the individual agreements segment have been very weak. Construction employees in the individual agreements segment account for around 61% of construction employees, dominating the method of pay-setting within the sector. However, with the overall labour market beginning to tighten, and construction activity levels remaining strong, we expect wages growth in the sector to continue to improve, after picking up from their lows of 2016. Nevertheless, construction activity is set to again weaken over FY20 and FY21, and this will limit the improvement in construction wages growth over the next two years.

Construction wages are expected to accelerate over FY22 to FY24, driven by the recovery in residential building activity which is expected to rise out of its trough from FY22, while high levels of non-dwelling building and rising engineering construction will underpin higher wages due to strong labour demand and expected widespread skill shortages in the construction industry. Declines in construction activity over FY25 to FY26, coupled with a

general weakening across overall labour markets will then cause construction wages growth to ease over FY25 and particularly FY26.

Our forecast is for the Australian Construction WPI to average 3.3% over the five-year period to 2025/26 at the national level, with South Australian construction wages growth to be slower at 3.2% – or 0.9% per annum on average in real (inflation adjusted) terms (see Table1.1).

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

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	5 yr Avg (f)
	Actuals					Forecasts			Next Regulatory Period				
NOMINAL PRICE CHANGES													
1. Gas Network-Related Labour													
EGWWS WPI - South Australia (a)	**2.9**	**2.0**	**1.9**	**2.0**	**2.5**	**2.8**	**2.9**	**3.2**	**3.6**	**3.8**	**3.7**	**3.5**	**3.6**
EGWWS WPI - Australia (b)	2.8	2.4	2.2	2.0	2.8	2.9	3.1	3.3	3.7	3.9	3.7	3.6	3.6
EGWWS AWOTE - Australia (b)	0.7	3.5	4.3	2.3	1.3	3.3	3.5	3.7	4.0	4.2	4.0	3.9	4.0
2. Contractor Labour Cost Escalation													
Construction WPI - South Australia (c)	**1.9**	**1.4**	**1.4**	**1.6**	**1.8**	**2.0**	**2.2**	**2.6**	**3.4**	**3.6**	**3.4**	**2.9**	**3.2**
Construction WPI - Australia (b)	2.1	1.6	1.7	1.9	1.9	2.0	2.4	2.8	3.6	3.7	3.4	3.0	3.3
Construction AWOTE - Australia (b)	2.2	1.4	2.2	1.0	-0.6	3.9	3.2	3.6	4.1	4.4	4.0	3.5	3.9
3. Australian Wages													
All Industries - WPI (d)	2.4	2.1	2.0	2.1	2.3	2.4	2.7	3.0	3.4	3.5	3.3	3.2	3.3
All Industries - AWOTE (d)	2.4	1.9	2.0	2.4	2.7	3.2	3.4	3.6	3.9	4.1	3.8	3.7	3.8
Consumer Price Index (headline) (e)	1.7	1.4	1.7	1.9	1.6	1.9	1.8	2.1	2.3	2.3	2.3	2.3	2.3
REAL PRICE CHANGES (g)													
1. Gas Network-Related Labour													
EGWWS WPI - South Australia (a)	**1.1**	**0.7**	**0.2**	**0.1**	**0.9**	**0.9**	**1.1**	**1.1**	**1.3**	**1.5**	**1.4**	**1.2**	**1.3**
EGWWS WPI - Australia (b)	1.1	1.0	0.5	0.0	1.1	1.0	1.2	1.2	1.4	1.6	1.4	1.3	1.4
EGWWS AWOTE - Australia (b)	-1.0	2.2	2.6	0.4	-0.3	1.4	1.7	1.6	1.7	1.9	1.7	1.6	1.7
2. Contractor Labour Cost Escalation													
Construction WPI - South Australia (c)	**0.2**	**0.0**	**-0.3**	**-0.4**	**0.1**	**0.1**	**0.4**	**0.5**	**1.1**	**1.3**	**1.0**	**0.6**	**0.9**
Construction WPI - Australia (b)	0.4	0.2	0.0	-0.1	0.2	0.1	0.6	0.7	1.3	1.4	1.1	0.6	1.0
Construction AWOTE - Australia (b)	0.5	0.0	0.5	-0.9	-2.2	2.0	1.4	1.5	1.7	2.0	1.7	1.2	1.6
3. Australian Wages													
All Industries - WPI (d)	0.7	0.7	0.2	0.1	0.7	0.5	0.9	0.9	1.1	1.2	1.0	0.9	1.0
All Industries - AWOTE (d)	0.7	0.5	0.3	0.5	1.0	1.3	1.6	1.5	1.6	1.8	1.5	1.4	1.5

Sources: BIS Oxford Economics, ABS

(a) Electricity, Gas, Water and Waste Services (EGWWS) Average Weekly Ordinary Time Earnings (AWOTE) and Wage Price Index (WPI) for South Australia.
(b) Australian sector wage forecasts provided for comparison.
(c) Construction Sector WPI for South Australia.
(d) Australian All Industries AWOTE and WPI provided for comparison.
(e) Reserve Bank of Australia forecasts to December 2021. Beyond that, we have used a 10-year arithmetic average of RBA forecasts and the mid-point of the Reserve Bank's 2 to 3 per cent inflation target range, which is the method preferred by the AER.
(f) Average Annual Growth Rate for 2021/22 to 2025/26 inclusive, ie for next regulatory period.
(g) Real price changes are calculated by deducting the inflation rate from nominal price changes.

Nominal prices for most of the **gas network related materials** are forecast to increase on average over the five-year period to FY26. After adjusting for the expected impacts of inflation, aluminium is expected to achieve the strongest price growth over the forecast period, at an average of 2.2% per annum followed by polyethylene pipe (1% pa). On the other hand, many materials are expected to see negative or no real price growth. This includes steel pipe prices, concrete, and the gas and fuel engineering construction IPD (implicit price deflator).

Given the variety of supply and demand drivers affecting prices of these commodities, each will be discussed in the relevant sections of report that follow. The year-by-year forecasts are shown in table 1.2.

As well as individual supply and demand drivers, consumers of these commodities in Australia are also affected by movements in the exchange rate. Specifically, movements in the Australian dollar (A$) against the US dollar (US$) can have significant effects on the domestic price of minerals and metals, as most globally traded commodities are priced in US$ terms. We used consensus forecasts to drive the outlook for these commodities where available. For exchange rates, these were only available for the near term. We therefore held rates constant over the longer term, at the last forecast point. Overall the exchange rate is predicted by the large range of forecasters supplying forecasts to the Consensus Economics survey to drift up from around US67 cents currently (February 2020) to around US71 cents by early 2022.

Table 1.2 Summary – Gas Network Materials and General Materials

Gas Network and Non-gas Network Related Materials	Annual Financial Year Growth											
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	5 yr Avg (h)
	Actual				Forecast		Next Regulatory period					2022-2026
Nominal Price Changes												
PE Pipe Price Index - A$ index (a)	1.1	-3.7	3.5	4.7	-9.5	2.1	6.9	3.1	2.4	2.2	1.7	**3.2**
Concrete (b)	-0.4	1.7	2.4	1.7	-0.2	1.1	1.8	2.3	1.1	-0.1	0.2	**1.1**
Gas & Fuel Construction Price Index (c)	-1.1	-1.4	4.5	6.4	2.4	1.8	2.4	2.7	2.4	2.0	1.8	**2.3**
Steel Pipe and Tube PPI (d)	-1.7	5.9	-5.7	6.6	-2.4	-0.5	0.3	0.2	0.1	1.0	1.0	**0.5**
Aluminium (e)	-5.6	10.9	17.1	-2.5	-3.6	2.4	1.2	3.8	3.1	8.4	6.1	**4.5**
General Materials	1.4	1.7	1.9	1.6	1.9	1.8	2.1	2.3	2.3	2.3	2.3	**2.3**
Exchange rate, A$, (period avg) (f)	*0.73*	*0.75*	*0.78*	*0.72*	*0.69*	*0.69*	*0.70*	*0.71*	*0.71*	*0.71*	*0.71*	*0.71*
Consumer Price Index (Headline)[(g)]	1.4	1.7	1.9	1.6	1.9	1.8	2.1	2.3	2.3	2.3	2.3	***2.3***
Real Price Changes												
PE Pipe Price Index - A$ index (a)	-0.3	-5.5	1.5	3.1	-11.4	0.3	4.8	0.8	0.0	-0.2	-0.6	**1.0**
Concrete (b)	-1.8	0.0	0.5	0.0	-2.1	-0.8	-0.3	0.0	-1.2	-2.4	-2.2	**-1.2**
Gas & Fuel Construction Price Index (c)	-2.4	-3.1	2.6	4.7	0.5	0.0	0.3	0.4	0.0	-0.3	-0.5	**0.0**
Steel Pipe and Tube PPI	-3.0	4.2	-7.6	4.9	-4.3	-2.3	-1.8	-2.1	-2.2	-1.4	-1.3	**-1.8**
Aluminium (e)	-7.0	9.2	15.2	-4.1	-5.5	0.6	-0.9	1.4	0.7	6.1	3.8	**2.2**
General Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**

Sources: BIS Oxford Economics, ABS, Consensus Economics

(a) PE (Polyethylene) prices are proxied using Manufacturing Wages, General Materials inflation and Thermoplastic Resin prices. Thermoplastic Resin is primarily driven by Crude Oil. Crude oil price forecasts are sourced from the latest available Consensus Economics 'Energy & Metal Consensus Forecasts' (EMCF) publication. US$ prices adjusted by using exchange rate above (see footnote (f)).

(b) Producer price index (PPI) for concrete, cement and sand: Adelaide. Forecasts based on BIS Oxford Economics (BISOE) modelling and construction and other macroeconomic forecasts.

(c) Gas and Fuel Construction Price Index forecasts from BISOE modelling and construction and other macroeconomic forecasts

(d) Steel Pipe & Tube producer price index (PPI), modelled using latest EMCF price forecasts for iron ore and coking coal, converted to A$ (using above exchange rate); plus manufacturing wages, transport co

(e) Aluminium price is London Metal Exchange (LME) price, converted to A$ (using above exchange rate). Forecasts from Consensus EMCF.

(f) Exchange rate forecasts sourced from latest available Consensus Economics 'Asia Pacific Consensus Forecasts' (APCF), which has forecasts covering the next 2 years, after which exchange rate is held steady.

(g) Reserve Bank of Australia forecasts to December 2021. Beyond that, we have used a 10-year arithmetic average of RBA forecasts and the mid-point of the Reserve Bank's 2 to 3 per cent inflation target range, which is the method preferred by the AER.

(h) Average Annual Growth Rate for 2021/22 to 2025/26 inclusive, ie for next regulatory period.

1. INTRODUCTION

In August 2019, BIS Oxford Economics was engaged by Australian Gas Networks (AGN) to provide updated price forecasts of labour and other input costs relevant to gas distribution networks in South Australia from 2020/21 to 2025/26. Forecasts of wages and materials will be used by Australian 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 early February 2020 and includes the September quarter 2019 WPI data release. Other inflation 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 and other input costs including numerical forecasts which are presented in the summary table.

Section 2 provides a macroeconomic outlook for Australia and South Australia. 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 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) and Construction sectors for Australia and South Australia, as measured by the Wage Price Index (WPI).

Section 5 provides forecasts for general materials and gas network related materials, including polyethylene pipe, concrete, steel and aluminium, plus a forecast for the Gas and Fuel engineering construction implicit price deflator (IPD), which measures the changes in construction costs of gas and fuel infrastructure and pipelines.

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

2. MACROECONOMIC OUTLOOK

2.1 AUSTRALIA ECONOMIC 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 1.7% through-the-year to September 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 2.1% in FY20, with negative impacts from the widespread bushfires and coronavirus in the March quarter 2020, expected to be unwound over the June and September quarters. We then expect growth to pick up to 2.7% in FY21 and then subsequently strengthen 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.

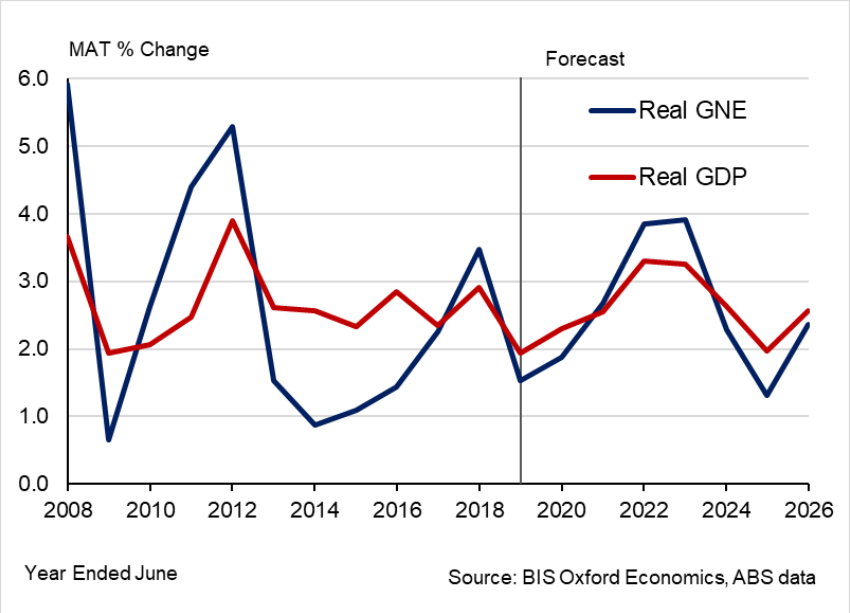
Residential construction activity has turned down sharply and the cycle has much further to run - we expect dwelling investment will be a large drag on GDP growth, and to a lesser extent employment growth, in FY20 and FY21. However, house prices have recovered in Sydney and Melbourne over recent months, 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 and coronavirus impacts

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 last 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 estimated growth was 2.9% in 2019, with the slowdown in growth in the US, China, Europe and India becoming apparent.

Global growth was showing signs of stabilisation by late 2019, but the coronavirus outbreak in early 2020 will have negative impacts on growth, particularly in Q1 2020. We estimate it will knock up to -0.5% off China's economic growth in 2020, with impacts on other Asian economies in particular, as well as US growth. In Australia, there will be some impacts on goods exports and commodity prices, but the main impacts will be on tourism (with the widespread bushfires also hurting inbound tourism) and education exports, which are assumed to unwind over Q2 and Q3. Global growth is expected to remain subdued in 2020, but thereafter, it 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 1.8%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 1.5% now to 1.9% in 2021. 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.

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.

Table 2.1 Australia – Key Economic Indicators, Financial Years

Year Ended June	2015	2016	2017	2018	2019	Forecasts 2020	2021	2022	2023	2024	2025	2026
Total New Private Investment (+)	**-2.8**	**-5.3**	**-1.8**	**3.6**	**-1.9**	**-1.3**	**4.3**	**8.3**	**6.5**	**0.8**	**-2.7**	**0.5**
New Public Investment (+)	**-7.6**	**8.1**	**8.5**	**11.5**	**2.3**	**-1.5**	**4.0**	**6.4**	**4.8**	**1.9**	**0.5**	**0.7**
Gross National Expenditure (GNE)	**1.0**	**1.4**	**2.3**	**3.6**	**1.6**	**1.3**	**2.7**	**3.8**	**3.9**	**2.4**	**1.5**	**2.2**
GDP	**2.2**	**2.8**	**2.4**	**2.9**	**2.0**	**2.1**	**2.7**	**3.3**	**3.3**	**2.6**	**2.2**	**2.5**
Inflation and Wages												
CPI (Yr Avg) - RBA forecasts (*)	1.7	1.4	1.7	1.9	1.6	1.9	1.8	2.1	2.3	2.3	2.3	2.3
Wage Price Index (Jun on Jun)(**)	2.3	2.1	1.9	2.1	2.4	2.5	2.8	3.2	3.5	3.4	3.2	3.2
Wage Price Index (Yr Avg)(**)	2.4	2.1	2.0	2.1	2.3	2.4	2.7	3.0	3.4	3.5	3.3	3.2
Average Weekly Earnings (Yr Avg)(^)	2.4	1.9	2.0	2.4	2.7	3.2	3.4	3.6	3.9	4.1	3.9	3.7
Employment												
– Employment Growth (Yr Avg)	1.2	2.3	1.5	3.0	2.4	1.9	1.2	1.7	2.3	1.9	1.1	1.3
– Employment Growth (May/May)	2.0	1.9	2.1	2.6	2.8	1.4	1.3	1.9	2.3	1.4	1.1	1.4
– Unemployment Rate (May) (%)	5.9	5.7	5.5	5.4	5.2	5.4	5.2	4.9	4.6	4.7	4.9	4.9
Labour Productivity Growth												
– Total	1.0	0.5	0.8	-0.1	-0.4	0.2	1.5	1.6	1.0	0.8	1.1	1.2
– Non-farm	1.0	0.7	0.7	0.1	-0.1	0.4	1.4	1.7	1.0	0.9	1.1	1.2

Source: BIS Oxford Economics, ABS and RBA

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

*Headline CPI forecasts based on Reserve Bank of Australia's forecasts to December 2021 quarter. Beyond this, we've used the arithmetic mean the next 2 years and the the mid-point of the Reserve Bank's 2 to 3 per cent inflation target range after 2022.

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

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

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 FY25 and FY26. 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 OUTLOOK FOR THE SOUTH AUSTRALIAN ECONOMY

The South Australian economy has experienced slower growth over the past year, with State Final Demand (SFD) slowing to a mere 0.2% through-the-year to September 2019 and a year average of 1.6% in FY19. This followed a surge in the pace of growth over the two years to FY18, with SFD reaching 3.6% in FY17 and 3.4% in FY18. In terms of Gross State Product (GSP), the picture is somewhat weaker, with 2.4% in FY17 and 2% growth in FY18 (which was well below national GDP growth of 2.9% in FY18), while GSP slowed sharply in FY19 to 1.4% due to weaker SFD growth and a collapse in international exports from the state. Job creation also improved over the two years to FY18, but after 2.2% growth in FY18, employment eased to 1.4% in FY19. The state's unemployment rate remains above the national average and, after averaging 5.8% in FY19, jumped to 7.3% in August 2019,

before settling back to around 6.2% over September to December 2019 – still well above the current national rate of 5.1%.

A pick-up in overall investment boosted the state economy over FY17 and FY18, with total investment increasing 4.8% in FY17 and 9.2% in FY18, before weakening to 0.9% in FY19. The latest data shows total investment was down -2.4% through-the-year to the September quarter 2019, due to declines in public investment, dwelling building and private engineering construction, which were partially offset by increases in private non-residential building and machinery expenditure.

New public investment recovered strongly over FY16 to FY18 before declining 5.4% in FY19. Further moderate declines are anticipated over the next 2-3 years as a number of major projects are completed, and few new major projects commence. Another round of road, rail and utilities infrastructure projects, plus increased public non-dwelling buildings, are projected to drive solid increases in public investment from FY23.

Dwelling investment recorded a small rise in FY19, but with a residential oversupply in the state, a moderate decline is forecast for FY20. However, with the small undersupply expected to manifest in FY20, we expect dwelling investment to turn around in FY21 and show solid growth over FY22 and FY23. Dwelling investment is forecast to plateau in FY24 before another decline in FY25 and FY26.

New business investment rebounded by 10% in FY18 and rose a further 4% in FY19. It is forecast to see a small decline in FY20, before solid increases resume over the subsequent 4 years. The recovery over the past two years has been led by a surge in non-residential building, driven by the $190 million Skycity Casino expansion, the $210 million Calvary Hospital, the $100 million Adelaide Airport Terminal Expansion, and a strong recovery in office and shops construction. Work done will plateau in in FY20, with further solid increases over the following 3-4 years. Private engineering construction jumped 26% in FY18 and rose a further 6% in FY19, boosted by a $600 million de-bottling and enhancement project at Olympic Dam, a pick-up in gas-related activity, telecommunications-related construction and major electricity-related construction, including wind farms, other generation capacity and network enhancements. However, private engineering construction is forecast to fall sharply in FY20 as a number of major projects finish. The predicted start of the $2.4 billion Olympic Dam 'Brownfield' expansion will boost business investment from FY23, with other major copper and oil and gas projects also contributing. These projects will provide a major boost to South Australia and help drive strong growth in SFD and GSP over the period from 2022 to 2024.

Employment growth is expected to slow over the next two years, and particularly in FY20 due to the overall decline in investment. Coupled with weak wages growth and low population growth, the end result will be a deceleration in consumer spending. Low population growth will continue to be an ongoing constraint to the state's economic growth. Population growth was only 0.6% in FY17 but has since improved to around 1% in FY19. We expect it to remain weak as South Australians go interstate in search of job opportunities. Over the next six years population growth is predicted to average 0.9%, around 0.7% lower than the national average.

Meanwhile, constrained state government finances will lead to slower growth in government spending, after the surprising strength of the past few years. Note that most of the rise in public investment over FY16 to FY18 has come from Commonwealth funding (roads, rail, defence, universities and telecommunications). The state government finances are constrained, with ongoing deficits and debt and a scarcity of public assets to provide revenue or to sell after most of the states' electricity and ports assets were privatised over

the past two decades. State government finances are also likely to remain constrained with stamp duty revenue set to fall and payroll tax growth expected to weaken from next year in line with weak employment growth.

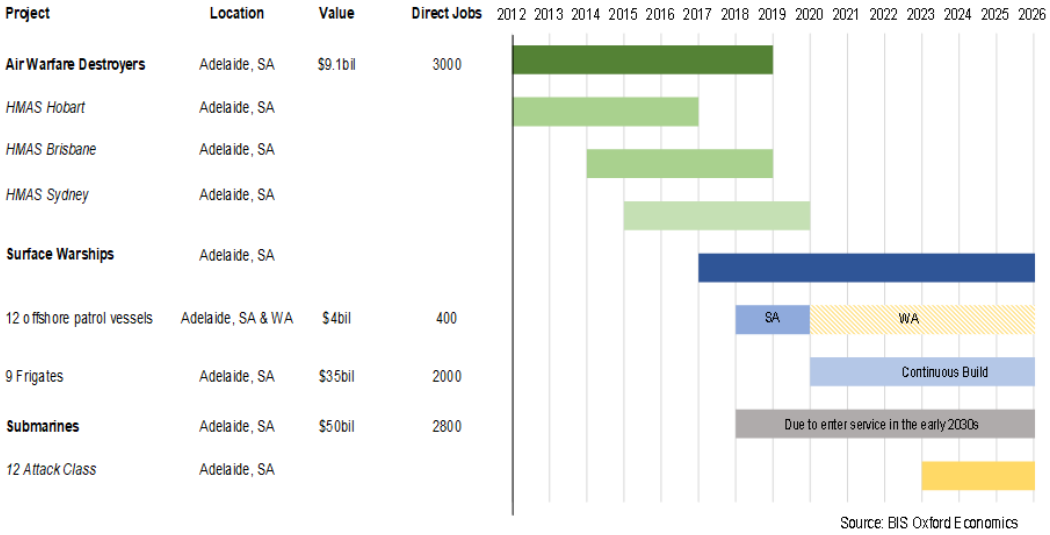
On the other hand, state and federal government commitments to defence projects will support the 'Defence State' economy. Headquarters of major aerospace, land and maritime defence companies are located in the state and numerous large projects will be based in South Australia over the coming decades. There is now a continuous timeline to construct surface warships and submarines for decades to come.

The Commonwealth government announced that Adelaide would be the hub of a continuous naval shipbuilding industry, setting out plans worth $40 billion for the construction of naval patrol vessels and other boats to fill the gap before construction of frigates and submarines begin. The Minister for Defence announced plans to begin building 12 Offshore Patrol Vessels from 2018 (although after the initial vessels, the construction of the remainder would move to Western Australia). This is expected to avoid the so-called 'valleys of death' between projects, which would have seen a loss of employment and workplace expertise, once the work on the Air Warfare Destroyers finished in late 2019.

The last of the navy's three air warfare destroyers were finished in 2019, while construction of 12 offshore patrol vessels officially began in Adelaide in November 2018. The offshore patrol vessels then fill the gap until the $35 billion Future Frigate construction begins in Adelaide in 2020. The frigate program will directly contribute to more than 2,000 jobs, and maintenance through the vessels' lives will be worth another $400 million. There is also a $50 billion contract to build 12 new submarines in Adelaide, which is expected to create 2,800 jobs (1,100 direct and 1,700 indirect jobs), but not get underway until 2023. The subs project may represent an expansion of the overall defence manufacturing programme, in terms of requiring extra workers and resources, until the frigates work starts winding down. Shipbuilding projects will have beneficial flow on effects, particularly to local steel manufacturers.

South Australia will also be the base for a number of land defence vehicle and aviation projects. For example, a $1 billion program to modernise the Army's fleet of M113 armoured personnel carriers will be based in South Australia, and South Australian manufacturers will also be part of the supply chain for the army's LAND 400 program to build land combat vehicles. South Australia will also benefit from 30 years of sustainment and upgrade work on the fleet of P-8A Poseidon maritime surveillance aircraft, which will be based at the RAAF Base in Adelaide.

Figure 2.3. South Australia Timeline of Maritime Defence Projects



Now recognised as the 'Defence State', South Australia will benefit from aviation, systems, maritime and land defence projects, with the largest boost to the state's manufacturing sector and flow-on effects to employment and consumer spending. However, it is important to recognise that this economic boost essentially comes mostly from taxpayers in other states, given that South Australia only accounts for 6% of the national economy (% of GDP).

Meanwhile, the manufacturing, agriculture, mining and other tradeable sectors (including education and tourism) will also benefit from a forecast sustained 'competitive' AUD of US$0.67 to US$0.78 over the next seven years to 2026.

Overall, SFD is forecast to weaken sharply in FY20 to around 0.5% due to the decline in investment and weakening in household and government consumption expenditure, before bouncing back to a 1.8% increase in FY21 as investment recovers. Thereafter, we expect an improvement and acceleration in SFD to over 3% in FY23 and FY24, driven by strengthening investment and employment growth. GSP is expected to track slightly higher than SFD over FY20 and FY21, with a bounceback in exports boosting GSP in FY21. GSP is then forecast to average 2.6% over FY22 to FY24. The stronger employment growth expected over FY22 to FY24 is expected to push the state's unemployment rate down from around 6.2% now to around 5% in FY23 and below 5% in FY24, close to the projected national average of 4.6% over those two years. The tightening in the state's labour market will, in turn push up wages in the state.

Both SFD and GSP are forecast to weaken in FY25 and FY26 due to declines in residential and business investment, the latter as a number of major projects wind down. Overall, SFD growth is forecast to average 2.4% growth over the five years to FY26 (similar to the past 5 years), while GSP is forecast to average 2.2% over the five years to FY26 (compared to an average of 1.3% for the past 5 years and 2.3% for the past three decades).

Table 3. South Australia – Key Economic Indicators, Financial Years

						Forecast						
Year Ended June	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
South Australia												
Total Construction Activity(*)	-9.1	-1.3	3.7	19.4	0.4	-8.0	4.0	2.7	7.7	5.2	-2.0	-2.2
State Final Demand	1.6	1.1	3.6	4.2	1.6	0.5	1.8	2.6	3.6	3.1	1.0	1.6
Gross State Product (GSP)(**)	**0.9**	**0.3**	**1.5**	**2.3**	**1.4**	**0.8**	**1.9**	**2.3**	**2.8**	**2.6**	**1.5**	**1.8**
Employment Growth (Year Avg)	0.5	0.5	1.3	2.2	1.4	0.7	0.8	1.4	2.3	1.8	0.9	0.7
Australia												
Total Construction Activity(*)	-7.0	-5.0	-3.2	12.0	-9.0	-3.5	3.7	9.8	6.3	0.4	-3.6	-2.1
Australian Domestic Demand	0.7	1.4	2.2	3.5	1.7	1.4	2.5	3.8	3.9	2.5	1.4	2.2
Gross Domestic Product (GDP)	2.2	2.8	2.4	2.9	2.0	2.1	2.7	3.3	3.3	2.6	2.2	2.5
Employment Growth (Year Avg)	1.2	2.3	1.5	3.0	2.4	1.9	1.2	1.7	2.3	1.9	1.1	1.3

Source: BIS Oxford Economics and ABS

* Total construction work done in constant 2017/18 prices as per the ABS Building Activity and Engineering Construction Activity
Total construction is the sum of new dwelling building (includes alterations and additions activity greater than $10,000), new non-building activity and new engineering construction.

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 1.7% through-the-year to December 2019. Rises in tradeables inflation over the past year have been driven mainly by food, motor vehicles, clothing, some 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 2.0% through-the-year to December 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 December 2019 only 0.2%, 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 1.8% in the December 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, and average around 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.

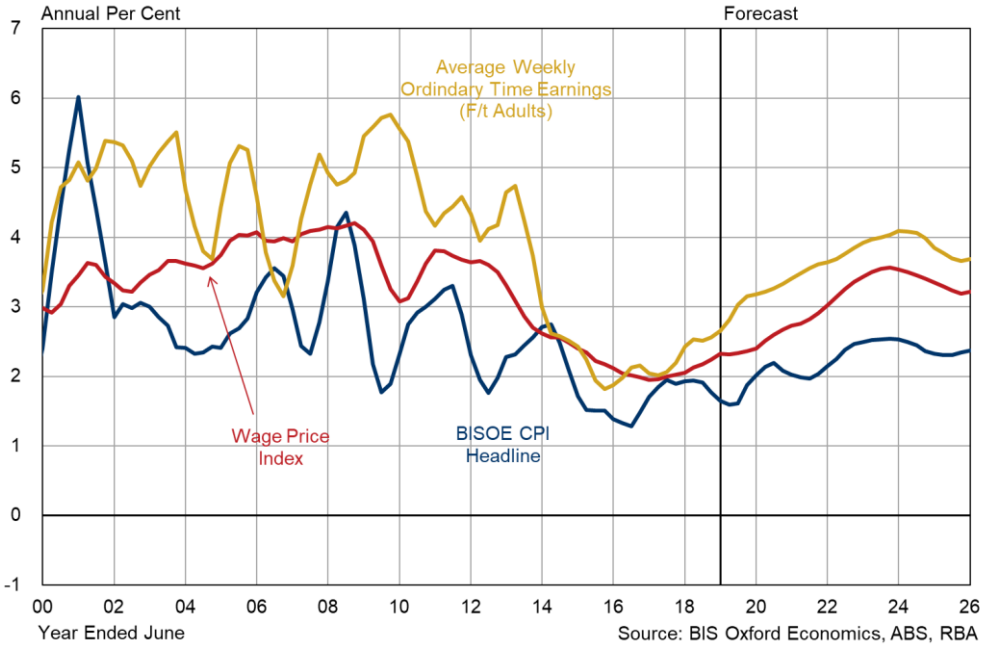
Taken together, we expect annual CPI inflation to increase by 2.5% per annum on average. In forecasting annual tradeables inflation of around 1.5% (compared to 1.2% on average for the past 16 years), we have assumed the following:

- 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 1.9% 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 2.3% for FY23 to FY26+, 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.

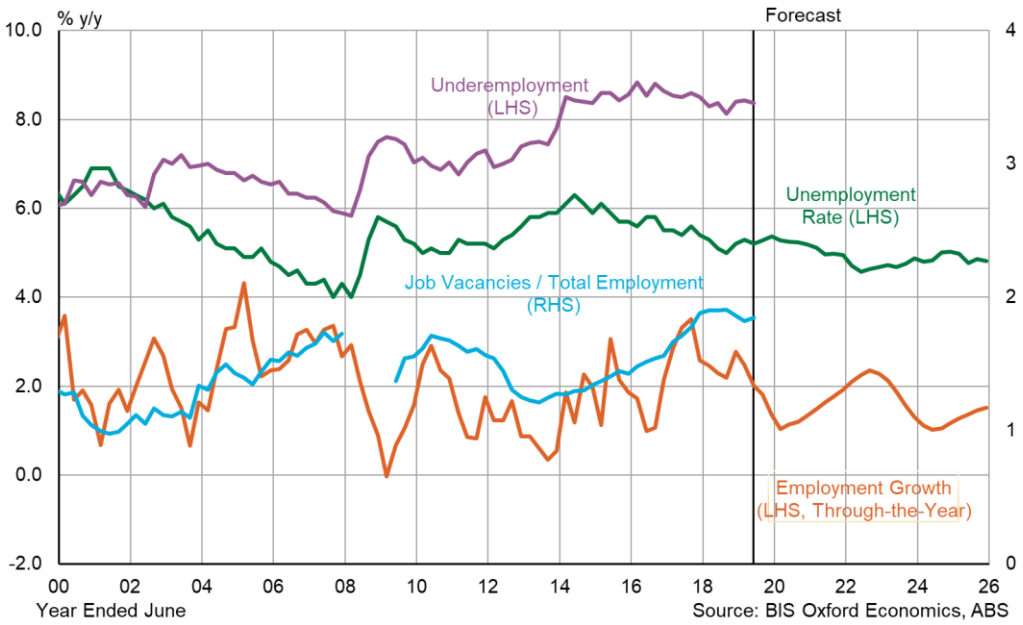
Wages growth has slowed markedly over the past 6 years, primarily due to weaker demand for labour, caused by both cyclical and structural factors. Among the underlying structural changes causing this unspectacular wage growth are increasing market flexibility and casualisation of the work force (what 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 gradually declined from an average of 6.2% down to 5% over late 2018/early 2019, but has since drifted up over 2019, before ending the year at 5.1%in December 2019. Historically 5% 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 8.4% over the past three quarters. The high underutilisation rate – the sum of unemployment and underemployment – reflects considerable slack in the labour market, which limits the bargaining power of workers and reduces pressure on wages.

[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.

Figure 3.2 Employment and Unemployment



Looking ahead, we expect employment growth to weaken over the next two years. There has been a sharp 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 surprisingly 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, given the average duration for the collective agreement is around 3 years. The AAWI in current operating agreements is 2.7% - below the 2.9% year-average in formalised agreements – but we expect the AAWIs of overall wage agreements in the collective bargaining segment to pick up gradually over the next 2 years, assuming some further small improvements in collective agreements.

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 through to overall improvements in pay rises in the collective bargaining and individual arrangements segments to gradually lift the wage price index (WPI) from 2.3% in FY19 to 2.4% in FY20 and 2.7% in FY21 – which is in line with most other forecasters 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 recent 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 3.0% in FY22 and peak at 3.5% 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 3.5%, driven by non-farm productivity growth of around 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 0.2-0.3% 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
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2020-26	2022-26
Wage Price Index																
Awards Only	13.1%	2.6	3.0	2.5	2.4	3.3	3.5	3.1	3.3	3.3	3.5	3.5	3.5	3.1	3.3	3.4
Collective Agreements	38.4%	3.5	3.3	3.2	3.1	2.8	2.7	2.8	2.9	3.1	3.4	3.6	3.6	3.5	3.3	3.4
Individual Arrangements	48.5%	1.9	1.5	1.1	0.8	1.0	1.7	1.8	2.4	2.9	3.4	3.5	3.1	2.9	2.9	3.2
Wage Price Index (a)	**100%**	**2.6**	**2.4**	**2.1**	**2.0**	**2.1**	**2.3**	**2.4**	**2.7**	**3.0**	**3.4**	**3.5**	**3.3**	**3.2**	**3.1**	**3.3**
Compositional Effects + Bonuses,etc		0.4	0.0	-0.2	0.1	0.4	0.3	0.8	0.7	0.6	0.5	0.5	0.5	0.5	0.6	0.5
AWOTE (b)	100%	3.0	2.4	1.9	2.0	2.4	2.7	3.2	3.4	3.6	3.9	4.1	3.9	3.7	3.7	3.8

Source: BIS Oxford Economics, 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).

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. INDUSTRY WAGE FORECASTS - UTILITIES & CONSTRUCTION: AUSTRALIA AND SOUTH AUSTRALIA

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 South Australia is used as a proxy for all of AGN's gas network related 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 AGN'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 AGN'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.

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, Victoria and Queensland), 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

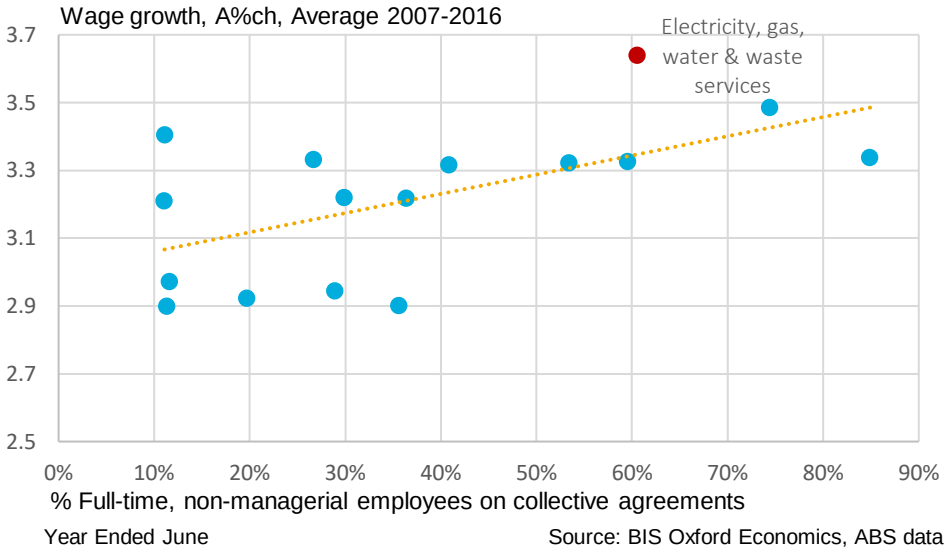
Strong Union presence in the industry have seen collective agreements outcomes above the All Industry average.

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



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 (lower pay) 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, which was down from the previous 5 years when EGWWS collective agreements averaged 0.4% above the all industries average. We expect these historical trends 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 15 years to FY2014 (excluding the effects of GST introduction in 2000/01). In the five years to FY19, collective agreements were on average 1.4% 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 1.3% 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 remain soft over the next 18 months, 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

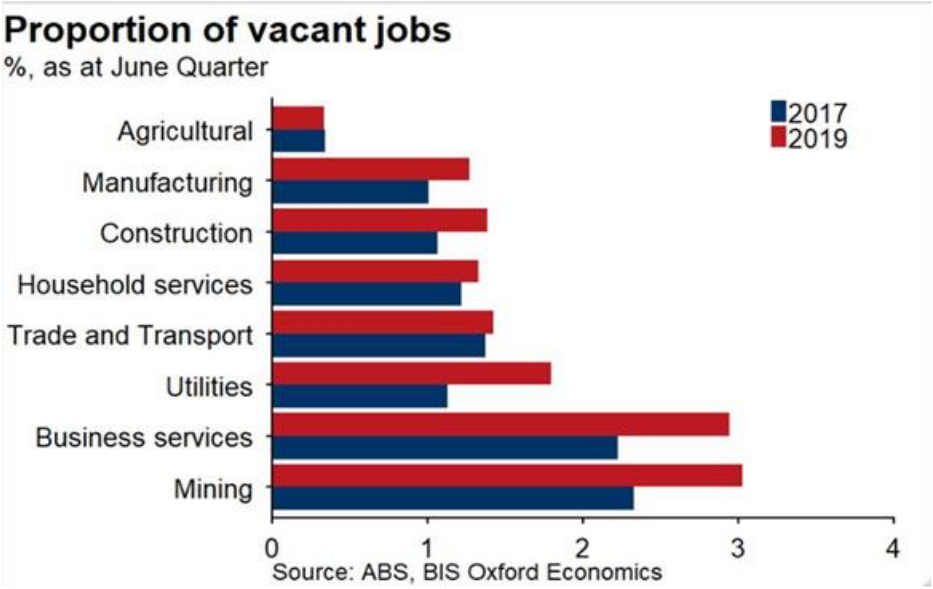


Figure 4.3. Wage Price Index - Australia All Industries, Electricity, Gas, Water and Waste Services, Mining and Construction

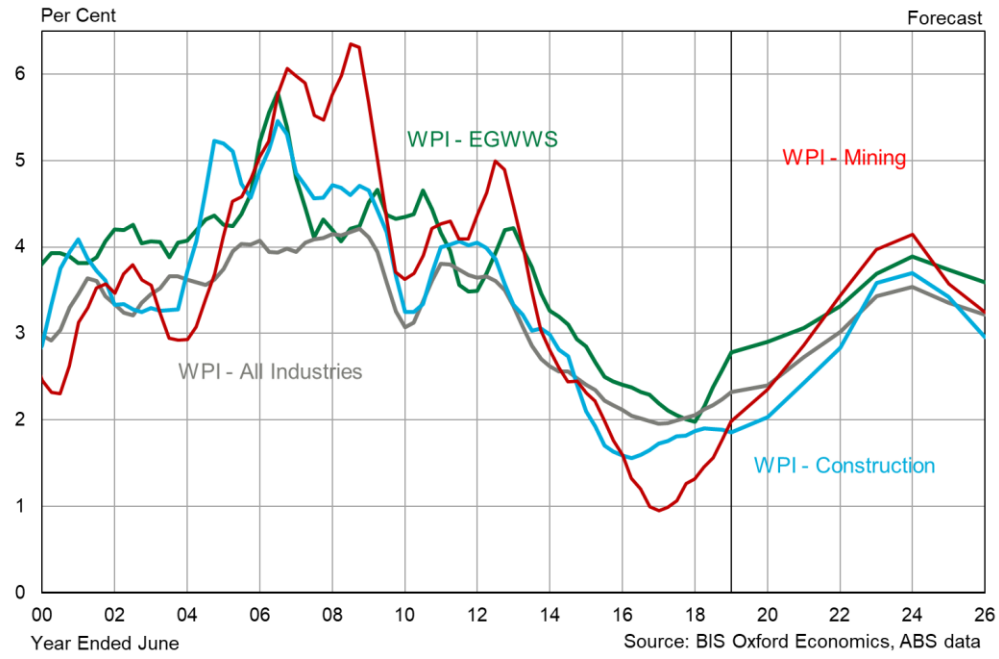


Figure 4.4. Australia – Construction Activity (2017/18 prices)

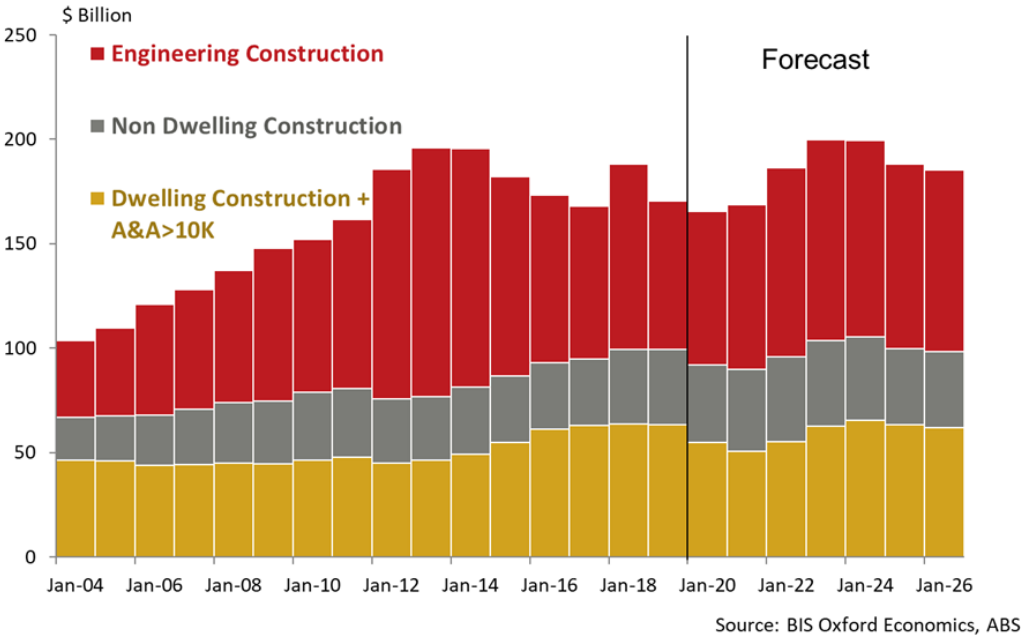
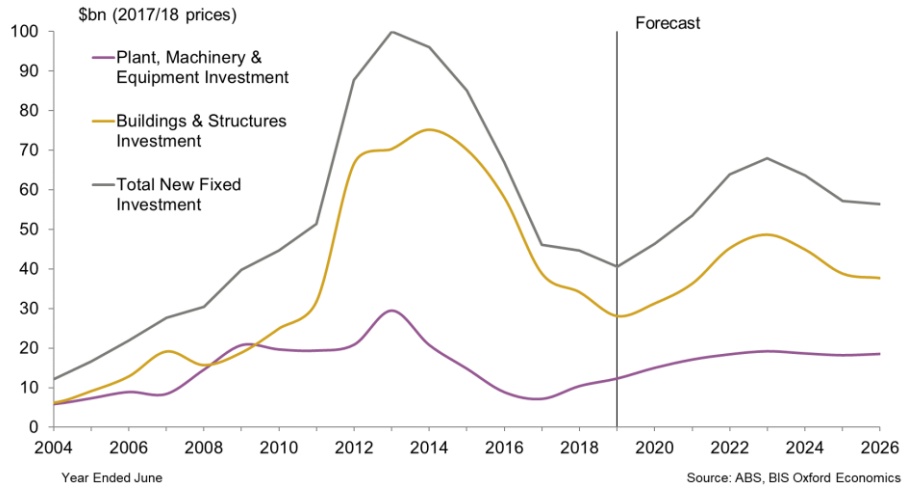


Figure 4.5. Australia – Mining Investment



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 (0.3 percentage points higher than the national all Industries WPI average of 3.3% per annum) over the five years to FY26. 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.

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.

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														
								Forecast							Average	Average
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2020-26	2022-26
Wage Price Index																
Awards Only	1.5%	2.6	3.0	2.5	2.4	3.3	3.5	3.1	3.3	3.3	3.5	3.5	3.5	3.1	3.3	3.4
Collective Agreements	64.6%	3.6	3.3	3.2	3.0	2.9	2.8	3.0	3.2	3.4	3.8	4.0	3.9	3.8	3.6	3.8
Individual Arrangements	33.9%	2.7	1.9	0.9	0.6	0.5	2.7	2.7	2.8	3.1	3.5	3.8	3.3	3.1	3.2	3.4
Wage Price Index (a)	**100%**	**3.3**	**2.8**	**2.4**	**2.2**	**2.0**	**2.8**	**2.9**	**3.1**	**3.3**	**3.7**	**3.9**	**3.7**	**3.6**	**3.5**	**3.6**
Compositional Effects + Bonuses,etc		-1.2	-2.2	1.1	2.1	0.3	-1.5	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.3
AWOTE (b)	100%	2.0	0.7	3.5	4.3	2.3	1.3	3.3	3.5	3.7	4.0	4.2	4.0	3.9	3.8	4.0

Source: BIS Oxford Economics, 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).

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 per worker. Utilities' productivity is more than double the national average according to ABS data for Australia and South Australia (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

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
2000	765	3.2	867	4.8	71.7	3.0	68.2	3.8
2001	804	5.1	918	6.0	74.2	3.5	70.8	3.8
2002	847	5.4	981	6.8	76.7	3.3	73.8	4.2
2003	890	5.0	1,001	2.1	79.3	3.5	76.8	4.1
2004	932	4.7	1,057	5.5	82.2	3.6	79.9	4.1
2005	973	4.4	1,091	3.2	85.3	3.7	83.3	4.3
2006	1 018	4.6	1,111	1.9	88.7	4.1	87.6	5.2
2007	1 054	3.6	1,152	3.7	92.2	3.9	91.8	4.8
2008	1 106	4.9	1,183	2.7	96.1	4.1	95.7	4.2
2009	1 166	5.5	1,255	6.1	100.0	4.1	100.0	4.5
2010	1 231	5.6	1,351	7.6	103.1	3.1	104.4	4.3
2011	1 283	4.2	1,474	9.1	107.0	3.8	108.7	4.2
2012	1 338	4.3	1,510	2.5	110.9	3.6	112.5	3.5
2013	1 400	4.6	1,602	6.1	114.6	3.3	117.3	4.2
2014	1 442	3.0	1,635	2.0	117.6	2.6	121.1	3.2
2015	1 477	2.4	1,646	0.7	120.4	2.4	124.5	2.8
2016	1 505	1.9	1,704	3.5	123.0	2.1	127.5	2.4
2017	1 536	2.0	1,777	4.3	125.4	2.0	130.3	2.2
2018	1 573	2.4	1,818	2.3	127.9	2.1	132.9	2.0
2019	1 615	2.7	1,842	1.3	130.9	2.3	136.6	2.8
Forecasts								
2020	1 666	3.2	1,903	3.3	134.0	2.4	140.6	2.9
2021	1 723	3.4	1,970	3.5	137.7	2.7	144.9	3.1
2022	1 786	3.6	2,043	3.7	141.9	3.0	149.7	3.3
2023	1 855	3.9	2,124	4.0	146.7	3.4	155.2	3.7
2024	1 930	4.1	2,214	4.2	151.9	3.5	161.2	3.9
2025	2 005	3.9	2,304	4.0	157.0	3.3	167.3	3.7
2026	2 080	3.7	2 393	3.9	162.0	3.2	173.3	3.6
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	
2019-2026	3.7		3.8		3.1		3.5	
2021-2026	3.8		4.0		3.3		3.6	

Source: BIS Oxford Economics, ABS

(1) Earnings per person for full-time adults. Data is year ended May (available only mid month of quarter).
(2) CAGR (Compound Annual Growth Rates) for 2021-2026 is the annual growth for 2021/22 to 2025/26 inclusive i.e. next Revenue Determination period.

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 South Australia (see figure 4.9 and table 4.4). 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

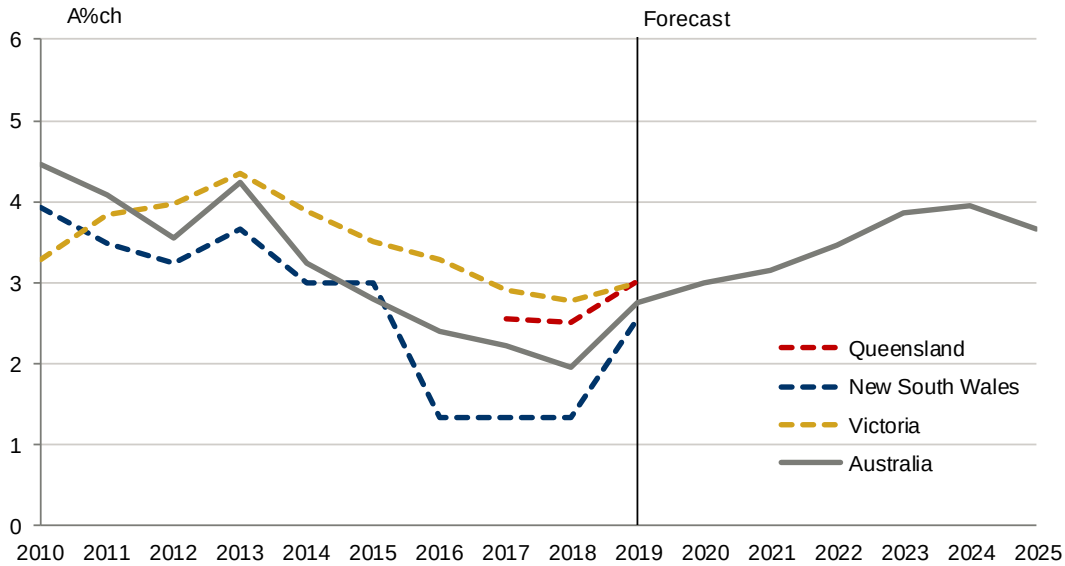
skilled workforce to ensure reliability and undertake capital works to cater for population and economic growth and for capital replacement.

4.2.1 Outlook for utilities wages growth and productivity in South Australia

The ABS do not provide WPI data for the Utilities sector in South Australia, providing state utilities data only for NSW, Victoria and Queensland (the latter since early 2016 only). These three states collectively account for 73% of total Australian utilities employment, with Western Australia accounting for 13.5%, and South Australia for 7.3%. Historical data and forecasts of WPI for the EGWWS sector in South Australia is therefore based on national EGWWS WPI forecasts, as well as movements in the 'unknown residual' for the utilities wage price index and recent differences in outcomes in collective bargaining in South Australia compared to the national average for the utilities sector.

Over FY16 and FY17, overall WPI growth in the EGWWS sector in South Australia is estimated to have been slightly lower than the national EGWWS increase. However, we estimate it was on par with the national EGWWS increase in FY18, although the national average was dragged down by a surprising low outcome in NSW, the largest state employer (see figure 4.6).

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

Wages in the South Australia utilities sector are expected to grow in line with the national utilities sector average over AGNs' upcoming regulatory period (see table 4.6 and 1.1). Over the next five years, utilities wage increases are again expected to be slightly lower than the national average – due to relative weaker utilities construction and weaker labour markets in South Australia. South Australian EGWWS WPI growth is expected to continue rising from the estimated 2.5% in FY19 to 2.8% and 2.9% (in nominal terms) over FY20 and FY21 respectively.

However, a marked pick-up in economic growth in the state from around FY22 is expected to see employment growth and the labour market tighten (see section 2.2). A key element of the ongoing strength in the South Australian economy is the large amounts of defence-related expenditure in South Australia over the forecast period (and beyond), including the manufacture of naval ships, submarines and army vehicles. This will also increase the demand for skilled labour and see the defence manufacturing sector also compete with the utilities sector for similarly skilled workers, many of which will have transferable skills across the utilities, construction, mining and manufacturing sectors. With strong competition for similarly skilled labour from the mining, construction and defence manufacturing industries, firms in the utilities sector will need to raise wages to attract and retain workers. This is expected to be accompanied by increases in utilities related construction in the state, mining-related investment and construction activity generally (figure 4.8). The overall strengthening in the labour market, and particularly in the Construction and Mining sectors – which are key competitors to the utilities sector in terms of 'similarly' skilled workers - is expected to result in utilities WPI growth accelerating significantly over the 2021 to 2023 period, and subsequently remain elevated over the following two years to FY25.

WPI growth is forecast to average 3.6% per annum in nominal terms over the five years to FY26 inclusive (i.e. over AGNs' next regulatory period; see table 4.6) – or 1.3% in real (inflation adjusted) terms (see Table 1 and Table 4.6).

Figure 4.7 Australia – Utilities Employment, Output and Investment

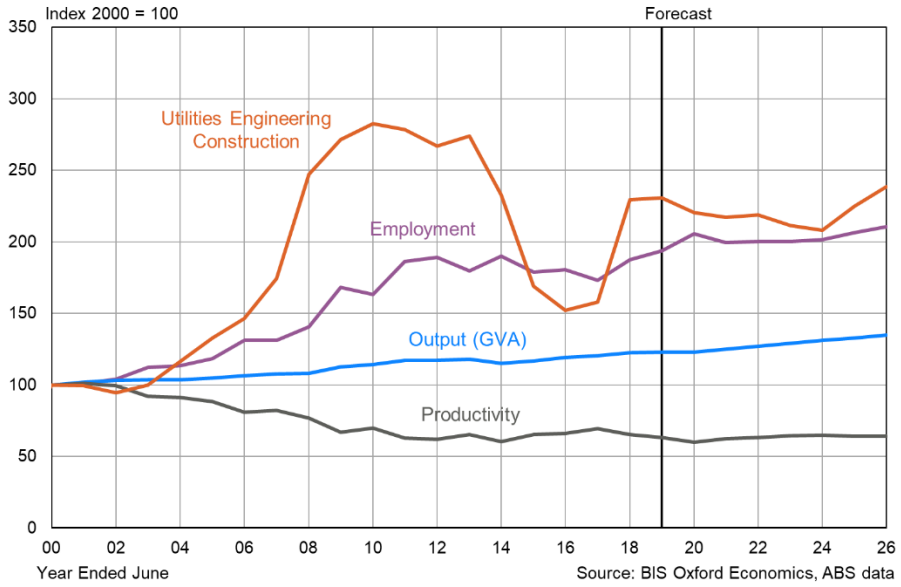


Figure 4.8 South Australia – Utilities Employment, Output and Investment

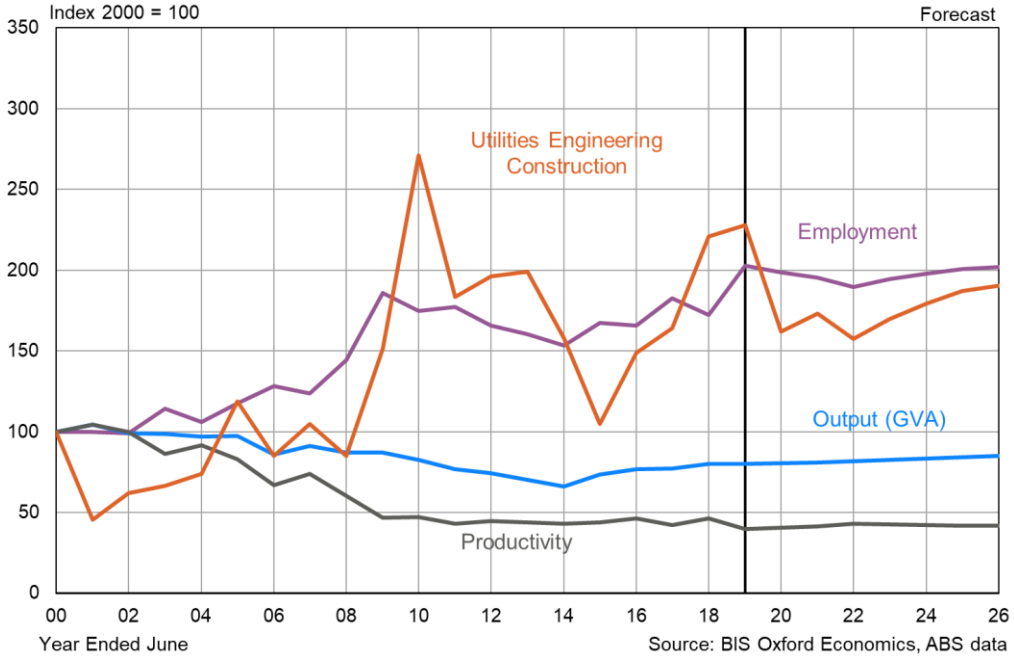


Figure 4.9 Utilities Productivity in Australia and South Australia

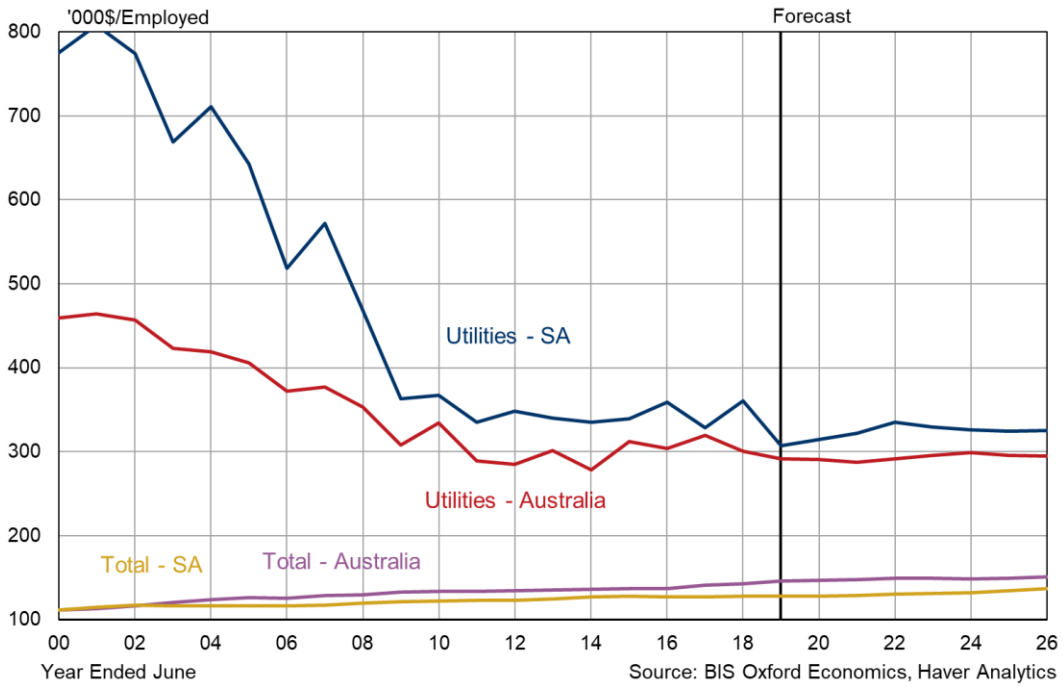


Table 4.4 below and figures 4.8 and 4.9 above show our forecasts for utilities labour productivity in South Australia. As discussed in the previous section, BISOE uses the conventional measure of labour productivity – as measured by real Gross Value Added (GVA) per employed person – as there is not a feasible, easily measured alternative. Similar to Australia, low productivity is set to continue in

part because utilities 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. Overall, labour productivity in the EGWWS sector in South Australia is forecast to average 0.2% p.a. over the five years to 2025/26 (see table 4.4).

Table 4.4. Utilities Productivity – South Australia

South Australia - Electricity, Gas, Water & Waste Services						
Year Ended June	Gross Value Added		Employment		Productivity $/employee	
	$m	%CH	'000	%CH	('000)	%CH
2009	4245	-0.3	11.7	28.6	362.8	-22.5
2010	4036	-4.9	11.0	-6.0	366.9	1.1
2011	3740	-7.3	11.2	1.6	334.7	-8.8
2012	3635	-2.8	10.5	-6.5	347.8	3.9
2013	3434	-5.5	10.1	-3.3	340.0	-2.3
2014	3232	-5.9	9.7	-4.5	334.9	-1.5
2015	3582	10.8	10.6	9.3	339.5	1.4
2016	3748	4.6	10.5	-0.9	358.7	5.6
2017	3775	0.7	11.5	10.0	328.3	-8.5
2018	3913	3.7	10.9	-5.7	360.6	9.9
2019	3919	0.2	12.8	17.7	306.8	-14.9
Forecasts						
2020	3934	0.4	12.5	-2.0	314.2	2.4
2021	3961	0.7	12.3	-1.7	321.8	2.4
2022	3996	0.9	11.9	-3.0	334.8	4.0
2023	4028	0.8	12.2	2.6	328.9	-1.8
2024	4063	0.9	12.5	1.8	325.9	-0.9
2025	4108	1.1	12.7	1.5	324.6	-0.4
2026	4145	0.9	12.7	0.6	325.5	0.3
Compound Annual Growth Rates						
1990-2000	-1.2		-5.5		4.5	
2000-2010	-1.9		5.7		-7.2	
2010-2019	-0.3		1.7		-2.0	
2019-2026	0.8		0.0		0.9	
2021-2026	0.9		0.7		0.2	

Source: BIS Oxford Economics, ABS data

4.3 CONSTRUCTION WPI FORECASTS

This section provides forecasts of AGN's external or 'out-sourced' labour escalation where there is a significant proportion of out-sourced labour which is contracted to perform construction-type activities in the capital expenditure budget. Accordingly, we proxy AGN's external labour cost escalation by wages growth (as measured by the WPI) in the state's construction industry.

Our research has shown that construction activity (ie work done in the sector) normally has a strong influence on construction wages, although changes in wages tend to lag construction (in work done terms) by around one year. Hence, our wage forecasts are based on BIS Oxford Economics forecasts of construction activity by state (which includes residential and non-residential building, plus engineering construction) as well as predicted movements in the construction wages at the national level. Forecasts of overall construction activity in Australia and South Australia are detailed in Table 2.2 and figure 4.4. The Construction sector wage forecasts for Australia are set out in Table 4.5, while the South Australian Construction WPI forecasts are set out in Table 4.6.

Similar to the utilities WPI data, the ABS does not provide WPI data for the Construction sector in South Australia, providing state Construction WPI data only for NSW, Victoria (until recently), Queensland and Western Australia. These four states collectively account for almost 90% of total Australian construction employment, with South Australia accounting for 5.6%. Historical data and forecasts of WPI for the Construction sector in South Australia therefore is based on national Construction WPI forecasts, as well as movements in the 'unknown residual' for the Construction wage price index and recent differences in outcomes in collective bargaining in South Australia compared to the national average for the Construction sector; plus relative movements in overall construction activity at the state level, compared to the national average.

Construction wages at the national and South Australian level have weakened dramatically since 2011/12 and are well below the robust increases during the construction boom of the latter half of last decade. While collective agreements in the sector have maintained their relative high increases over the past 4 years – between 4% and 5% – wages growth in the individual agreements segment have been very weak. Construction employees in the individual agreements segment account for around 61% of construction employees, dominating the method of pay-setting within the sector. Wages growth has slowly improved from their lows of 2016, despite weaker engineering construction activity. Further gradual improvement is expected over the next two years, although another decline in overall activity in FY20 (due to the residential downturn) will limit the improvement in construction wages growth in the short-term.

Construction wages are expected to accelerate over FY22 to FY24, driven by the recovery in residential building activity which is expected to rise out of its trough from FY22, while high levels of non-dwelling building and rising engineering construction will underpin higher wages due to strong labour demand and expected widespread skill shortages in the construction industry. Declines in construction activity over FY25 to FY26, coupled with a general weakening across overall labour markets will then cause construction wages growth to ease over FY25 and FY26.

Our forecast is for the Australian Construction WPI to average 3.3% over the five-year period to 2025/26 at the national level, with South Australian construction wages growth to be slower at 3.2% – or 0.9% per annum on average in real (inflation adjusted) terms (see Table 1.1 and Table 4.6). While this is a marked improvement on the past five years, it is

still well down on the 4.3% annual national average (nominal terms) of the decade to 2011/12.

Table 4.5. Total Australia (All Industries) and Construction Average Weekly Ordinary Time Earnings and Wage Price Index

Year Ended June	Average Weekly Ordinary Time Earnings (1)				Wage Price Index (2)			
	All Industries		Construction		All Industries		Construction	
	$	%CH	$	%CH	Index	%CH	Index	%CH
2009	1 166	5.5	1,162	7.8	100.0	4.1	100.0	4.7
2010	1 231	5.6	1,251	7.7	103.1	3.1	103.3	3.3
2011	1 283	4.2	1,314	5.0	107.0	3.8	107.4	4.0
2012	1 338	4.3	1,360	3.5	110.9	3.6	111.7	4.1
2013	1 400	4.6	1,418	4.3	114.6	3.3	115.5	3.3
2014	1 442	3.0	1,448	2.1	117.6	2.6	118.9	2.9
2015	1 477	2.4	1,480	2.2	120.4	2.4	121.4	2.1
2016	1 505	1.9	1,501	1.4	123.0	2.1	123.3	1.6
2017	1 536	2.0	1,534	2.2	125.4	2.0	125.5	1.7
2018	1 573	2.4	1,550	1.0	127.9	2.1	127.8	1.9
2019	1 615	2.7	1,541	-0.6	130.9	2.3	130.2	1.9
Forecasts								
2020	1 666	3.2	1,601	3.9	134.0	2.4	132.8	2.0
2021	1 723	3.4	1,652	3.2	137.7	2.7	136.0	2.4
2022	1 786	3.6	1,712	3.6	141.9	3.0	139.9	2.8
2023	1 855	3.9	1,781	4.1	146.7	3.4	144.9	3.6
2024	1 930	4.1	1,859	4.4	151.9	3.5	150.3	3.7
2025	2 005	3.9	1,934	4.0	157.0	3.3	155.4	3.4
2026	2 080	3.7	2 010	3.9	162.0	3.2	161.0	3.6
Compound Annual Growth Rates (2)								
2000-2010	4.9		5.6		3.7		4.2	
2010-2019	3.1		2.3		2.7		2.6	
2019-2026	3.7		3.9		3.1		3.1	
2021-2026	3.8		4.0		3.3		3.4	

Source: BIS Oxford Economics, ABS

(1) Earnings per person for full-time adults. Data is year ended May (available only mid month of quarter).
(2) CAGR (Compound Annual Growth Rates) for 2021-2026 is the annual growth for 2021/22 to 2025/26 inclusive i.e. next Revenue Determination period.

Table 4.6. South Australia: Electricity, Gas, Water & Waste Services, Construction and All Industries Wage Price Indices

Year Ended June	EGWWS Wage Price Index South Australia (a)			Construction Wage Price Index South Australia (b)		
	Nominal Index	%CH	Real growth %CH (c)	Nominal Index	%CH	Real growth %CH (c)
2009	100.0			100.0		
2010	104.8	4.8	2.5	102.7	2.7	0.4
2011	109.0	4.0	0.8	106.2	3.4	0.3
2012	112.8	3.5	1.2	110.4	3.9	1.6
2013	117.8	4.5	2.2	113.6	2.9	0.6
2014	121.9	3.5	0.8	116.3	2.4	-0.3
2015	125.4	2.9	1.1	118.6	1.9	0.2
2016	128.0	2.0	0.7	120.2	1.4	0.0
2017	130.4	1.9	0.2	122.0	1.4	-0.3
2018	133.1	2.0	0.1	123.9	1.6	-0.4
2019	136.4	2.5	0.9	126.0	1.8	0.1
Forecasts						
2020	140.2	2.8	0.9	128.6	2.0	0.1
2021	144.3	2.9	1.1	131.4	2.2	0.4
2022	149.0	3.2	1.1	134.8	2.6	0.5
2023	154.3	3.6	1.3	139.5	3.4	1.1
2024	160.3	3.8	1.5	144.5	3.6	1.3
2025	166.2	3.7	1.4	149.4	3.4	1.0
2026	172.0	3.5	1.2	153.7	2.9	0.6
Compound Annual Growth Rates						
2009-2019	3.2		1.0	2.3		0.2
2019-2026	3.4		1.2	2.9		0.7
2021-2026	3.6		1.3	3.2		0.9

Source: BIS Oxford Economics, ABS

(a) historical data unavailable from ABS, so estimated from Australian WPI, less NSW and Victorian data (only states that are published for EGWWS WPI), with the residual further adjusted for differences in movements in collective agreements for South Australia compared to Australia.

(b) historical WPI data unavailable for South Australia, so estimated from Australian Construction WPI, less NSW, Vic, Qld and WA Construction WPI (the only states published by ABS for Construction WPI),with adjustments for collective agreements and construction activity.

(c) Real price changes are calculated by deducting the inflation rate from nominal price changes.

5. GAS NETWORK RELATED MATERIALS

Table 5.1: Gas Network Related Materials and General Materials Summary

Gas Network and Non-gas Network Related Materials	Annual Financial Year Growth											
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	5 yr Avg (h)
	Actual				Forecast		Next Regulatory period					2022-2026
Nominal Price Changes												
PE Pipe Price Index - A$ index (a)	1.1	-3.7	3.5	4.7	-9.5	2.1	6.9	3.1	2.4	2.2	1.7	**3.2**
Concrete (b)	-0.4	1.7	2.4	1.7	-0.2	1.1	1.8	2.3	1.1	-0.1	0.2	**1.1**
Gas & Fuel Construction Price Index (c)	-1.1	-1.4	4.5	6.4	2.4	1.8	2.4	2.7	2.4	2.0	1.8	**2.3**
Steel Pipe and Tube PPI (d)	-1.7	5.9	-5.7	6.6	-2.4	-0.5	0.3	0.2	0.1	1.0	1.0	**0.5**
Aluminium (e)	-5.6	10.9	17.1	-2.5	-3.6	2.4	1.2	3.8	3.1	8.4	6.1	**4.5**
General Materials	1.4	1.7	1.9	1.6	1.9	1.8	2.1	2.3	2.3	2.3	2.3	**2.3**
Exchange rate, A$, (period avg) (f)	*0.73*	*0.75*	*0.78*	*0.72*	*0.69*	*0.69*	*0.70*	*0.71*	*0.71*	*0.71*	*0.71*	*0.71*
Consumer Price Index (Headline)[(g)]	1.4	1.7	1.9	1.6	1.9	1.8	2.1	2.3	2.3	2.3	2.3	***2.3***
Real Price Changes												
PE Pipe Price Index - A$ index (a)	-0.3	-5.5	1.5	3.1	-11.4	0.3	4.8	0.8	0.0	-0.2	-0.6	**1.0**
Concrete (b)	-1.8	0.0	0.5	0.0	-2.1	-0.8	-0.3	0.0	-1.2	-2.4	-2.2	**-1.2**
Gas & Fuel Construction Price Index (c)	-2.4	-3.1	2.6	4.7	0.5	0.0	0.3	0.4	0.0	-0.3	-0.5	**0.0**
Steel Pipe and Tube PPI	-3.0	4.2	-7.6	4.9	-4.3	-2.3	-1.8	-2.1	-2.2	-1.4	-1.3	**-1.8**
Aluminium (e)	-7.0	9.2	15.2	-4.1	-5.5	0.6	-0.9	1.4	0.7	6.1	3.8	**2.2**
General Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**

Sources: BIS Oxford Economics, ABS, Consensus Economics

(a) PE (Polyethylene) prices are proxied using Manufacturing Wages, General Materials inflation and Thermoplastic Resin prices. Thermoplastic Resin is primarily driven by Crude Oil. Crude oil price forecasts are sourced from the latest available Consensus Economics 'Energy & Metal Consensus Forecasts' (EMCF) publication. US$ prices adjusted by using exchange rate above (see footnote (f)).

(b) Producer price index (PPI) for concrete, cement and sand: Adelaide. Forecasts based on BIS Oxford Economics (BISOE) modelling and construction and other macroeconomic forecasts.

(c) Gas and Fuel Construction Price Index forecasts from BISOE modelling and construction and other macroeconomic forecasts

(d) Steel Pipe & Tube producer price index (PPI), modelled using latest EMCF price forecasts for iron ore and coking coal, converted to A$ (using above exchange rate); plus manufacturing wages, transport c

(e) Aluminium price is London Metal Exchange (LME) price, converted to A$ (using above exchange rate). Forecasts from Consensus EMCF.

(f) Exchange rate forecasts sourced from latest available Consensus Economics 'Asia Pacific Consensus Forecasts' (APCF), which has forecasts covering the next 2 years, after which exchange rate is held steady.

(g) Reserve Bank of Australia forecasts to December 2021. Beyond that, we have used a 10-year arithmetic average of RBA forecasts and the mid-point of the Reserve Bank's 2 to 3 per cent inflation target range, which is the method preferred by the AER.

(h) Average Annual Growth Rate for 2021/22 to 2025/26 inclusive, ie for next regulatory period.

Prices of most gas network related materials are forecast to increase on average over the five-year period to FY26. After adjusting for the expected impacts of inflation, aluminium is expected to achieve the strongest price growth over the forecast period, at an average of 2.2% per annum followed by polyethylene pipe (1% pa). On the other hand, many materials are expected to see negative or no real price growth. This includes steel pipe prices, concrete, and the gas and fuel engineering construction IPD (implicit price deflator).

Given the variety of supply and demand drivers affecting prices of these commodities, each will be discussed in the relevant sections of report that follow.

As well as individual supply and demand drivers, consumers of these commodities in Australia are also affected by movements in the exchange rate. Specifically, movements in the Australian dollar (A$) against the US dollar (US$) can have significant effects on the domestic price of minerals and metals, as most globally traded commodities are priced in US$ terms.

We used consensus forecasts to drive the outlook for these commodities where available. For exchange rates, these were only available for the near term. We therefore held rates constant over the longer term, at the last forecast point.

5.1 ALUMINIUM PRICES

Aluminium price forecasts are global price forecasts – the London Metal Exchange Aluminium price - sourced from the latest *Consensus Economics 'Energy & Metals Consensus Forecasts'* (EMCF) publication. This publication provides aluminium price forecasts measured in US$ per metric tonne from a range of forecasters. The latest available publication is January 2020, where 29 separate forecasters supplied aluminium price forecasts out to 2029 – the average of all the forecasters is used here. The AER has shown a preference for accepting a range of forecasts from different forecasters, and then taking an average. The Consensus Economics E&MCF provides that for a range of global energy and metals commodities. Quarterly forecasts are provided for two financial years, followed by calendar year forecasts for the next three years. Long term forecasts are provided by a five-year average.

These US$ forecasts were converted into A$ terms using consensus forecasts of exchange rates. Exchange rate forecasts are only available for the next two years from the *Consensus Economics Asia Pacific Consensus Forecasts* (APCF) publication. The US$/A$ exchange rate is then held constant at the last APCF forecast point over the longer term. Overall the exchange rate is predicted by the large range of forecasters supplying forecasts to the Consensus Economics survey to drift up from around US67 cents currently (February 2020) to around US71 cents by early 2022.

5.2 STEEL PRICES

For steel prices, we forecast the 'steel pipe and tube producer price index' (PPI) from ABS (catalogue #6427.0), as these types of steel products are more relevant to gas networks. The ABS' steel pipe price index does not have consensus forecasts available. Therefore, we constructed a forecasting model where the consensus forecasts of iron ore and coking coal are used to drive the outlook, with these two commodity price forecasts sourced from the latest Consensus Economics EMCF publication.

Steel pipe prices are tied to various factors including exchange rates, manufacturing wages, transport and energy costs. Domestic construction activity also has an influence on prices, with price pressures increasing during upswings and booms, and decreasing during down turns. Most prominently however, steel is tied to the price of its raw materials: iron ore and coking coal.

Higher iron ore and coking coal prices saw steel pipe prices grow by 6% in FY17, before falling 8% in FY18 as iron ore and coking coal prices fell back. Growth has since spiked up again. Consensus forecasts point towards a relatively weak outlook overall. Growth in steel pipe prices is expected to fall below inflation over the outlook period as a result.

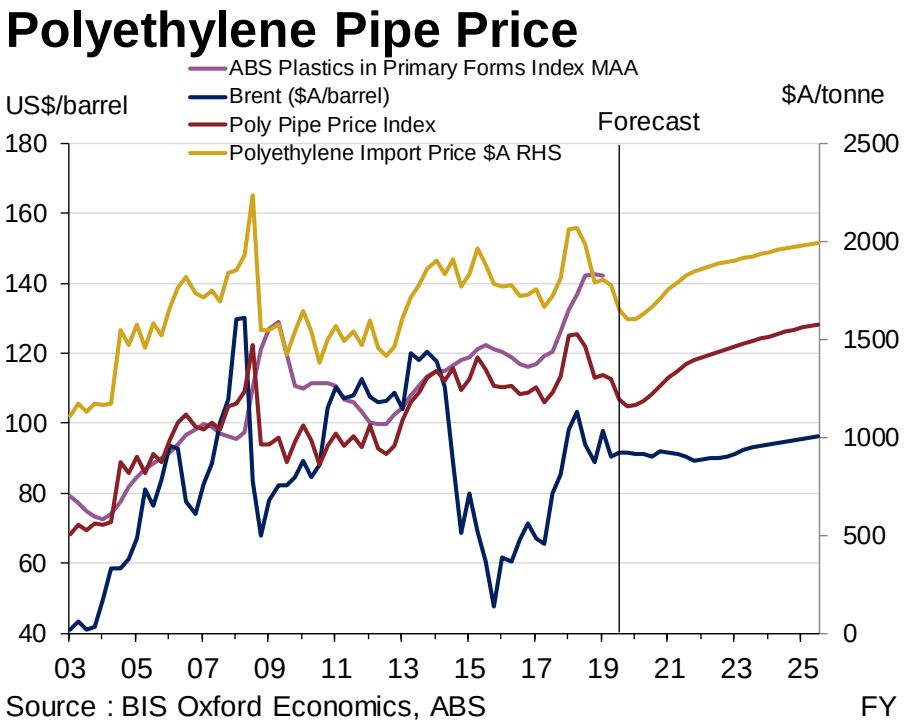
5.3 POLYETHYLENE PIPE

To forecast polyethylene pipe prices we considered a weighted mix of three key drivers: Underlying polyethylene (PE) prices, manufacturing wages, and transport/overheads.

PE prices are strongly linked to crude oil prices. Thus, we used the latest Consensus Economics EMCF forecasts of crude oil prices and exchange rates to drive prices for this component over the outlook period. Manufacturing wages were driven by the BIS Oxford Economics wage model, and the transport and overheads inputs were indexed to CPI inflation.

Benchmark Brent oil prices peaked at US$81/barrel in October 2018, before plummeting to around US$50/bbl in late December. Prices then progressively recovered to US$71/bbl in May 2019, before easing to US$63/bbl (monthly average) in January 2020. Consensus forecasts indicate a mild recovery to commence from 2021.

In recent months PE prices have dropped below the' natural' level implied by oil prices. Accordingly, we expect an upward correction in the near-term as prices revert to a more stable long-run level in line with oil prices and growth rates converge towards those of oil prices. A modest strengthening in manufacturing wages, transport and overheads (the latter in line with general inflation) will also add to the growth in the PE pipe price index over the medium term.



5.4 CONCRETE PRICES

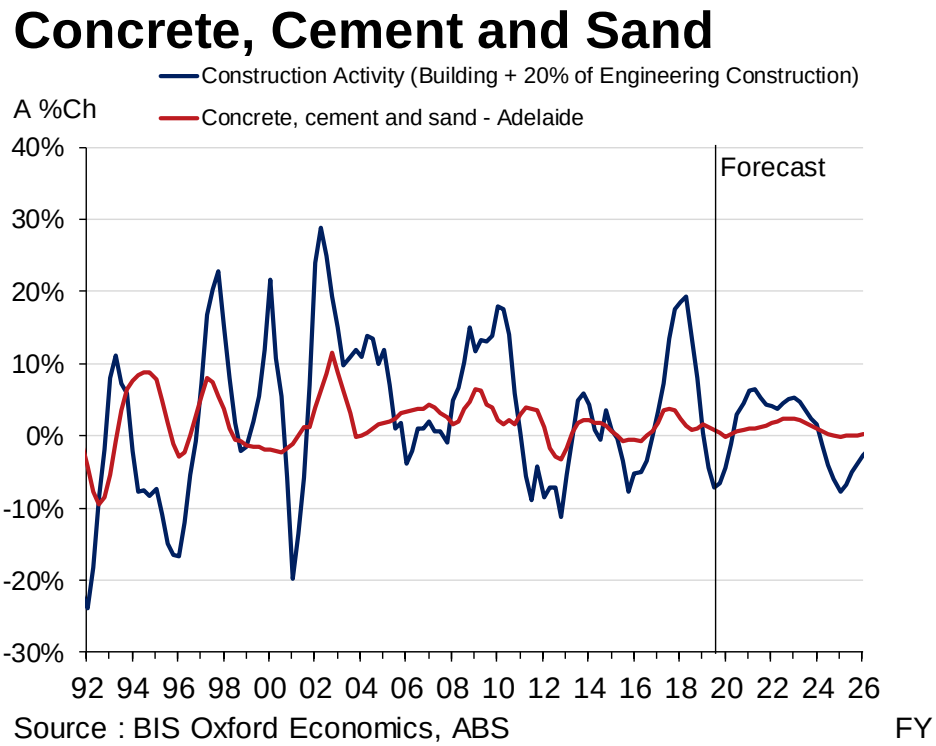
Our forecasts of concrete, cement, and sand prices are heavily influenced by our regional building and construction work done outlooks.

Adelaide region Concrete, Cement and Sand prices lifted strongly post-GFC, on the back of a strong upswing in construction activity. Price growth eventually slowed and went negative in 2013 after construction activity retreated. Thereafter,

price growth has remained somewhat subdued, even as residential building activity boomed through FY18 and began contracting in FY19.

The Adelaide construction industry is entering a period of strength, which will drive increases in concrete prices. This will be helped along by growth in demand and prices in neighbouring states, particularly NSW and Victoria, which will lead to a tightening in construction and building materials markets and upward pressures in building materials prices in the eastern seaboard and South Australia.

Price growth is forecast to peak at 2.3 per cent in FY23, after several years of strong construction activity. As demand from the construction sector tapers off, concrete, cement and sand prices are forecast to follow suit, with prices staying fixed in FY25 and FY26.



5.5 GAS AND FUEL CONSTRUCTION PRICE INDEX

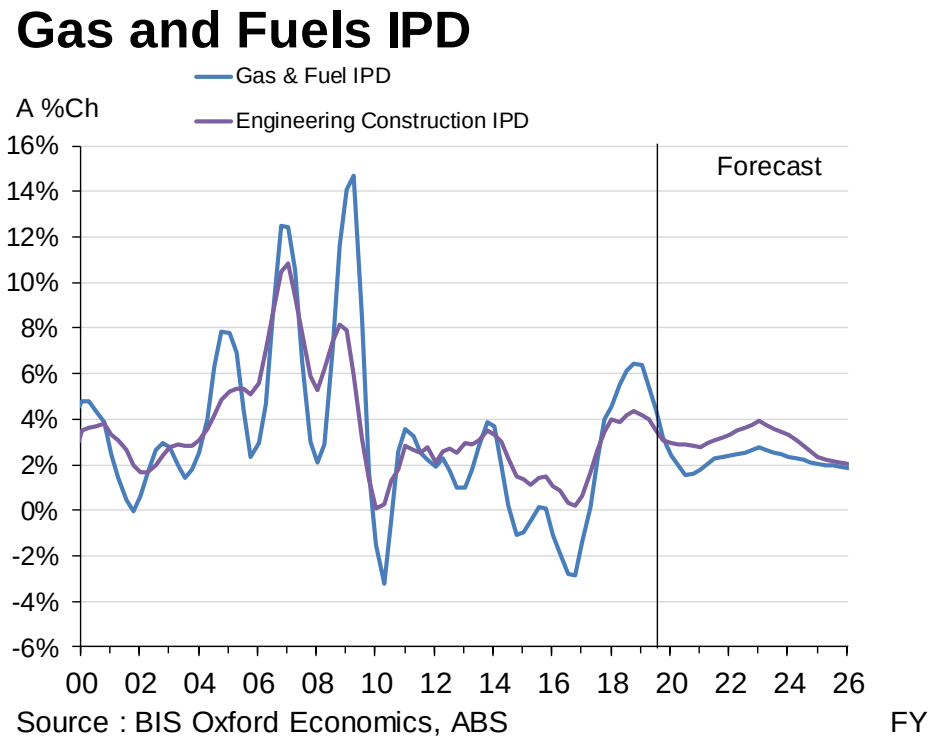
Utilities including gas network businesses often outsource a proportion of their capital works (or even maintenance) to the construction sector. We will therefore include an escalator for totally outsourced contracts, which may be a ‘turn-key’ project or similar, and involves the contractor providing both labour and materials. In effect, the escalator here would be a combined index of labour and materials. The gas and fuel engineering construction implicit price deflator (IPD) measures cost growth relevant to the gas pipeline engineering construction sector. It is a combined index of materials and labour, and is one of six unpublished IPD’s (obtained under a special ABS subscription service) which make up the total engineering construction price deflator. Only total Australia IPDs are available for these unpublished IPDs – state breakdowns are unavailable. Growth in this index is driven by construction and

manufacturing wages, steel pipe prices and general engineering construction costs.

Overall, gas and fuel engineering construction costs are expected to experience moderate growth over the next 6 years, with overall growth roughly equal to inflation. This price index tracks movements in overall engineering construction costs, with peaks and troughs often linked to swings in the price of steel pipes and tubes.

Growth peaked in FY19 in line with growth in steel prices. We forecast comparatively weaker growth over the outlook period, despite relatively strong cost growth for the total engineering construction sector. This is primarily because steel price growth is subdued based on consensus forecasts.

Individual components of the index are discussed below.



Engineering construction cost growth to ease over the near term

The engineering construction IPD is a measure of cost growth relevant to the engineering construction sector as a whole. This makes up the largest driver of the gas and fuel IPD, explaining 60 per cent of the index's movement. The engineering construction IPD has accelerated over the past 2 years. While rising oil and steel prices played a role, so too did pressures on local resources such as quarry products, concrete and labour.

Engineering construction cost growth is expected to see growth ease over FY20. Wage growth is forecast to remain relatively weak in the short run, leading to low pressure from the wage component of engineering construction costs. Additionally, raw materials price inflation is expected to moderate, in line with the declining pace of commodity price rises over this period, and this will weigh on the overall sector IPD.

The engineering construction IPD growth will lift to 3.9% in FY23 driven by rebuilding strength in construction wages and a cyclical peak in construction activity. Following this, engineering cost growth is forecast to dip back towards CPI as activity and costs fall with wage growth levelling out, and other materials price growth moving to long run levels.

Steel pipes and tubes prices to see mild growth

Steel pipes and tubing form the second largest component of the gas and fuel IPD and can be attributed to 30 per cent of the index's movement. The series is predominantly driven by international steel prices (in A$ terms), and also includes the cost of manufacturing the pipe and tube products. This component has been tied to the consensus outlook for coal and iron ore products and exhibits a mildly positive cost outlook.

5.6 GENERAL MATERIALS COSTS

The general materials include a range of items used in most businesses and organisations, such as stationary, office furniture, electricity, water, fuel, rent, etc. Across the range of items, the average price increase would be similar to consumer price inflation. Accordingly, the appropriate cost escalator for general materials will be the Consumer Price Index (CPI). The CPI has been frequently used by the AER to allow for general material prices. This means that the real (after inflation) escalator would then be zero.

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.

Husam El-Tarifi, Senior Economist

Husam joined BIS Oxford Economics in 2013 after obtaining his Bachelor's Degree in Economics with Honours from the University of New South Wales. He works across the Asset Sales, Infrastructure and Mining, and the Economics units where he contributes to a number of reports and private client studies including cost escalation projects.

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