



TransGrid

**TransGrid Revenue Proposal
2018/19 – 2022/23**

Appendix H

BIS Shrapnel:

Wage forecasts to 2023

REPORT ON EXPECTED WAGE CHANGES TO 2022/23

Prepared by BIS Shrapnel for TransGrid

Final

November 2016

BIS Shrapnel welcomes any feedback concerning the forecasts or methodology used in this report as well as any suggestions for future improvement.

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SUMMARY

- In early October 2016, BIS Shrapnel was engaged by TransGrid to provide price forecasts of labour relevant to electricity transmission network in New South Wales. Forecasts of wages will be used by TransGrid to develop their operating and capital expenditure forecasts over their next revenue determination period. These forecasts, in turn, will be included in TransGrid's revenue proposal to the Australian Energy Regulator in January 2017. Although the next regulatory control period is 1 July 2018 to 30 June 2023, BIS Shrapnel was asked to provide seven year forecasts covering the financial years 2016/17 to 2022/23 inclusive.
- Overall, BIS Shrapnel 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 4.4% per annum over the seven years to 2022/23, 0.2% higher than the national 'All Industries' AWOTE average of 4.2% per annum over the same seven-year period. In terms of underlying wages growth for private businesses within the 'utilities' sector across Australia — expressed in wage price index (WPI) terms — BIS Shrapnel is forecasting an average of 3.8% per annum over the seven years to 2022/23.
- Our AWOTE forecasts are higher due to compositional effects. Apprentices, trainees and numbers of new staff have increased markedly over recent years, across the electricity, gas and water sector generally. Given slower growth in employment numbers over the next decade, it is likely that there will be overall up skilling of the existing workforce, which will see a commensurate movement by much of the workforce into higher grades (i.e. on higher pay), resulting in higher earnings per employee.
- Wages growth for the privately held businesses within the EGGWS sector has consistently outpaced the average increase in the WPI for the whole EGWWS sector over the last six years. We believe the overall increase in the WPI has been dragged down by wage restraints applied by state governments to contain costs. For example, the New South Wales government has maintained a Public Sector Wages Policy that caps public sector wage increases at 2.5% since 2011. The Victorian, Queensland, Western Australia and South Australia have also restricted nominal wage increases to 2.5% at various stages over the past six years.
- With further privatisation of electricity assets in New South Wales and ongoing state budget constraints, we are forecasting private WPI for the EGWWS sector to continue to grow at a faster pace the industry average. However, as state governments budget position improves over the medium to long-term, we expect them to relax their wage restrictions. As a result, we are forecasting wage increases awarded by publicly owned networks to slowly converge to those for the privately owned businesses over the longer-term.

**Table I: Summary of Wage Forecasts
(% change, year average, year-ended June)**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average (d)
	Actuals					Forecasts		Next Revenue Determination Period					
NOMINAL PRICE CHANGES													
Australian Wages													
All Industries - AWOTE (a)	4.3	4.6	3.0	2.4	1.9	2.9	3.7	3.5	3.6	4.2	4.8	4.8	4.2
New South Wales Wages													
All Industries - AWOTE (a)	3.1	4.3	2.6	4.3	2.3	3.0	4.0	3.5	3.5	4.0	4.6	4.7	4.1
Electricity, Gas, Water and Waste Services Wages													
Australia - Private WPI (b)	3.8	4.8	3.2	3.2	2.7	3.1	3.4	3.5	3.7	4.1	4.3	4.3	4.0
Consumer Price Index (headline - RBA Forecasts)	2.3	2.3	2.7	1.7	1.4	1.7	2.0	2.5	2.5	2.5	2.5	2.5	2.4
REAL PRICE CHANGES (c)													
Australian Wages													
All Industries - AWOTE(a)	2.0	2.3	0.3	0.7	0.5	1.2	1.7	1.0	1.1	1.7	2.3	2.3	1.9
New South Wales Wages													
All Industries - AWOTE(a)	0.8	2.0	-0.1	2.6	1.0	1.3	2.1	1.0	1.0	1.5	2.1	2.2	1.7
Electricity, Gas, Water and Waste Services Wages													
Australia - Private WPI (b)	1.5	2.5	0.5	1.5	1.3	1.4	1.5	1.0	1.2	1.6	1.8	1.8	1.6

(a) Average Weekly Ordinary Time Earnings for full-time adult persons.

(b) Wage Price Index. Ordinary time hourly rates of pay excluding bonuses.

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

(d) Average for the next revenue determination period i.e. from 2018/19 to 2022/23 inclusive.

However, average increase in headline CPI is calculated as a geometric mean of two-year Reserve Bank forecasts and a 2.5% per annum inflation for the next eight years. This method is preferred by the Australian Energy Regulator.

1. INTRODUCTION, OUTLINE OF REPORT & DATA SOURCES

In early October 2016, BIS Shrapnel was engaged by TransGrid to provide price forecasts of labour relevant to electricity transmission network in New South Wales. Forecasts of labour prices will be used by TransGrid to develop their operating and capital expenditure forecasts over their next revenue determination period. These forecasts, in turn, will be included in TransGrid's revenue proposal to the Australian Energy Regulator in January 2017. Although the next regulatory control period is 1 July 2018 to 30 June 2023, BIS Shrapnel was asked to provide seven year forecasts covering the financial years 2016/17 to 2022/23 inclusive.

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

The Australian Bureau of Statistics is the primary data source for the consumer price index, wages, employment, real gross value added and investment data, and for a range of other economic variables shown in Table 2.1 and Table 2.2. The most recent wages data is for the June 2016 quarter and the latest industry employment data is for the month of August 2016. The June 2016 quarter was the latest available data for real gross value added (at the Australian level only), investment and indeed most of the economic variables in Table 2.1. The latest data for Gross State Product and real gross value added for state industry sectors was 2014/15. Other inflation and interest rate data were sourced from the Reserve Bank of Australia while data and information concerning enterprise agreements were obtained from the Department of Employment.

Forecasts of the economic variables in this report were mostly sourced from BIS Shrapnel reports including *Economic Outlook* and *Long Term Forecasts: 2016 – 2031* report plus other unpublished forecasts and from BIS Shrapnel internal research and modelling.

We used a top-down and bottom-up approach to forecasting key economic indicators of the Australian economy. The bottom-up approach models the key sectors of the economy at a regional and individual category level, which are then aggregated to national totals. The top-down modelling then reconciles the bottom-up forecasts by ensuring that the forecasts are consistent with prevailing trends, investment and business cycles and assumptions about the general macroeconomic outlook. This approach to the analysis of an economy allows for a richer set of information to influence the macroeconomic outlook and complements our econometric approach to data modelling and forecasting.

The structure of this report is as follows:

- The previous **Summary** section presents an overview of the outlook for the labour price forecasts and provides summary table.
- **Section 2** provides an overview of the world economy as well as a macroeconomic outlook for Australia and New South Wales, including a brief commentary of the logic and key drivers, plus forecasts of key economic variables. This provides a context for our Australia level and industry wage forecasts.
- **Section 3** discusses BIS Shrapnel's model of wage determinations and provides forecasts of national ('all industries') wages and CPI inflation. This section also includes the Reserve

Bank of Australia projections of CPI inflation which is used to deflate the nominal wage forecasts provided in this report.

- **Section 4** provides wage forecasts for the Electricity, Gas, Water and Waste Services (EGWWS) sector at the Australia level as measured by the WPI (wage price index). This section also has a discussion of historical movements and forecasts of the WPI for privately held businesses with the broader EGWWS sector at the Australia level.
- **Appendices**, which includes CVS of project key personnel.

2. OVERVIEW OF THE MACROECONOMIC OUTLOOK

2.1 World economy: current state of play and outlook

The world economy grew by 3.2% in calendar year 2015, well below its long-run average of 3.6%. Last year was the fourth consecutive year in which the world economy grew by less than its potential growth reflecting a prolonged period of weaker growth following the GFC (global financial crisis). Growth in emerging markets and developing economies — while still accounting for over 70 percent of global growth — stepped down for the fifth consecutive year in 2015, making a marginally smaller contribution to world growth. However, this was partially offset by a modest recovery in advanced economies, keeping overall growth in 2015 just below the rate achieved in the previous year.

At the beginning of this year, most commentators believed that five key issues would shape the outlook for calendar years 2016 and 2017 including:

- Expectations of how fast the US Federal Reserve (the Fed) would normalise its monetary policy (i.e. return highly stimulative interest rates to its neutral level).
- The difficulties China could face in rebalancing its economy from an investment-led model to one which is driven by domestic demand and whether this would result in a significant slowing in Chinese growth.
- The path commodity prices would take after plummeting in 2015 which sent many net commodity exporting nations including Brazil, Canada and Russia into recession.
- Whether ongoing monetary and fiscal stimulus would stimulate private demand in Japan,
- And the resilience of the recovery in the Euro-area economies.

Everything being equal, our expectation at the beginning of 2016 was for a modest pick-up in global growth this year and in 2017 and 2018. Our view was that emerging market economies would continue to grow solidly albeit at a slightly slower pace. In addition, we believed that better performance by the advanced countries, particularly the United States, would support world economic activity.

However, 2016 started with a bang with sharp falls in equity prices pretty much around the world as investors put greater weight on downside risks to the global outlook due to a slowing Chinese and other emerging market economies. Concerns about global demand drove oil prices lower in January adding to the bearish sentiment. Fears about emerging market economies' growth prospects also led to net capital outflow from these countries resulting in a tightening of financial conditions. Thankfully, sentiment improved by March and normal business resumed. However, as conditions were returning to normal, the financial markets took another hit.

On 24th June 2016, Britain, via a referendum, voted to leave the European Union (Brexit). This outcome was unexpected and as a result sent panic amongst markets which had priced in the 'Remain' vote winning comfortably. In the immediate aftermath of the Brexit vote, the pound lost more than 15% (trading at its weakest level since 1985) and more than \$3 trillion was wiped off share markets globally. As ever, the political fallout within Britain of the Brexit vote was swift. The incumbent Prime Minister, who campaigned for the remain vote, quit his position in the immediate aftermath of the vote. A new Prime Minister was installed with many 'Remain' campaigners also losing their cabinet positions. Financial market conditions since the vote have settled down and it is more than likely that the actual real economy impact won't be as severe as the initial headlines suggested.

Nonetheless, shocks to financial markets worldwide stemming from the unexpected Brexit vote have altered our growth profile for the UK and the Euro-area slightly. We have shaved growth by around 0.1% per annum over the next two years with the decline in the UK growth marginally larger due to weaker confidence, tighter credit conditions and reduced bilateral trade. That said, most of the impact on GDP is expected to come from the uncertainty surrounding business investment particularly as the timing of Britain's exit is likely to drawn out. Already, the government's plan to exit the EU is being hindered by legal challenges. The high court has ruled in favour of the claimants that the Prime Minister cannot use executive powers (i.e. undertake a decision without consulting the Parliament) to trigger Article 50 of the Lisbon Treaty and thereby formally beginning the two year Brexit process. This means that the EU exit process can only be done by an Act of Parliament. The government has said that it will appeal the ruling, and the Supreme Court is set to consider the case between 5-8 December 2016 putting the withdrawal timing further in limbo.

We believe global growth will continue to be boosted by emerging markets and developing economies. China, while slowing, is still the world's largest economy and will continue to make significant contributions to growth. India and ASEAN-5 (Indonesia, Philippines, Malaysia, Thailand and Vietnam) GDP growth is expected to pick up pace over the next two years. Meanwhile Russia and Brazil currently in recession are expected to recover, albeit modestly, in 2017 adding to world growth.

Conversely, many advanced economies are still in protracted recovery from their GFC induced economic downturns. The United States is the key for global growth going forward. The economy is now 10% larger than its previous peak in 2007. In addition, employment has surpassed its 2008 peak by 5 million workers and the unemployment rate has fallen from 10% to below 5%. Many analysts believe that the United States' economy is close to full employment. However, the problem for the United States is very low levels of price inflation. Hence, the hesitancy of the Federal Reserve to raise rates further. The US central bank is happy for the unemployment rate to fall even further so that wages pick up and pushes price inflation back towards its target of 2%.

For most of the Euro-area economies, it was always going to take a decade, all things being equal, to recover from the ashes of Great Recession following the financial crisis. Nonetheless, stimulatory monetary policy and improvements in competitiveness stemming from falling unit labour costs will support growth in the Euro-area. Japan is expected to benefit from ongoing monetary and fiscal stimulus. including a delay in a sales tax hike in response to ongoing weakness in private demand growth. Meanwhile, Chinese growth is slowing as authorities seek to rebalance the composition of its growth from investment-led to household consumption. But we expect China to continue to make significant contributions to world GDP growth.

Overall, the newspapers are full of doom and gloom as the US presidential election nears, as Europe struggles out of rolling recessions in the face of concerns about viability of their banks, as the UK slowly exits the EU, and with concerns about the sustainability of growth in China. Only the US is doing well. It was always going to take a decade to absorb the excess capacity created during the pre-GFC boom until investment came through to boost growth. We think the US will end up driving world recovery notwithstanding any nasty shocks post-election. But it will take time. We're forecasting the world economy to grow by 3.3% this year before picking up, albeit gradually, to 3.7% and 3.8% in 2017 and 2018 respectively. We believe world growth will pause in 2019 due to higher interest rates before returning to stronger (trend) growth next decade.

2.2 Australia – current state of play and broad economic outlook

Australia's real GDP grew by 0.5% in the June 2016 quarter (seasonally adjusted), bringing the through-the-year growth (June 2016 compared to June 2015) to 3.3% — the strongest outcome in four years. While the June result was slightly below market expectations of 0.6%, it was still a solid number considering an already impressive 1% growth in the March quarter. However, the second quarter growth was driven by public demand with very little sign of broadly based growth. Take out the stimulus from government consumption expenditure and public investment which included a 27.6% spike in defence spending, real GDP would have been flat in the June quarter. Over 2015/16, GDP grew by 2.9%.

Certainly, Australian growth will stay soft for the rest of this decade as we absorb the shock of falling mining investment, as the residential cycle turns down and until non-mining growth and business investment recover. But that's a good outcome. There is minimal risk of recession. And other resources exporting countries have gone into recession.

As discussed, the world economy is staying weaker for longer, still recovering from the GFC.

Unlike most other advanced economies, we managed to avoid recession in the wake of the GFC. Our last recession was in 1991, a quarter of a century ago, when we had our own financial crisis. Since then, GDP has grown to \$1.7 trillion (in 2013/14 prices), 120% larger than in 1991, adding over four million jobs. As a result, Australia has continued to move up the OECD ranking to 10th in terms of GDP per capita (on a purchasing power parity basis), and now sits around 18% below the US, compared with 26% in 1991.

Australia's GDP growth averaged 3.2% per annum over the last 25 years. That's considered our potential growth rate — the sustainable rate at which the economy can grow without adding to inflation.

1990s growth was underpinned, post-recession, by strong labour productivity gains resulting from changes to manning practices and investment in productive assets. This allowed the economy to prosper without the burden of exorbitant cost pressures and much higher interest rates. More recently, growth has been largely driven by a 'once in a generation' mining investment boom which commenced in 2002/03 and lasted for a decade. The resultant increases in capacity are still driving growth in production and exports, and underpinning GDP.

The boom in mining investment (comprising mine construction, plant and equipment and infrastructure investment, exploration spending, investment in computer software and R&D) is now long gone. Coal and iron ore peaked in 2012/13 although the boom in LNG, the largest resources construction sub-sector, lasted longer driven by ongoing works on mammoth LNG plants in Western Australia, Queensland and the Northern Territory. Nonetheless, it too has peaked and started to decline.

We're now around half way through the fall in mining construction. And that's a major negative shock to the economy. Growth has been below par, averaging 2.5% per annum.

But it could have been worse. Remember the recession in other resources exporting countries.

Thankfully, nearly all of the negative contribution from falling mining construction has been offset by increased mining production and exports. That's despite sharp falls in commodity prices. Australia's big iron ore producers are some of the world's most efficient and lowest cost producers. They remain profitable and can maintain production even at lower prices. Not so the higher cost producers.

With the shock from falling resources construction offset by increased resources production, strong residential building and resilient consumption expenditure (both households and

government) in the face of falling infrastructure spending kept us out of recession. The lower dollar now provides a fillip to tourism and education services directly adding to growth.

There's no doubt that we've had a good run. So, where to from here?

The next three years will be a long and difficult transition towards balanced growth

Growth will remain weak for some years yet with the next stage involving:

- Another three years of falling mining construction taking the total decline to 74% below the peak.
- Working through the structural shift from a mining investment-driven economy back to the balanced growth we had before the mining boom. However, rebuilding non-mining growth and investment will be agonisingly slow.
- Falling residential building, a key driver of growth over the last three years,
- Recovery in infrastructure spending by governments,
- Major regional and industry shifts,
- Recovery in finance and business services as non-mining growth and investment gradually build momentum.

Meanwhile, we expect that:

- The dollar will stay in between US \$.70 and \$.80, just above Australia's competitive level and a little higher than we would like, but low enough to drive growth in Tourism, Education and the more competitive dollar-exposed industries.
- Inflation will remain contained. And we're not concerned about deflation.
- Interest rates will stay lower for longer as the US Fed will be slow to raise cash rates and bond rates slow to rise, allowing Australian rates to remain lower. Weak growth and investment worldwide means weak demand for funds in a post-Quantitative Easing world awash with funds.

We anticipate weak growth as non-mining business investment on slow road to recovery

Australia's problems are domestic. With the end of the mining boom, we face a protracted and difficult structural change involving rebuilding of dollar-exposed industries and recovery in non-mining growth and investment. However, the structural change from a mining investment-led economy to balanced growth was always going to be slow and painful. A lower Australian dollar around the competitive US 58 – 70 cents range would help speed recovery. But that seems unlikely in a world where investment in Australia remains particularly attractive.

While household consumption expenditure and public spending (both recurrent and investment spending) will make healthy contributions to growth, non-mining business is still recovering from the effects of the GFC.

Business is still in survival mode, containing costs and deferring expenditure. Growth is weak and profits weak, with excess capacity deferring expenditure. They'll invest when demand and profits are improving and capacity tightening, requiring investment to service growth. That will take time, both overseas and in Australia. Reducing interest rates won't help. Businesses aren't ready to invest yet. And that means that non-mining business investment won't pick up momentum for some years yet.

We know the shape of recovery

After a decade of constraint or recession, the dollar-exposed industries will recover first. We are already seeing recovery in tourism, both domestic and inbound, and education services. They'll need to refurbish and then expand to meet demand. Other dollar-exposed industries, too, are benefiting from the improved competitiveness of a lower dollar, showing initial signs of recovery. That will broaden to growth and, eventually, investment in the non-mining service sectors. But it will take time.

Meanwhile, public infrastructure investment is coming out of a prolonged slump. It recorded modest growth last year, but will pick up strongly over the next three years, funded by asset sales. Investment will be led by major road and rail infrastructure, along with rapidly rising telecommunications construction as the NBN rollout is accelerated. They will be joined later by modest recoveries in water, sewerage and electricity infrastructure, required to service rising population and to catch up on deferred capital works. Public non-dwelling building is near the trough of the cycle and will also start to pick up, albeit modestly.

That, too will spread to demand in other non-mining industries. And as growth comes through, businesses will loosen the purse strings and start to invest. But we expect that to take three years to build momentum.

In the meantime, GDP growth will be underwritten by net exports with contributions from consumption expenditure (both households and government) and public investment. We are forecasting net exports to add 1% to growth over the next three years.

Overall, GDP growth is expected to be below trend, averaging 2.6% per annum for the rest of this decade (see Table 2.1). The next three years will be challenging times much like the last two years, with major differences across states, regions, towns and capital cities.

Soft growth means that:

- Employment growth will be weak and the unemployment rate will rise.
- Inflation in prices and wages won't be a problem this decade.
- Interest rates should remain low but could go even lower if the dollar appreciates again, or if the economy weakens. We have a large buffer and don't have to follow increases in US cash rates. Bond rates, however are a different story. While bond rates look like staying lower for longer, in the medium term we expect them to rise significantly, starting in the United States with Australia following.

In a weak world economy, Australia looks a haven of security as an investment destination. But we have our own problems. The end of the mining boom and structural change as we emerge from the thrall of the GFC will be a difficult road. But we can see the path to recovery and restructuring of the economy. The lower dollar is a key here. Improved competitiveness will provide a boost that will spread through non-mining and, eventually, underpin a recovery in investment. We are forecasting stronger output and employment growth next decade (again, see Table 2.1).

Table 2.1: Australia – Key Economic Indicators, Financial Years

Year Ended June	2011	2012	2013	2014	2015	2016	Forecasts						
							2017	2018	2019	2020	2021	2022	2023
Private Investment													
– Dwellings	3.8	-5.9	-1.8	5.1	8.1	9.1	1.0	-7.8	-9.5	-0.2	2.9	2.8	-2.2
– New Non-Dwelling Construction (+)	18.5	37.6	9.1	-0.7	-11.8	-16.0	-14.1	-6.7	-2.3	2.3	4.9	7.6	0.5
– New Non-Dwelling Building (+)	9.0	9.8	5.2	3.5	5.5	-0.2	-4.9	3.8	-1.6	0.0	4.6	7.0	-1.7
– New Engineering Construction (+)	25.0	54.5	10.8	-2.3	-19.0	-24.6	-20.6	-15.7	-2.9	4.9	5.2	8.2	2.6
Total New Private Investment (+)	5.7	14.7	3.5	-0.8	-2.7	-5.5	-4.0	-3.6	-2.3	5.5	7.9	6.1	-0.2
New Public Investment (+)	-3.2	-4.3	-3.9	-3.7	-6.8	2.0	7.7	8.2	3.5	1.7	0.6	1.2	0.3
Gross National Expenditure (GNE)	4.3	5.0	1.4	1.0	1.0	1.1	1.8	1.5	1.5	3.6	4.0	3.6	2.0
GDP	2.4	3.6	2.4	2.5	2.3	2.9	2.9	2.6	2.2	3.2	3.3	3.3	2.6
Employment													
– Employment Growth (Yr Avg)	2.4	1.2	1.2	0.5	1.2	2.2	1.4	1.1	0.7	1.3	2.1	2.0	1.2
– Employment Growth (May on May) (%)	2.2	1.7	0.8	0.5	1.9	1.8	1.4	0.9	0.7	1.7	2.2	1.7	0.9
– Unemployment Rate (May) (%)	5.0	5.2	5.6	5.8	5.8	5.6	5.7	5.9	6.0	5.5	5.0	4.8	5.1
Labour Productivity Growth													
– Total	0.0	2.4	1.2	1.9	1.1	0.7	1.4	1.5	1.5	1.9	1.1	1.3	1.5
– Non-farm	-0.1	2.5	1.3	2.0	1.2	0.8	1.4	1.5	1.6	1.8	1.1	1.3	1.5

Source: BIS Shrapnel, ABS and RBA

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

2.2.2 Key risks to outlook

The risk of a sharper slowdown in Chinese growth (and demand for Australian commodities) would put Australia in a particularly vulnerable position; given our commodity exports are significantly dependent on continued robust demand from China, as well as other Asian economies. However, this scenario is unlikely, with the general consensus being that Chinese growth will stabilise around 6% over the next three years, particularly given the willingness (and firepower) of authorities there to prevent a serious slowdown.

There is a risk that commodity prices don't improve over the next two years as expected, which would prolong the mining investment downturn, see government revenues remain weak and national income growth remain sluggish for longer. However, this risk is associated with a weaker dollar than forecast, which would encourage sustainable structural change toward balanced growth and an eventual return to stronger economic growth. Similarly, there is a risk that the dollar will fall further or more quickly than currently anticipated. But this would be a positive outcome for many Australian industries, including the perpetually weak manufacturing sector, as well as other trade-exposed industries such as agriculture, tourism and education.

There is a risk that our forecast recovery in non-mining business investment will take longer to come through, which means that the economy will stay softer for longer. If the recovery does not come through, we expect the Reserve Bank to keep interest rates at historically low levels even longer than our current forecast to support economic recovery. Conversely, there is an upside 'risk' that non-mining investment comes through sooner and stronger than anticipated, possibly via the tradeables sectors ramping up investment faster than we expect, which may then flow quickly onto other industries.

Longer term, the main risk to Australia's growth prospects relate to the fundamental drivers of growth – lower population growth and a failure for labour productivity growth to maintain its long-term average. However, we expect Australia's relatively high level of income to continue to attract migrants. Furthermore, as the positive benefits of the terms of trade and increased labour supply of the past decade or two start to wane, we expect both governments and

businesses to make a more concerted effort to invest in productivity – much as it occurred during the 1980s and 1990s.

2.3 The New South Wales Economy: current conditions and outlook

NSW has the best short-to-medium term prospects of all the states. BIS Shrapnel is predicting economic growth to outpace the Australian average and the other states over the next two years in terms of Gross State Product (GSP), State Final Demand (SFD)¹ and employment growth.

This positive outlook follows the past two good years, when the NSW economy also outperformed the national average – a marked turnaround from the previous decade or so when the state mostly lagged the national economy. Gross State Product (GSP) growth was 2.4% in 2014/15, 0.1% higher than the Australian GDP growth, and an estimated 3.5% in 2015/16, 0.6% above Australian GDP. Meanwhile, State Final Demand (SFD) has been growing strongly, increasing 3.3% and 3.7% in 2014/15 and 2015/16 respectively, around 2.5% higher than Australian Domestic Demand growth in both years.

Key to the strength of SFD has been increases in construction activity mainly from dwellings, but also private non-dwelling building and infrastructure investment. The state is also benefitting from improved competitiveness – due to a significantly lower A\$ – which is boosting domestic trade exposed industries via increased exports and import substitution. This, in turn, has supported increased business investment, strong employment growth and household consumption expenditure.

Going forward, there are several positive factors which are expected to drive further strong growth:

- Dwelling building will grow strongly, for at least another year, before NSW joins the national housing downturn. Major government infrastructure projects are now under way and will ramp up further over the next four years.
- The Australian \$ is expected to remain around or below current levels, and continue boosting the state's tradeables sectors.
- The recent strength of private non-dwelling construction, equipment investment, and software and research and development spending (which form the majority of 'intellectual property products' investment) suggest non-mining business investment has started to recover in the state – a lot earlier than in other states.
- The project pipeline for private non-residential building and private engineering construction indicates further growth in these construction segments over the next two-to-three years, although the non-dwelling building segment will pause over 2016/17.
- Population growth has picked up and is predicted to hold at, or just above, the national average over the next two years.
- Employment growth has been very strong over 2015/16 and is forecast to remain strong for the next two years.
- The strength of the labour market, increases in population and buoyant property prices have driven (and will continue to drive) strong growth in household consumption expenditure.

¹ State final demand is defined as the sum of all expenditures by households, businesses and governments.

Private dwelling investment to peak sometime next year, despite market remaining undersupplied

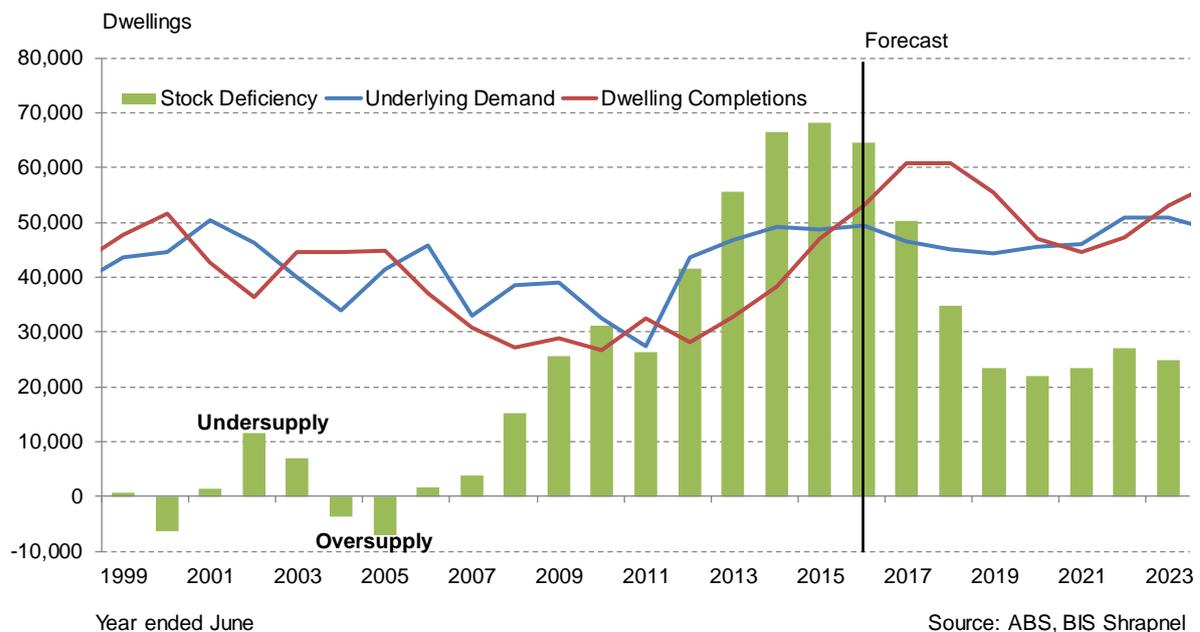
Residential investment has made a significant contribution to the state’s economic growth over the past four years and we expect this to continue over this year at least. Our current forecast is for an increase in dwelling investment of over 6% in 2016/17, led by new dwelling building but also supported by moderate growth in home renovations (alterations and additions – A & A) activity – which constitutes just over a third of total dwelling investment. However, there may be upside to the near-term forecast, given a large upward revision to March quarter dwelling commencements in the recently released June quarter ABS Building Activity data, and a further rise in June quarter commencements.

Nonetheless, although forecast dwelling completions are now pushing well above the underlying demand (number of houses required given household formation rates), the increase in investment over the next two years will still not be enough to eradicate the stock deficiency leaving the market undersupplied (see Chart 2.1).

Despite this, we believe residential building will falter in 2017/18 and 2018/19, as moves over the past year or so by APRA and the banks to put the brakes on investor lending is now sending high density building into a period of decline.

As the current cycle is driven by apartment building (made bankable by presales to investors), the fall is likely to more than offset further small rises in private detached houses (despite first home buyers up against the affordability barrier) causing overall private residential building to suffer a modest fall in 2017/18, and 2018/19 before favourable underlying fundamentals, including a significant stock deficiency, drive the next upswing from the end of this decade.

Chart 2.1: Underlying demand for dwellings and estimated stock deficiency – New South Wales



Public investment is now becoming a key driver of NSW economic growth

New public investment increased 7% last financial year, following five years of weakness and is forecast to increase a cumulative 23% over the next two years, with further (albeit modest) rises

over the following two-to-three years. A 20% rise in public engineering drove the increase last year – offsetting a 20% fall in the (smaller) public non-dwelling building segment and flat growth in other areas of public investment. Public investment in NSW is ramping up at a faster and more sustained rate than in other states, underwritten by proceeds from asset sales and helped by rising tax revenues driven by residential stamp duties and stronger economic and employment growth. The privatisation of 49% of the state's electricity network will provide a further boost to long-term funding.

Public infrastructure construction will continue to be the major driver, boosted by major transport projects including the various stages of the expansion of the M4 and M5 corridors (WestConnex), Woolgoolga to Ballina Pacific Highway upgrade and the Sydney CBD Light Rail, while an injection of private funding will support the development of the North West Rail Link and the NorthConnex toll road project, which will link the M1 and M2 motorways.

Public non-residential building is forecast to bounce back over 2017/18 (after sharp declines over 2014/15 and 2015/16), led by increases in schools and university building, a round of hospital upgrades (worth over \$1.3 billion), the \$125 million Opera House and \$150 million Circular Quay upgrades and possibly around \$600 million of work on the Olympic and other sports stadia such as a new stadium at Parramatta.

Moderate growth in business investment to continue

New businesses investment has exhibited modest growth of around 3% per annum over the past two years, and is forecast to increase by just over 2% in 2016/17 before picking up to almost 5% in 2017/18, with offsetting cycles to continue among its components – machinery and equipment, private non-dwelling building, private engineering construction and intellectual property products (software, R& D, mineral exploration).

After strong growth over the past three years, private non-dwelling building is expected to decline by around 11% in 2016/17 as work on a number of major projects finishes, including the Barangaroo office towers and a major round of hotels, with private schools, hospitals and retail building activities also falling back in 2016/17. However, a number of projects likely to commence over the next two years should see activity rise from 2017/18, led by the \$500 million Castle Tower retail expansion, the \$450 million work on the eight stations for the North West Rail Link (a PPP), the \$680 million Crown Hotel and Casino at Barangaroo and the \$600 Grafton Prison (expected to be a PPP). In the office sector, strong underlying demand combined with constrained supply is expected to underwrite another upswing from 2017/18.

Private new engineering construction has fallen 40% over the past three years, due largely to the decline in mining and heavy industry construction, with steep falls in roads and subdivisions, harbours, water and electricity-related construction also detracting from activity. Increased private infrastructure construction will now see a recovery from 2016/17, due to a significant lift in roads and subdivisions and railways construction, along with small rises in telecommunications construction, with mining and electricity-related investment picking up from 2017/18.

Good employment prospects will underpin solid consumer demand

In 2015/16, the New South Wales economy recorded the strongest annual jobs growth in nearly two decades, with year-on-year growth of 3.7%. This is expected to be followed by growth of 2% and 1.7% over 2016/17 and 2017/18 respectively. This will keep the unemployment rate around 5% to 5.5% over the next few years (currently 4.9%, September 2016).

The continuing strong growth in private investment and recovery in public investment will boost the state's key finance and property and business services sectors, which collectively account for over 26% of New South Wales GSP and almost 19% of total state employment. These sectors will also derive additional benefits from the revival in non-mining business demand and profits, and ultimately the increased investment. The state's construction sector – which accounts for just under 9% of employment (but only 5% of GSP) – will also grow over the next 2-3 years, and boost other sectors, such as manufacturing, wholesaling, transport and a range of service industries. NSW services industries will benefit from the broader base of growth across the state and nation, including solid consumer demand.

The positive outlook for the labour market bodes well for private consumption expenditure (PCE). The strength of the labour market, increases in population and buoyant property prices have driven strong growth in household consumption expenditure. PCE registered 3.6% growth in 2014/15 (well above the national average of 2.7%), easing to 3.3% in 2015/16 (but still above the national average of 3.0%). With the labour market and consumer confidence looking healthy, PCE is forecast to again grow by around 3.3% in 2016/17, before growth eases.

NSW SFD and GSP growth sustained this year, before easing in 2017/18

The significant decline in commodity prices and the associated depreciation of the Australian dollar is driving the nation's structural shift away from mining and mining-related investment and towards a broader base of economic growth. New South Wales' diversified economy is in a good position to reap the benefits of the weaker dollar as improved competitiveness drives growth in the state's key trade-exposed industries, including agriculture, manufacturing, education, and tourism. SFD growth is forecast to be sustained at 3.7% in 2016/17, before growth eases to 2.7% in 2017/18 due mainly to the fall in residential building, with growth well above forecast national growth in Australian Domestic Demand of around 1.6% over the next two years (see Table 2.2).

In addition, New South Wales and Victoria are the only two states which regularly run a large surplus on net interstate trade in goods and services, with this surplus worth around 16% of NSW GSP in 2014/15 and 2013/14. However, given the weak growth expected across most other states over the next three years, we expect little contribution from net interstate trade, although some gains will come from import substitution, including domestic tourism. However, net international exports are likely to detract from growth in 2016/17 (as occurred over the past two years), but are then expected to contribute positively (albeit only slightly) to GSP growth over the following two years.

Table 2.2: New South Wales – Key Economic Indicators, Financial Years

Year Ended June	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
New South Wales													
State Final Demand	3.0	1.6	1.6	2.6	3.3	3.7	3.7	2.7	2.0	3.0	3.5	3.0	1.6
Gross State Product (GSP)**	2.8	1.9	2.0	2.3	2.4	3.5	3.3	2.9	2.4	2.7	2.8	2.7	2.1
Employment Growth (Year Average)	2.8	0.7	1.5	0.6	1.8	3.7	2.0	1.7	0.9	0.9	1.6	1.5	0.6
Australia													
Australian Domestic Demand	3.7	5.1	1.6	1.3	0.8	1.2	1.7	1.5	1.6	3.5	4.0	3.7	2.1
Gross Domestic Product (GDP)	2.4	3.6	2.4	2.5	2.3	2.9	2.9	2.6	2.2	3.2	3.3	3.3	2.6
Employment Growth (Year Average)	2.4	1.2	1.2	0.5	1.2	2.2	1.4	1.1	0.7	1.3	2.1	2.0	1.2

Source: BIS Shrapnel and ABS

* Total construction work done in constant 2013/14 prices as per the ABS Building Activity and Engineering Construction Activity in Australia surveys. Total construction is the sum of new dwelling building (includes alterations and additions activity greater than \$10,000), new non-dwelling building and new engineering construction.

**Gross State Product for year-ended June 2016 is an estimate.

GSP growth is forecast to increase by 3.3% in 2016/17, easing to 2.9% in 2017/18 with the small contribution from net interstate trade adding to the small contribution from net international trade, leaving GSP growth tracking just above growth in state final demand in 2017/18.

In summary, over the next two years, New South Wales will have the strongest state economy. Growth has outpaced national average over past two years and is expected to remain above average over next two years. In addition, non-mining business investment has picked up earlier than most states. However, a significant housing undersupply will underpin residential building over medium term. Public investment, private non-dwelling building and private civil construction will take over the baton from residential building and be key drivers of growth.

Beyond the next two years and over the five-year period to 2022/23, we are forecasting New South Wales' annual SFD growth to slow back down to an average of 2.6%, with GSP also expected to moderate to 2.6%. Much of this slowdown will come from the construction sector. The gradual erosion of the state's housing shortage throughout the remainder of the 2010s will lead to a downturn in dwelling investment in the early to mid-2020s. Engineering construction is also expected to fall over this period due to tumbling investment across roads (as the first stages of WestConnex wind down), telecommunications (as the NBN rollout reaches completion), and mining and heavy industry (as the next round of projects comes to an end). On a positive note, the Australian dollar is forecast to average under US\$0.80 during most of this period, supporting trade-exposed industries, and New South Wales will still derive benefits from solid economic growth in other states, given its tendency to run a positive balance on interstate trade in goods and services.

3. INFLATION AND WAGES

3.1 Inflation: current state of play and outlook

Consumer price inflation hasn't been a problem for over two years despite a 20% depreciation of the Australian dollar since June 2014. Underlying inflation has generally remained in the lower half of the Reserve Bank's 2 to 3% target range over calendar year 2015 and dipped below 2% in the first half of 2016. Increases in import prices have largely been offset by deflation in costs of intermediate inputs including freight costs. In addition, weak domestic demand has kept a lid on wages and non-tradeables inflation. We believe price inflation is unlikely to be of concern over the short-term.

We expect broadly based price pressures to remain contained over the next 12 to 18 months as weak wages growth provides a drag, although the headline rate will rise due to higher petrol prices as oil prices recover from their troughs. With underlying inflation subdued, we expect the Reserve Bank to keep rates on hold until the economy strengthens. However, the risk is on the downside. The Reserve Bank may choose to cut rates again if the dollar appreciates materially in the near-term or if the economy weakens significantly.

CPI rises in the September 2016 quarter driven by temporary factors ...

The consumer price index rose by 0.7% in the September quarter to be 1.3% higher through-the-year (September 2016 quarter over September 2015 quarter), representing a rise in the annual headline CPI from 1% in the June 2016 quarter. The September quarter outcome was driven by a 19.5% spike in fruit prices and a 5.9% jump in price of vegetables. Adverse weather including floods in major growing areas impacted on supply and drove the large increases in the price of fruit and vegetables. As a result, the food and non-alcoholic beverages group rose by 1.7% in the September quarter adding 0.3% to the quarterly outcome.

The September quarter headline CPI was also boosted by a 12.5% increase in excise rates for tobacco which came into effect on 1 September. Tobacco prices rose by 2.3% in the last quarter. This, combined with a 0.8% increase in the price of spirits pushed alcohol and tobacco prices up by 1.1% in the quarter to be 5.7% higher through-the-year. Meanwhile, fuel prices (the other usual volatile component of the CPI) fell by 2.9% in the quarter even though the benchmark Tapis crude oil price rose marginally from A\$0.40 per litre in June to A\$0.41 in the September quarter. The petrol station retailers passed on a 4c/ltr reduction in refiners' margins to consumers rather than absorbing the savings into their margins, which at present is running at a healthy 12c/ltr.

... but underlying inflation remains low

While headline CPI in the September quarter was a little stronger than expected, broadly based price pressures in the economy remains low. Underlying inflation (as measured by an average of the Reserve Bank's trimmed mean and weighted average median) rose by 0.4% in the September 2016 quarter to be 1.5% higher through-the-year. This is weakest annual increase ever recorded.

**Table 3.1: Wages and Prices – Australia
Year Average Growth**

Year Ended June	Average Weekly Ordinary Time Earnings ⁽¹⁾		Official Headline CPI ⁽²⁾	
	\$/week	%CH	Index	%CH
2000	765.4		69.4	
2001	804.2	5.1	73.6	6.0
2002	847.4	5.4	75.7	2.9
2003	890.0	5.0	78.0	3.0
2004	931.6	4.7	79.9	2.4
2005	972.9	4.4	81.8	2.4
2006	1 017.5	4.6	84.4	3.2
2007	1 054.1	3.6	86.9	3.0
2008	1 106.1	4.9	89.8	3.4
2009	1 166.5	5.5	92.6	3.1
2010	1 231.3	5.6	94.8	2.3
2011	1 282.5	4.2	97.7	3.1
2012	1 338.1	4.3	100.0	2.3
2013	1 400.3	4.6	102.3	2.3
2014	1 442.2	3.0	105.0	2.7
2015	1 477.3	2.4	106.8	1.7
2016	1 505.0	1.9	108.3	1.4
Forecasts				
2017	1 549.3	2.9	110.1	1.7
2018	1 606.7	3.7	112.3	2.0
2019	1 663.2	3.5	114.8	2.2
2020	1 723.7	3.6	117.7	2.5
2021	1 796.8	4.2	120.6	2.5
2022	1 883.8	4.8	123.7	2.5
2023	1 975.0	4.8	126.7	2.5
Compound Annual Growth Rates ⁽³⁾				
1990-2000	3.9		2.1	
2000-2010	4.9		3.2	
2010-2016	3.4		2.2	
2016-2023	4.0		2.3	
2018-2023	4.2		2.4	

Source: BIS Shrapnel, ABS

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

(2) Headline CPI forecasts based on Reserve Bank of Australia forecasts to December 2018 quarter. Beyond this, we've taken the mid-point of the RBA's 2-3% target range as preferred by the AER.

(3) CAGR (Compound Annual Growth Rates) for 2018-2023 is CAGR for 2018/19 to 2022/23 inclusive (ie next Revenue Determination period).

Where to from here? Our inflation forecasts.

Overall, BIS Shrapnel's view is that broadly based inflationary pressures will be weak over the near-term reflecting spare capacity and weak demand in the economy, with some second round depreciation effects gradually adding to overall price growth. In addition, food inflation is expected to rise over the medium-term. Food inflation has averaged close to 3% p.a. over the past two decades, but had been very weak over the past two years (averaging only 0.6% p.a.), due to intense competition between the major supermarkets (Coles, Woolworths and 'new-comer' Aldi) and falling or weak global agricultural prices. These two influences are unsustainable—the supermarkets cannot keep cutting prices (and either their own margins or suppliers'), while world agricultural prices will pick up over the medium-term as global oversupply dissipates.

Underlying inflation is forecast to rise only slowly over the next 2 years to 2.4% by late 2017. However, we are forecasting headline inflation to pick up to 2.9% by late 2017, with tradeables inflation seeing a strong rebound. This will be largely due to rising petrol prices and other components of tradeables inflation (including food), along with another increase in tobacco excise (which comes into effect on 1 September 2017), adding around 0.25% to headline inflation.

With oil prices now appearing to rise from their cyclical lows (Brent is around US\$50 compared to low of US\$29/barrel in mid-January), the anticipated recovery in oil prices over 2016/17 (to around US\$58/barrel by mid-2017) will see petrol prices rise and add to tradeable and headline CPI inflation—estimated to add 0.5% back to the CPI over the next 18 months. There will also be indirect impacts via higher transport costs.

This increase in headline inflation will, however, be a one-off. A flatter global oil price, low global inflation, less impact from increases in tobacco excise and weak consumer demand will see headline inflation return back to around 2.3% by 2018/19, largely in line with underlying inflation. Meanwhile, underlying inflation is expected to ease over 2018/19, before picking up through 2019/20 and 2020/21 as demand strengthens, spare capacity diminishes and the unemployment rate falls back toward 5%.

Meanwhile, wage inflation is expected to remain subdued due to little improvement in the unemployment rate over the next 18 months, with only a gradual rise over the next two years with the WPI rising to 2.7% by December 2017, largely in response to the lift in the headline CPI rate over 2016/17. Wages growth is then expected to ease over 2018/19 as a lagged response to a weakening in economic growth, lower CPI and a rising unemployment rate. Stronger wages growth is anticipated in 2019/20 as economic growth strengthens and the unemployment rate falls.

Headline CPI inflation is forecast to average 2.5% per annum over the next five years to 2020/21, with underlying inflation slightly lower at 2.2%.

Inflation containment will remain a policy challenge beyond the medium-term.

Headline CPI inflation is forecast to average 2.7% per annum over the decade to 2030/31. This is slightly higher than the mid-point of the Reserve Bank's 2 to 3% target range and is based on the following logic:

- Tradeables inflation, which constitutes about 40% of the CPI, is forecast to increase by an average of just under 2% per annum contributing 0.7 to 0.8% to annual inflation.
- Non-tradeables inflation (comprising the remaining 60% of the basket) is assumed to increase by around 3% to 3.3% per annum contributing roughly 2% to headline inflation.

Taken together, we expect annual CPI inflation to increase by 2.7% per annum on average.

In forecasting annual tradeables inflation of close to 2%, we have assumed the following:

- We don't expect a rapid rise in the Australian dollar to mute tradeables inflation like it did last decade. In the 2000s, and in early this decade, tradeables inflation was significantly muted by a rising exchange rate. 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 US 80 cents in the early 2020s and then a drift back to the long-term average of US 75 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 continue to exhibit volatility but generally speaking, demand is likely to outweigh supply putting upward pressure on prices over the long term.
- The differing bottom-up assumptions gives us a baseline annual tradeables inflation forecast of close to 2% for the next decade.

On the other hand, non-tradeables inflation is forecast to increase by 3% to 3.3% per annum over the next decade, 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.

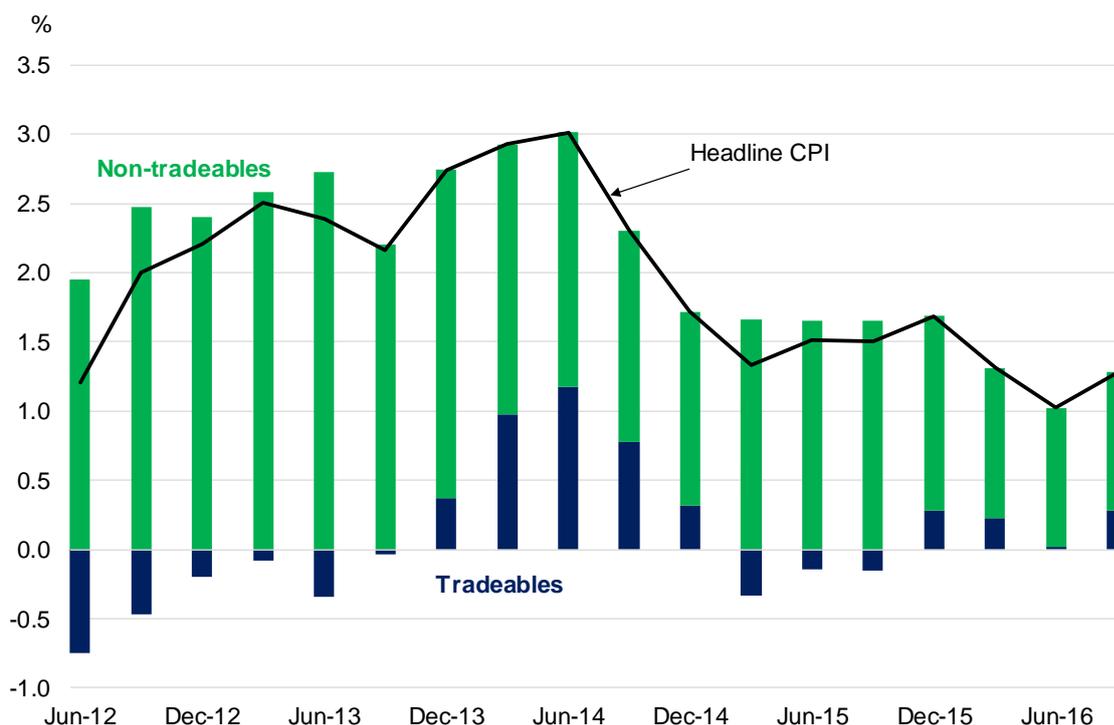
Longer-term, tight labour markets will emerge once again given the ageing population and become a chronic problem for non-tradeables inflation. The large pool of unemployed labour that was a feature of the 1990s has gone. Moreover, skilled labour shortages will remain a problem for the foreseeable future. In addition, administrative charges including health price increases (which invariably rise faster than overall CPI) will place upward pressure on domestic services inflation. Indeed, by early next decade, both skilled and general labour shortages will begin to emerge due to demographic factors, in particular retirements of Australia's 'baby boomers' generation. Australia will continue to experience sustained labour shortages in the decade to 2030 (and beyond), and these shortages will become more significant as the workforce ages. As Australia's 'baby boomers' generation move into the 65+ age group, the growth of the 15-64-year-old component of Australia's working age population (the overwhelming majority of Australia's workforce) will begin to slow.

With more people retiring, the supply of labour is expected to increase at a slower rate through the coming decade. This will lead not only to skilled labour shortages, but total labour shortages. Meanwhile, the demand for labour will continue to rise, particularly in periods of strong investment and economic growth. These sustained labour shortages will result in a long term upward bias in wage inflationary pressures.

In the meantime, deflation not a risk

Chart 3.1 decomposes annual headline CPI into tradeables and non-tradeables inflation. As can be seen from the chart, the low inflation over the past two years has been driven by negative and smaller contribution from tradeables inflation as well as a step-down in the contribution from non-tradeables inflation.

Chart 3.1: Contribution to Annual Headline CPI Inflation (through-the-year)



Source: BIS Shrapnel, ABS

A key factor constraining tradeables inflation since the December 2014 quarter has been sharp falls in oil prices. Declines in oil prices directly contributed to lower petrol prices and indirectly put a lid on final retail prices via lower shipping and freight costs. Meanwhile, non-tradeables inflation has also been weaker recently due to soft wages growth, moderate inflation in rents and generally disinflation in utilities charges.

Looking ahead, we think factors which have acted to contain inflation will begin to reverse putting upward pressure on inflation. Inflationary pressure will come from two sources. Firstly and as discussed earlier, oil prices are coming out of the bottom of their cycle. The recovery in oil prices will be a source of inflationary pressure both directly and indirectly especially as the Australian dollar is also expected to remain around current levels of US 74 cents through to the end of calendar year 2017. This will see petrol prices rise and add to tradeable and headline CPI inflation – estimated to add 0.6% back to the CPI over the next 18 months. There will also be indirect impacts via higher transport costs.

Secondly, higher wage inflation will come through although that will take time. At present, wages are contained by excess capacity in the labour market — the labour market is weaker than it looks as the low unemployment rate is driven individuals leaving the labour market in response to softer employment opportunities (i.e. lower participation rate) — and weak profits by the non-mining business sector of the economy. The latter is limiting non-mining businesses' capacity to afford higher wage increments to staff. However, as non-mining businesses recovers, we will see a pick-up in employment and wages growth. Accordingly, unit labour costs will rise putting upward pressure on inflation.

Overall, we aren't worried about deflation and we believe the Reserve bank shouldn't be concerned either. Hence, we expect interest rates to be on hold unless the dollar appreciates significantly. A lower interest rate would be needed to bring the dollar down so the Australian economy remains competitive and to underwrite the transition to broadly based growth.

Reserve Bank of Australia CPI forecasts

The Reserve Bank provides the 'official' view of CPI forecasts. The RBA's November 2016 'Statement on Monetary Policy' projects the annual headline CPI rate at 1.5% through-the-year to December 2016 quarter, rising to 1½ to 2½% range through to December 2018. Beyond 2018, we have used annual CPI inflation at 2.5% which is in the middle of the RBA's target range of 2 to 3%.

3.2 Australian All Industries Wages: current state of play and outlook

3.2.1 A note on different wage measures and BIS Shrapnel's wage model

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 Shrapnel forecasts.
- 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 Shrapnel 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% — 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.

For this reason, BIS Shrapnel prefers using AWOTE as the measure that best reflects the increase in wage cost changes for business and the public sector across the economy. On the other hand, wage price index can be used as a measure of *underlying* wage inflation in the economy.

Description of BIS Shrapnel's wage model

BIS Shrapnel's wage model (for both AWOTE and WPI) is based on the analysis of past and future (expected) wage movements in three discrete segments of the workforce, based on the three main methods of setting pay and working conditions (see Tables 3.2 and 3.3):

- Those dependent on awards rely on pay increases given in the annual National Wage case by Fair Work Australia (formerly by the Fair Pay Commission and the Australian Industrial Relations Commission). Most of the wage increases in the National Wage case over the past decade have been given as flat, fixed amount (i.e. dollar value) increases, rather than as a proportional increase. At the all industries level, 8.1% of all employees (data excludes those in agriculture, forestry and fishing) have their pay rises determined by this method. In the electricity, gas, water and waste services sector, only 2.7% of workers have their pay set by this method.
- Collective agreements negotiated under enterprise bargaining account for 41.9% of all employees, but 67.7% of electricity, gas, water and waste services employees' wage increases are determined by this method.
- The remaining 50% of all industries employees have their pay set by individual arrangements, such as individual contracts or other salary arrangements (including incentive-based schemes), while the proportion for electricity, gas, water and waste services is 30%.

**Table 3.2: Methods of Setting Pay, Industry, May 2010
Proportion of Full-Time Adult Employees (%)**

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

Source: ABS

Future movements of forecasts of wage inflation are based on the key influences on the different wage determination mechanisms of each discrete segment i.e.:

- increases in the Federal Minimum Wage (on which a range of mostly lower paid awards are also based) granted by Fair Work Australia (and by the Fair Pay Commission and the AIRC previously) each year are usually set in relation to recent increases in the CPI and with regard to the wage-setting body's view of both current and short-term future economic conditions. For instance, the \$21.66 increase granted by the Fair Pay Commission in its decision in mid-2008 (effective October 2008) amounted to a 4.1% increase for those on the Federal Minimum Wage of \$522/week. This reflected the marked acceleration in the CPI in the first half of 2008 (to 4.2% in the March quarter and to 4.5% in the June quarter). It also reflected the strong economic conditions apparent around mid-2008 (the unemployment rate was just over 4%). Conversely, the Fair Pay Commission gave no increase in its July 2009 decision, citing as its reasons, the deterioration of economic conditions and what we believe is a spurious link between minimum wage increases and higher unemployment.
- increases in collective agreements under enterprise bargaining are influenced by a combination of recent CPI increases, inflationary expectations, the recent profitability of relevant enterprises, current business conditions and the short-term economic outlook, and by the industrial relations 'strength' of relevant unions. Because the average duration of agreements now runs for two-to-three years, BIS Shrapnel bases its near-term forecasts on the strength of recent agreements, which have been 'formalised' over recent quarters. Thereafter, collective agreements are based on BIS Shrapnel's macroeconomic forecasts.
- increases in individual agreements 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, current business conditions and the short-term economic outlook.

Note in Table 3.3, wage increases under 'individual arrangements' are calculated by deduction. Data from Department of Employment are used for wage increases under collective agreements.

Chart 3.2: Australia – Wages and Prices

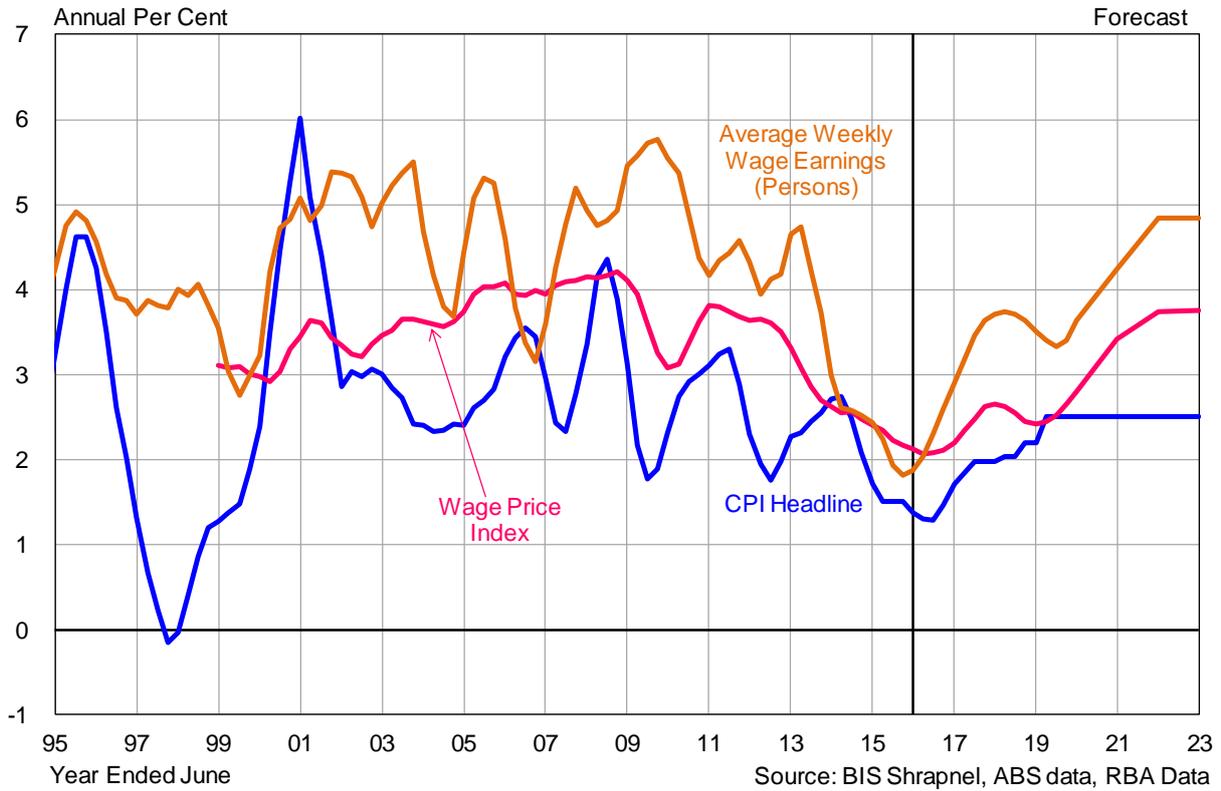
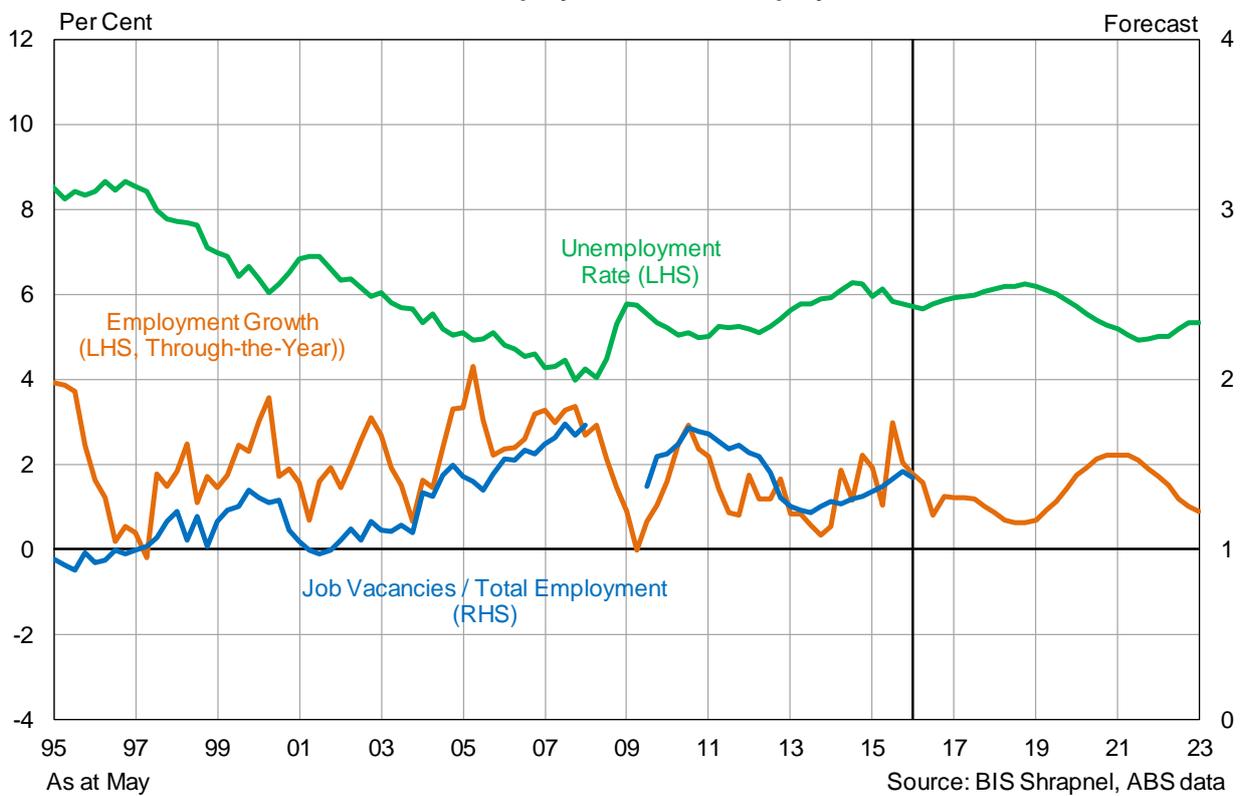


Chart 3.3: Employment and Unemployment



Some Deficiencies in Econometric Models of Wage Determination for the EGWWS Sector

We believe that BIS Shrapnel's pay-setting method or bottom-up wage model better approximates the underlying (actual) data generating process than a straight application of an econometric model. As a result, we strongly believe our model of wage determination at both the national and industry sector level is superior to a methodology utilising purely econometric regression techniques, in particular linear regression models to forecast wages. This opinion is based on a number of factors including the following:

- the evolution of the wage determination system from the 1980s and particularly during the 1990s in the utilities sector means that econometric equations struggle with the changes in the relative importance of different factors influencing wages growth that have occurred over the past two-to-three decades. As such, we believe that an econometric equation would struggle to properly model the present complexity of the wage determination processes in this sector.
- BIS Shrapnel's model of wage determination does take account of the present complexity of the wage determination process, both at the national (all industries) level and at the industry sector level. Our methodology and explanation of the macroeconomic influences are, we believe, clear and transparent. We use small sector mathematical models to derive forecasts for discrete segments, rather than an over-riding, overall macroeconomic model.

BIS Shrapnel believes the use of univariate or multi-equation time series econometric modelling is not the best method for forecasting wages growth in the utilities sector. This is because many regression equations include lagged dependent variables, and econometric models that include lagged dependant variables tend to miss turning points in the cycle, often producing results we know to be spurious. Indeed, the models performed no better (or worse) than a combination of a large range of 'mini' sectoral models overlaid with our expertise and knowledge of key influences.

3.2.2 Australian wages: current conditions and outlook

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

Falling terms of trade, spare capacity in the labour market, weak inflation and inflation expectations along with a flexible labour market have conspired to slow wages growth over recent years. Year average growth in 2015/16 was 2.1% for the WPI and 1.9% for Average Weekly Ordinary Time Earnings, both down from 2.4% in 2014/15. In through the year terms, wages growth at present is the lowest since 1998 (i.e. since the ABS started recording this data).

Many of the industry sectors that were the leaders of strong wages growth in the decade to 2011/12 are now at the other end of the spectrum. The end of the mining investment boom has seen wage rises in the mining, construction, professional services and transport sectors all fall back below the national average.

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 price pressures, while a significant section of pay deals are being set in line with CPI inflation. The unemployment rate has fallen from 6.3% in July 2015 to 5.6% now. There is often a lagged response of wages to improvements in the labour market (i.e. unemployment rate), which may see wages gradually pick up from here, albeit modestly as plenty of spare capacity still exists due to weak demand and investment.

WPI inflation is expected to remain subdued due to little improvement in the unemployment rate over the next 18 to 24 months. Only a gradual rise over the next two years is forecast with the

WPI expected to rise by 2.7% by June 2018, largely in response to the lift in the headline CPI over 2016/17. Wages growth is then expected to ease over 2018/19 as a lagged response to a weakening in economic growth, lower CPI and a rising unemployment rate. Stronger wages growth is anticipated in 2019/20 as economic growth strengthens and the unemployment rate falls.

Indeed, a broadening in employment, profits and investment is expected from early next decade as the next set of economic drivers, in particular non-mining business investment, comes through. The increase in profits combined with rising price inflation next decade will push up wages growth over 2019/20 to 2022/23. There is usually a lag of at least a year for wages to respond upward to a strengthening in employment and falls in unemployment (and conversely downward wage pressure responding to weaker economic conditions). Wages growth (in year average terms) is expected to rise further and peak at 3.8% for WPI (4.8% for AWOTE) in 2022/23 – which would be the strongest result in WPI terms in a decade (see Table 3.3).

Longer-term, both skilled and general labour shortages will begin to emerge due to demographic factors, in particular retirements of Australia's 'baby boomers' generation. Australia will continue to experience sustained labour shortages in the 10 years to 2031 (and beyond), and these shortages will become more significant as the workforce ages. As Australia's 'baby boomers' generation move into the 65+ age group, the growth of the 15-64 year old cohort of Australia's working age population (the overwhelming majority of Australia's workforce) will begin to slow.

With more people retiring, the supply of labour is expected to increase at a slower rate through the coming decade. This will lead not only to skilled labour shortages, but total labour shortages. Meanwhile, the demand for labour will continue to rise, particularly in periods of strong investment and economic growth. These sustained labour shortages will result in a long-term upward bias in wage inflationary pressures.

**Table 3.3: Wages Growth: All Industries, Australia
(by Workforce Segmented by Pay Setting Method)**

Year Ended June	% of Workforce in 2010	Year Average Per Cent Change															
		2010	2011	2012	2013	2014	2015	2016	Forecast							Average 2017-23	Average 2019-23
								2017	2018	2019	2020	2021	2022	2023			
Awards Only	8.1%	0.7	3.5	3.4	2.9	2.6	3.0	2.5	2.4	2.9	2.7	2.6	2.7	2.9	3.1	2.8	2.8
Collective Agreements	41.9%	3.9	3.8	3.8	3.6	3.5	3.3	3.2	3.1	3.0	3.0	3.0	3.1	3.3	3.5	3.1	3.2
Individual Arrangements	50.0%	2.8	3.8	3.5	3.1	1.9	1.5	1.1	1.4	2.3	1.9	2.7	3.8	4.3	4.1	2.9	3.4
Compositional Effects + Bonuses, etc		2.5	0.4	0.7	1.3	0.4	0.0	-0.2	0.7	1.0	1.1	0.8	0.8	1.1	1.1	1.0	1.0
AWOTE (a)	100%	5.6	4.2	4.3	4.6	3.0	2.4	1.9	2.9	3.7	3.5	3.6	4.2	4.8	4.8	4.0	4.2

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

4. WAGE FORECASTS FOR THE ELECTRICITY, GAS, WATER AND WASTE SERVICES SECTOR

In this section, we provide an outlook for the WPI (wage price index) for the EGWWS (electricity, gas, water and waste services) sector at the national level. In addition, we provide a discussion and forecasts of the WPI for privately held businesses within the broader EGWWS industry, again at the Australia level.

At the national level, wages growth in the EGWWS sector is invariably higher than the total Australian national (all industry) average. The wage price index growth has consistently been above the national average since the index's inception in 1997 and averaged 0.6% higher over the decade to 2013 (see Chart 4.1). 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.

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

In addition, the electricity, gas and water sector is a largely capital intensive industry whose employees have higher skill, productivity and commensurately higher wage levels than most other sectors. Further, the overall national average tends to be dragged down by the lower wage and lower skilled sectors such as the Retail Trade, Wholesale Trade, Accommodation, Cafés and Restaurants, and, in some periods, also Manufacturing and Construction. 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.

4.1 Strong union presence in the utilities sector will ensure collective agreements remain above the all industry average

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

The key elements of the utilities wage forecast are set out in Table 4.2. This shows that collective bargaining dominates the pay setting arrangements in the utilities sector, while the relative absence of workers relying on (often) low-increase awards (set in the National Wage Case) means the overall average for total utilities wages will generally be higher than the all industries average. Over the past five years, the outcomes from collective agreements have been 0.1% higher, on average, than the all industries average, at 3.6% compared to 3.5%. We expect this trend to continue over the outlook period, with collective agreements achieving average increases of 3.6% for the utilities sector, compared to 3.1% for all industries.

BIS Shrapnel analysis shows collective agreements in the EGWWS sector have been on average around 1.5% higher than CPI inflation over the decade to 2010 (excluding the effects of GST introduction in 2000/01). In the five years to 2010 when the labour market was very

Table 4.1: Wage Price Index Growth by Sector and for EGWWS

Sector	% of Total Employment Jun'16	Annual Per Cent Change (year-on-year) ⁽¹⁾										Five-Year YE Jun Average
		Jun'08	Jun'09	Jun'10	Jun'11	Jun'12	Jun'13	Jun'14	Jun'15	Mar'16	Jun'16	
Private		4.3	4.0	2.7	3.8	3.7	3.4	2.6	2.3	2.1	2.0	2.8
Public		4.0	4.2	4.2	3.8	3.2	3.2	2.8	2.6	2.6	2.5	2.9
Industry												
Electricity, Gas, Water and Waste Services	1.2%	4.2	4.5	4.3	4.2	3.5	4.2	3.3	2.8	2.4	2.4	3.2
Total All ⁽²⁾	100%	4.1	4.1	3.1	3.8	3.6	3.3	2.6	2.4	2.2	2.1	2.8

Source: BIS Shrapnel, ABS

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

tight, collective agreements were on average 1.7% above the CPI. Given the strength of unions in the sector and a still strong demand for skilled labour over the next four years (and possibly beyond) than for most of the 2000s, collective agreements are forecast to remain around 1.3% above the 'official' CPI over the forecast period.

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

We expect EBA outcomes to show modest growth over the next two years but remain above inflation and the 'all industries' average given that the demand for skilled labour remains strong and particularly given the recent high enterprise agreement outcomes in the construction sector. This will influence negotiations in the EGWWS sector, as some skills can be transferable. A mild recovery in EBA outcomes will occur over subsequent years as the labour market begins to tighten, unemployment falls and business profitability improves. However, forecast growth in wage agreements of around 3.6% per annum remains below that experienced over much of the past decade.

4.2 Demand for skilled labour also a key driver of utilities wages

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

We believe investment in the sector has been the key driver of employment growth in the sector over the past decade. Chart 4.2 illustrates this relationship, and shows employment has a stronger relationship with utilities engineering construction rather than utilities output.

Table 4.2: Electricity, Gas, Water and Waste Services Forecasts – Australia

Year Ended June	% of Workforce in 2010	Year Average Per Cent Change (a)															
		2010	2011	2012	2013	2014	2015	2016	Forecast							Average 2017-23	Average 2019-23
									2017	2018	2019	2020	2021	2022	2023		
Awards Only	2.7%	0.7	3.2	3.4	2.9	2.6	3.0	2.5	2.4	2.9	2.7	2.6	2.7	2.9	3.1	2.8	2.8
Collective Agreements	67.7%	4.6	4.2	4.1	3.9	3.6	3.4	3.2	3.3	3.0	3.5	3.5	3.7	4.0	4.2	3.6	3.8
Individual Arrangements	29.6%	4.2	4.2	2.1	5.0	2.4	1.7	0.9	2.5	1.8	2.5	3.4	4.5	4.9	4.6	3.5	4.0
Compositional Effects + Bonuses, etc		3.2	4.9	-1.0	1.9	-1.2	-2.2	1.1	0.6	0.7	0.7	0.5	0.5	0.7	0.7	0.6	0.6
AWOTE (Persons)(a)	100%	7.6	9.1	2.5	6.1	2.0	0.7	3.5	3.4	3.7	3.8	4.0	4.4	4.9	5.0	4.2	4.4

(a) Full-time Adult Persons, excluding overtime

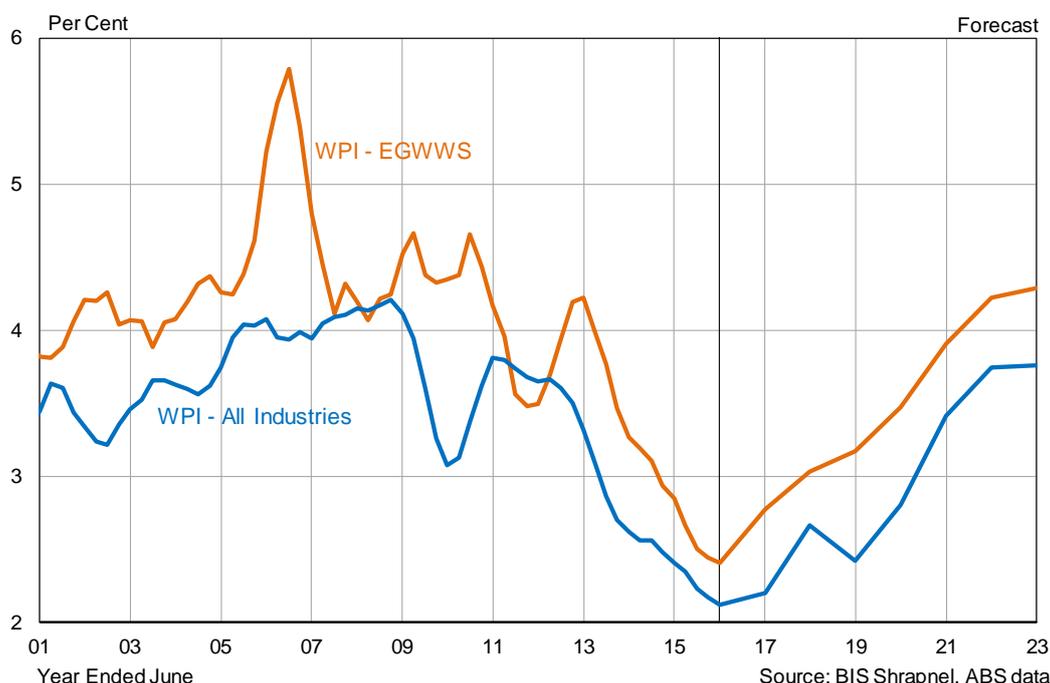
**Table 4.3: Federal Wage Agreements – Collective Agreements by Industry
(Average Annualised Wage Increase)**

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

(1) Current agreements in December of each year.

Source: Department of Employment

**Chart 4.1: Wage Price Index
Total Australia (All Industries) and Electricity, Gas, Water and Waste Services**



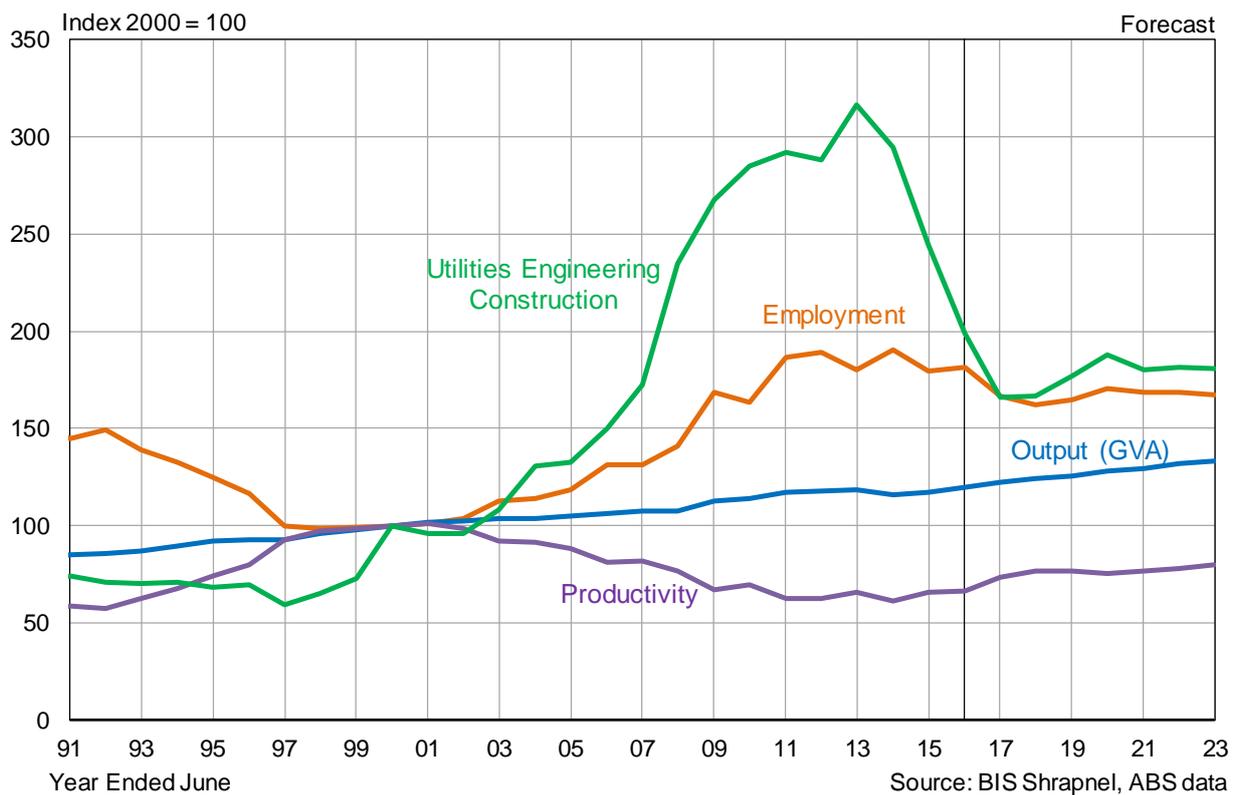
As well as the pick-up in infrastructure work, this strong growth in utilities employment has also been associated with an ongoing reversal in the sharp losses in employment seen through the 1990s. Privatisation and rationalisation were the drivers of the job cuts in the 1990s, but in some cases the desire to be streamlined left only a 'skeleton' crew in-house for routine operations and emergency disruptions, while capital and maintenance works (both minor and major) tended to be contracted out. Capital expenditure in the utilities sector during the 1990s was also relatively low, and this may also have contributed to weaker employment.

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

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

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

Chart 4.2: Australia – Utilities Employment, Output and Investment



**Table 4.4: Average Weekly Ordinary Time Earnings
Total Australia and Electricity, Gas, Water and Waste Services Sector
(Year Average Growth)**

Year Ended June	Average Weekly Ordinary Time Earnings ⁽¹⁾			
	All Industries		Electricity, Gas, Water and Waste Services	
	\$	%CH	\$	%CH
1999	741.4	3.5	827.1	3.9
2000	765.4	3.2	866.8	4.8
2001	804.2	5.1	918.5	6.0
2002	847.4	5.4	981.0	6.8
2003	890.0	5.0	1,001.3	2.1
2004	931.6	4.7	1,056.7	5.5
2005	972.9	4.4	1,090.6	3.2
2006	1 017.5	4.6	1,110.9	1.9
2007	1 054.1	3.6	1,151.9	3.7
2008	1 106.1	4.9	1,182.8	2.7
2009	1 166.5	5.5	1,255.5	6.1
2010	1 231.3	5.6	1,350.8	7.6
2011	1 282.5	4.2	1,473.9	9.1
2012	1 338.1	4.3	1,510.0	2.5
2013	1 400.3	4.6	1,602.5	6.1
2014	1 442.2	3.0	1,635.0	2.0
2015	1 477.3	2.4	1,646.0	0.7
2016	1 505.0	1.9	1,704.4	3.5
Forecasts				
2017	1 549.3	2.9	1,762.7	3.4
2018	1 606.7	3.7	1,827.9	3.7
2019	1 663.2	3.5	1,897.9	3.8
2020	1 723.7	3.6	1,972.9	4.0
2021	1 796.8	4.2	2,059.3	4.4
2022	1 883.8	4.8	2,160.0	4.9
2023	1 975.0	4.8	2,268.4	5.0
Compound Annual Growth Rates ⁽²⁾				
2000-2010	4.9		4.5	
2010-2016	3.4		4.0	
2016-2023	4.0		4.2	
2018-2023	4.2		4.4	

Source: BIS Shrapnel, 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 2018-2023 is the annual growth for 2018/19 to 2022/23 inclusive i.e. for TransGrid's next Revenue Determination period.

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

Individual agreements will strengthen from their current weakness

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

Wage growth from individual agreements rose by just 1.7% over the year to June 2015 and slowed to 0.9% last year, reflecting general weakness in the economy and the full-time labour market. However, this is expected to turn around from this year, albeit gradually. Stronger increases are expected from the beginning of next decade in line with a strengthening economy. Businesses will find they must 'meet the market' on remuneration in order to attract and retain staff and we expect wages under individual arrangements to continue to rise through the middle of the next decade.

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

Overall, BIS Shrapnel 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 4.4% per annum over the seven years to 2022/23, 0.2% higher than the national 'All Industries' AWOTE average of 4.2% per annum over the same seven-year period. In terms of underlying wages growth in the 'utilities' sector for total Australia — expressed in wage price index (WPI) terms — BIS Shrapnel is forecasting an average of 3.8% per annum (also 0.6 percentage points higher than the national 'All Industries' WPI average of 3.2% per annum) over the seven years to 2022/23.

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.

4.3 Wage forecasts for privately held businesses within the utilities sector

Wages growth for the privately held businesses within the EGGWS sector has consistently outpaced the average increase in the WPI for the whole EGWWS sector over the last six years (see Table 4.6). We believe the overall increase in the WPI has been dragged down by wage restraints applied by state governments to contain costs. For example, the New South Wales government has maintained a Public Sector Wages Policy that caps public sector wage increases at 2.5% since 2011. The Victorian, Queensland, Western Australia and South Australia have also restricted nominal wage increases to 2.5% at various stages over the past six years.

With increased privatisation of electricity assets in New South Wales and ongoing state budget constraints, we are forecasting private WPI for the EGWWS sector to continue to grow at a faster pace the industry average. However, as state governments budget position improves

over the medium to long-term, we expect them to relax their wage restrictions. As a result, we are forecasting wage increases awarded by publicly owned networks to slowly converge to those for the privately owned businesses.

**Table 4.5: EGWWS WPI for the Private Sector: Australia
Year Average Growth**

Year Ended June	Wage Price Index	
	Private	
	Index	%CH
1999	67.9	3.2
2000	70.0	3.1
2001	72.4	3.5
2002	75.3	4.0
2003	78.1	3.7
2004	80.6	3.2
2005	84.0	4.2
2006	87.5	4.3
2007	91.6	4.6
2008	95.5	4.3
2009	100.0	4.7
2010	103.6	3.6
2011	107.6	3.8
2012	111.7	3.8
2013	117.0	4.8
2014	120.8	3.2
2015	124.7	3.2
2016	128.1	2.7
Forecasts		
2017	132.0	3.1
2018	136.5	3.4
2019	141.2	3.5
2020	146.4	3.7
2021	152.4	4.1
2022	159.0	4.3
2023	165.9	4.3
Compound Annual Growth Rates		
2000-2010	4.0	
2010-2016	4.3	
2016-2023	3.8	
2018-2023	4.0	

Source: BIS Shrapnel, ABS

APPENDIX A:**TERMS OF REFERENCE**

TransGrid must forecast future operating expenditure and capital expenditure as part of its revenue submission to the Australian Energy Regulator (AER) for the regulatory control period commencing 1 July 2018.

To help with its forecasting, TransGrid seeks independent forecasts about how wages tracked by the Australian Bureau of Statistics that reasonably reflect TransGrid's business are expected to change over the period from 1 July 2017 to 30 June 2023. The period in question includes the last year of TransGrid's current regulatory control period.

APPENDIX B:**STATEMENT OF COMPLIANCE WITH EXPERT WITNESS GUIDELINES**

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

APPENDIX C:

CURRICULUM VITAE OF KEY PERSONNEL

Kishti Sen – Senior Economist

As a senior economist, Kishti contributes to the formulation of BIS Shrapnel's economic forecasts, at the Australia, State, regional and industry level. In addition, he is the lead author of BIS Shrapnel's monthly Economic Outlook Bulletin and annual Long Term Forecasts report.

Prior to joining BIS Shrapnel in 2007, Kishti managed the Reserve Bank of Fiji's research and analytical work programme. At the Reserve Bank, he was also a member of the Monetary Policy Committee - a small group of senior staff advising the Governor directly on interest-rate settings.

Kishti holds a PhD in Economics from the University of Sydney and has special interest in macroeconomic forecasting, monetary policy, benefit-cost assessments, econometric modelling and general macroeconomic consultancy.

Richard Robinson – Senior Economist and Associate Director - Economics

Richard Robinson has been employed with BIS Shrapnel since 1986.

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

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

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

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

Husam El-Tarifi – Research Analyst

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

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

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