Real Labour and Material Cost Escalation Forecasts to 2020/21

– Australia, New South Wales & ACT

> FINAL REPORT • FEBRUARY 2015

ActewAGL Distribution Gas Network

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BUSINESS RESEARCH AND FORECASTING

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 November 2014, BIS Shrapnel was engaged by ActewAGL Distribution Gas Network (AAD) to provide an expert opinion on the outlook for labour and a range of material cost escalators relevant to gas distribution networks in New South Wales and the Australian Capital Territory over a seven year period from 2013/14 to 2020/21 (ie from 1 July 2013 to 30 June 2021). The labour and material cost escalators were used by AAD to develop the level of operating and capital expenditure required to fulfil the opex and capex objectives (as set out under the Rules) over their next regulatory period.
- Internal labour includes gas distribution network-related labour who work directly and indirectly on the maintenance, design and operation of the gas distribution network and would typically be classified as part of the operational aspects of the business. The workers work both in the field and in offices. The escalator which BIS Shrapnel proposes to use for gas network-related labour and for purposes of developing operational expenditure forecasts is wages growth in the Electricity, Gas, Water and Waste Services (EGWWS or 'Utilities') sector for the Australian Capital Territory. We propose that AAD also use this escalator for field services work performed by Jemena Asset Management's (JAM) Australian Capital Territory based sub-contractors. For field and asset management services provided by JAM's New South Wales based labour, we propose AAD use the New South Wales EGWWS wage forecasts. Both the New South Wales and Australian Capital Territory utilities sector wages are based on our Australian EGWWS wage forecasts.
- AAD also uses external labour through JAM's Australian Capital Territory (ACT) based sub-contractors to help in the delivery of capital projects. This labour cost would typically be classified to the capital expenditure budget. In our view, the most appropriate escalator for AAD's external contract labour involved in the delivery of capital projects is the WPI for ACT's construction sector as almost all of JAM's ACT sub-contractors would typically be classified to the ACT construction sector. For comparison purposes, we provide wage forecasts of the New South Wales construction industry as well.
- 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 4.9 per cent per annum over the five years to 2020/21, 0.2 per cent higher than the national 'All Industries' AWOTE average of 4.7 per cent per annum over the same five 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 4 per cent per annum (0.3 percentage points higher than the national 'All Industries' WPI average of 3.7 per cent per annum) over the five years to 2020/21.
- New South Wales utilities WPI growth is forecast to average 4.2 per cent per annum — 0.2 percentage points higher than the national utilities average of 4 per cent per annum — over the five years from 2016/17 to 2020/21 inclusive (ie over AAD's next regulatory period).
- Utilities investment is a key influence on employment growth in the utilities sector (even though some capital projects are outsourced to the construction sector). The combination of relatively high levels of utilities engineering construction and overall construction in the state means increased wage pressures in the NSW utilities sector (relative to other states) over the five years to 2020/21.
- The ABS does not provide WPI data for the Utilities sector in Australian Capital Territory, providing state utilities data only for NSW (since September quarter 2008) and Victoria. These two states collectively account for almost 54 per cent of total Australian utilities employment, with Queensland accounting for just over 22 per cent, then Western Australia and South Australia at 11.4 per cent and 7.4 per cent respectively. Forecasts of WPI for the EGWWS sector in Australian Capital Territory therefore is based on national EGWWS WPI forecasts, as well as movements in the 'unknown residual' for the utilities wage price index.

- The utilities wage forecasts for Australian Capital Territory are expected to ease over the next two years (in line with the national utilities sector average) and stay below the national average reflecting the relatively smaller size of the utilities sector in that state.
- Our research has shown that construction activity (ie work done in the sector) normally has a strong influence on construction wages. Hence, our wage forecasts are based on BIS Shrapnel's forecasts of construction activity by state (which includes residential and non-residential building, engineering construction) as well as predicted movements in the construction wages at the national level.
- NSW construction wages over the next five years, on average, is expected to be stronger than the national average. After underperforming the Australian average for most of the last decade, construction activity in NSW is expected to grow substantially over the three years to 2016/17. Private dwelling construction will be the initial driver, followed by a new round of public sector infrastructure projects. The latter will be driven by a need to make up for underinvestment over much of the past decade as well as increased ability to finance it through asset recycling.
- NSW construction wages will follow the recovery in dwelling construction and the improvement in total construction. Construction wages (in WPI terms) is expected to average 3.8 per cent per annum over the next seven years.
- Total construction in the Australian Capital Territory has been declining over the past two years and is expected to fall for another two years before flattening out. Falling dwellings building will be a key driver of weak construction activity in that state. Given our outlook for construction activity, we think construction wages in the Australian Capital Territory will, on average, remain below the national mean over the next seven years.
- With respect to material cost escalators, a forecast based on a final price model of physical assets installed on the network is not feasible. Putting together a long enough time series of prices of physical assets to make it amenable to econometric modelling — in order to numerically estimate the relationship — is almost impossible. For example, to the best of our knowledge, there is no published data on polyethylene pipe prices. Lack of readily available historical data combined with an absence of futures market for equipment typically installed on a gas distribution network compelled us to use an input cost model to generate forecasts of polyethylene pipe prices. We note that this methodology (ie one based on weighted average of input costs) has previously been accepted by the AER (see, Draft Decision, SP AusNet Transmission Determination 2014/15 to 2016/17, August 2013, p.67).
- Our forecasts of material cost escalators or the relevant inputs (commodities) are based on Consensus Economics forecasts. Hence, we consider them to be robust. Consensus Economics forecasts are effectively an average of a number of independent forecasts. Consequently, as the AER recognises, they represent the most reliable forecasts. In fact, the AER has previously accepted commodity price forecasts based on Consensus forecasts (see AER Final Decision for NSW Distribution Determination 2009/10 to 2013/14).
- While all individual commodities have their own supply and demand drivers, consumers of these commodities in Australia are also affected by movements in the exchange rate. Specifically, movements in the Australian dollar (A$) against the US dollar (US$) can have significant effects on the domestic price of minerals and metals. At the time of writing, the A$ had fallen 20.5 per cent since April 2013. This drove Australian-denominated commodity prices higher through 2013/14 and in 2014/15.
- Looking ahead, prices of all gas network-related materials (in nominal terms) are forecast to increase on average over the next five years before falling due to exchange rate appreciation. The A$ is expected to appreciate by nearly 10 per cent over 2019/20 and a further 3.8 per cent in 2020/21, directly flowing through to lower commodity prices for Australian consumers.

Summary – Labour Cost Escalation Forecasts

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

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	5 yr Avg (g)
	Actuals				Forecasts		Next Regulatory Period					
NOMINAL PRICE CHANGES												
1. Gas Network-Related Labour												
EGWWS AWOTE - Australian Capital Territory (a,b)	7.4	4.9	5.1	1.7	3.0	3.3	4.2	4.9	5.0	5.1	4.7	4.8
EGWWS WPI - Australian Capital Territory (a)	**3.9**	**3.4**	**4.0**	**3.1**	**3.1**	**3.0**	**3.4**	**3.6**	**3.9**	**4.0**	**3.8**	**3.7**
EGWWS AWOTE - New South Wales (a,b)	4.4	1.5	5.1	1.7	3.1	3.4	4.7	5.1	5.0	5.2	4.9	5.0
EGWWS WPI - New South Wales (a)	**3.5**	**3.2**	**3.7**	**3.0**	**3.5**	**3.4**	**3.6**	**4.1**	**4.4**	**4.5**	**4.4**	**4.2**
EGWWS AWOTE - Australia (c)	9.1	2.5	6.1	2.0	3.4	3.8	4.4	4.9	5.1	5.2	4.8	4.9
EGWWS WPI - Australia (c)	4.2	3.5	4.2	3.3	3.2	3.3	3.6	3.9	4.1	4.3	4.2	4.0
2. Contractor Labour Cost Escalation												
Construction AWOTE - Australian Capital Territory (b)	7.9	6.7	3.9	1.9	3.0	3.4	3.6	3.8	4.1	3.9	4.5	4.0
Construction WPI - Australian Capital Territory (d)	**3.9**	**4.0**	**4.1**	**3.7**	**3.2**	**3.3**	**3.7**	**3.8**	**3.7**	**4.0**	**4.2**	**3.9**
Construction AWOTE - New South Wales (d,b)	-4.6	4.3	4.5	2.3	3.4	3.9	4.5	4.5	4.3	4.7	4.9	4.6
Construction WPI - New South Wales (d)	**4.1**	**3.2**	**3.3**	**2.9**	**3.2**	**3.6**	**3.9**	**4.2**	**4.1**	**4.3**	**4.4**	**4.2**
Construction AWOTE - Australia (c)	5.0	3.5	4.3	2.1	3.2	3.7	4.3	4.1	4.5	5.1	5.4	4.7
Construction WPI - Australia (c)	4.0	4.1	3.3	3.0	2.9	3.4	3.8	3.8	4.0	4.3	4.4	4.1
3. Australian Wages												
All Industries - AWOTE (e)	4.2	4.3	4.6	3.0	3.3	3.9	4.5	4.9	4.3	4.9	5.1	4.7
All Industries - WPI (e)	3.8	3.6	3.3	2.6	2.6	2.9	3.4	3.7	3.4	3.9	3.9	3.7
Consumer Price Index (headline) (f)	3.1	2.3	2.3	2.7	2.0	2.6	2.5	2.5	2.5	2.5	2.5	2.5
REAL PRICE CHANGES (h)												
1. Gas Network-Related Labour												
EGWWS AWOTE - Australian Capital Territory (a)	4.3	2.6	2.8	-1.0	1.0	0.7	1.7	2.4	2.5	2.6	2.2	2.3
EGWWS WPI - Australian Capital Territory (a)	**0.8**	**1.1**	**1.8**	**0.4**	**1.1**	**0.4**	**0.9**	**1.1**	**1.4**	**1.5**	**1.3**	**1.2**
EGWWS AWOTE - New South Wales (a)	1.3	-0.8	2.8	-1.0	1.1	0.8	2.2	2.6	2.5	2.7	2.4	2.5
EGWWS WPI - New South Wales (a)	0.4	0.9	1.4	0.3	1.5	0.8	1.1	1.6	1.9	2.0	1.9	1.7
EGWWS AWOTE - Australia (c)	6.0	0.1	3.9	-0.7	1.4	1.2	1.9	2.4	2.6	2.7	2.3	2.4
EGWWS WPI - Australia (c)	1.1	1.2	1.9	0.5	1.2	0.7	1.1	1.4	1.6	1.8	1.7	1.5
2. Contractor Labour Cost Escalation												
Construction AWOTE - Australian Capital Territory	4.8	4.4	1.6	-0.8	1.0	0.8	1.1	1.3	1.6	1.4	2.0	1.5
Construction WPI - Australian Capital Territory	**0.8**	**1.7**	**1.8**	**1.0**	**1.2**	**0.7**	**1.2**	**1.3**	**1.2**	**1.5**	**1.7**	**1.4**
Construction AWOTE - New South Wales	-7.7	2.0	2.2	-0.4	1.4	1.3	2.0	2.0	1.8	2.2	2.4	2.1
Construction WPI - New South Wales	**1.0**	**0.9**	**1.0**	**0.2**	**1.2**	**1.0**	**1.4**	**1.7**	**1.6**	**1.8**	**1.9**	**1.7**
Construction AWOTE - Australia (c)	1.9	1.2	2.0	-0.6	1.2	1.1	1.8	1.6	2.0	2.6	2.9	2.2
Construction WPI - Australia (c)	0.9	1.7	1.1	0.3	0.9	0.8	1.3	1.3	1.5	1.8	1.9	1.6
3. Australian Wages												
All Industries - AWOTE (e)	1.0	2.0	2.4	0.3	1.3	1.3	2.0	2.4	1.8	2.4	2.6	2.2
All Industries - WPI (e)	0.7	1.3	1.0	-0.1	0.6	0.3	0.9	1.2	0.9	1.4	1.4	1.2

(a,b) Back data for WPI estimated from the rest of Australia Electricity, Gas, Water and Waste Services (EGWWS) WPI, which, in turn, is derived from Australia, NSW and Victoria EGWWS wage price indices. The ABS stopped producing AWOTE at the state industry level from the end of 2011. Hence, the increase in AWOTE for 2011/12 at the state industry level is estimated from historical data, changes in the relevant Australian industry AWOTE forecasts as well as known movements in state all industries WPI. Similarly, our forecasts for AWOTE are based on our Australian industry wage forecasts and state industry WPI forecasts.
(c) Australian sector wage forecasts provided for comparison.
(d) Back data estimated from rest of Australia construction WPI.
(e) Australian All Industries AWOTE and WPI provided for comparison.
(f) Headline CPI forecasts based on Reserve Bank of Australia forecasts to December 2016 quarter and then Commonwealth Treasury medium term projections.
(g) Average Annual Growth Rate for 2016/17 to 2020/21 inclusive ie for next regulatory period.
(h) Real price changes are calculated by deducting the inflation rate from nominal price changes.

Summary – Material Cost Escalation Forecasts

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

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	5 yr Avg (h)
	Actuals				Forecasts		Next Regulatory Period					
Nominal Price Changes												
1. Steel - Asia (a)		-3.8	-9.6	3.4	4.1	11.8	1.2	6.2	6.2	-8.6	-1.4	0.7
2. Aluminium (a)		-7.0	-12.0	6.7	15.3	19.2	4.4	7.6	6.2	-8.5	-2.3	1.5
3. Brass (a)				9.5	12.1	15.3	3.0	5.4	4.5	-9.5	-3.5	0.0
4. Copper (a)		-1.8	-8.4	3.9	5.5	12.2	3.1	6.1	4.4	-9.9	-3.4	0.1
5. Zinc (a)		-8.6	-6.2	17.9	22.0	19.8	2.8	4.3	4.7	-8.9	-3.5	-0.1
6. Plastics Prices												
a) Nylon-11 (b)	-0.7	2.5	2.7	14.4	-7.0	2.8	3.9	6.7	5.6	-5.1	-1.0	2.0
b) HDPE (Polyethylene) (c)	-0.7	2.5	2.7	14.4	-7.0	2.8	3.9	6.7	5.6	-5.1	-1.0	2.0
7. Concrete (d)	5.9	6.2	4.2	1.7	2.5	4.5	5.1	1.8	0.5	1.2	3.0	2.3
8. Gas and Fuel Construction Price Index (e)	-8.3	-1.2	1.1	3.6	3.2	1.8	0.2	3.0	3.3	3.4	3.7	2.7
9. General Materials Prices (f)	3.1	2.3	2.3	2.7	2.0	2.6	2.5	2.5	2.5	2.5	2.5	2.5
Consumer Price Index (g)	**3.1**	**2.3**	**2.3**	**2.7**	**2.0**	**2.6**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Real Price Changes (i)												
1. Steel - Asia (a)		**-6.1**	**-11.8**	**0.7**	**2.1**	**9.2**	**-1.3**	**3.7**	**3.7**	**-11.1**	**-3.9**	**-1.8**
2. Aluminium (a)		**-9.3**	**-14.3**	**4.0**	**13.3**	**16.6**	**1.9**	**5.1**	**3.7**	**-11.0**	**-4.8**	**-1.0**
3. Brass (a)				**6.8**	**10.1**	**12.7**	**0.5**	**2.9**	**2.0**	**-12.0**	**-6.0**	**-2.5**
4. Copper (a)		**-4.1**	**-10.6**	**1.2**	**3.5**	**9.6**	**0.6**	**3.6**	**1.9**	**-12.4**	**-5.9**	**-2.4**
5. Zinc (a)		**-10.9**	**-8.5**	**15.2**	**20.0**	**17.2**	**0.3**	**1.8**	**2.2**	**-11.4**	**-6.0**	**-2.6**
6. Plastics Prices												
a) Nylon-11 (b)	**-3.8**	**0.2**	**0.4**	**11.7**	**-9.0**	**0.2**	**1.4**	**4.2**	**3.1**	**-7.6**	**-3.5**	**-0.5**
b) HDPE (Polyethylene) (c)	**-3.8**	**0.2**	**0.4**	**11.7**	**-9.0**	**0.2**	**1.4**	**4.2**	**3.1**	**-7.6**	**-3.5**	**-0.5**
7. Concrete (d)	**2.8**	**3.9**	**1.9**	**-1.1**	**0.5**	**1.9**	**2.6**	**-0.7**	**-2.0**	**-1.3**	**0.5**	**-0.2**
8. Gas and Fuel Construction Price Index (e)	**-11.4**	**-3.5**	**-1.2**	**0.9**	**1.2**	**-0.8**	**-2.3**	**0.5**	**0.8**	**0.9**	**1.2**	**0.2**
9. General materials Prices (f)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Source: BIS Shrapnel

(a) Price growth from Consensus Economics, converted to Australian dollars
(b) Castor Oil is the key raw material of Nylon-11. Because we do not have any historical data on Castor Oil, we have approximated Nylon-11 by using HDPE growth rates.
(c) HDPE (Polyethylene) prices are proxied using an established relationship with WTI crude oil.
(d) Concrete price growth in Australian dollars. Forecasts from BIS Shrapnel modelling.
(e) Gas and Fuel Construction Price Index forecasts from BIS Shrapnel modelling.
(f) General Materials are proxied using CPI forecasts.
(g) Headline CPI forecasts based on Reserve Bank of Australia forecasts to December 2016 quarter and then Commonwealth Treasury medium term projections.
(h) Average Annual Growth Rate for 2016/17 to 2020/21 inclusive ie for next regulatory period.
(i) Real price changes are calculated by deducting the inflation rate from nominal price changes.

1. INTRODUCTION, OUTLINE OF REPORT & DATA SOURCES

In November 2014, BIS Shrapnel was engaged by ActewAGL Distribution (AAD) Gas Network to provide an expert opinion on the outlook for labour and a range of material cost escalators relevant to gas distribution networks in New South Wales and the Australian Capital Territory over a seven year period from 2013/14 to 2020/21 (ie from 1 July 2013 to 30 June 2021). The labour and material cost escalators were used by AAD to develop the level of operating and capital expenditure required to fulfil the opex and capex objectives (as set out under the Rules) over their next regulatory period.

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 E. I have been assisted in the preparation of this report by Dr Kishti Sen, Senior Economist at BIS Shrapnel, Daniel Gradwell, Economist and Jehanesan Konesan, Research Associate at BIS Shrapnel. Curriculum vitas of all relevant personnel are attached in Appendix F. Notwithstanding the assistance from the other three economists, the opinions in this report are my own and I take full responsibility for them. A brief description of the material upon which I have relied for the preparation of this report follows.

The Australian Bureau of Statistics (ABS) is the primary data source for the consumer price index, wages, employment, real gross value added and investment (including engineering construction) data, and for a range of other economic variables shown in table 2.1. The most recent wages data is September 2014 quarter, the latest industry employment data is November 2014 and the latest inflation data is December 2014 quarter. The September 2014 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 detailed engineering construction data (by state and by category) have data up to September 2014 quarter. The latest data for Gross State Product (GSP) and real gross value added for state industry sectors was 2013/14. Other inflation and interest rates data were sourced from the Reserve Bank of Australia. Other data and information particularly concerning enterprise agreements was obtained from the Department of Employment.

Forecasts of the economic variables in this report were mostly sourced from BIS Shrapnel reports, including *Economic Outlook, Long Term Forecasts: 2014 – 2029* report*, Engineering Construction: 2013/14 to 2027/28 and Long Term Building Work Done Forecasts*, plus other unpublished forecasts and from BIS Shrapnel internal research.

Commodity price forecasts including steel and aluminium price forecasts were sourced from Consensus Economics *Energy & Metals Consensus Forecasts* publication. Polyethylene pipe and Nylon-11 price forecasts are based on thermoplastic resin prices, manufacturing wages and transport costs. Concrete price and gas & fuel construction implicit price deflator forecasts are based on our projections of underlying construction activity.

We believe our forecasts are arrived at on a reasonable basis and represent the best forecast possible given latest data, our thorough research and detailed analysis.

The structure of this report is as follows:

- The **Summary** section presents an overview of the outlook for the labour and material cost escalators and a summary table.
- **Section 2** provides an overview of the macroeconomic outlook for Australia and New South Wales and the Australian Capital Territory, 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 determination and provides forecasts of national ('all industries') wages and CPI inflation, with the Reserve Bank of Australia and Treasury medium-term projections of CPI inflation. The latter is used to deflate the nominal escalators provided in this report.
- **Section 4** provides an outlook for AAD's (internal) gas network-related labour cost escalation which is based on forecasts of wages growth for the Electricity, Gas, Water and Waste Services industry for Australia, New South Wales and the Australian Capital Territory.
- **Section 5** provides forecasts of AAD's (external) contractor labour cost escalation.
- **Section 6** provides an outlook for a range of material cost escalators relevant to the operation and maintenance of gas networks in New South Wales as well as the Australian Capital Territory.
- **Appendices,** which includes a note on different wage measures and a description of BIS Shrapnel's wage and exchange rate model.

2. MACROECONOMIC FORECASTS: AUSTRALIA AND NEW SOUTH WALES

2.1 Overview of the Australian economy

The Australian economy is on the threshold of a major transition phase. It will involve a slow adjustment from an economy tilted towards servicing the mining boom over the past 10 years to broadly based growth. We'll need business growth and investment in the non-mining sectors to pick up and tilt the economy back into balance, as it was prior to the start of the mining boom.

There is little choice. It's only a question of the speed of adjustment and the damage done in the transition. Mining investment has just begun to fall, with the major shock to growth over the next four years. That will be offset by the recovery in residential building and continued growth in resources exports. It will require recovery in non-mining business investment and a structural change back towards balanced growth. And that involves:

- a competitive exchange rate to underwrite structural change, and
- recovery in non-mining growth and profitability, with absorption of excess capacity allowing a shift from the cost-cutting and investment deferring psychology of businesses — a legacy of the GFC — to one of increased appetite for growth and investment.

We are delighted with the fall in the Australian dollar. It is the single most important driver of structural change and growth. We think that, allowing for the rise in the US dollar, the Australian dollar needs to be below US 70 cents for our export and import-competing industries to be competitive on average. Already, we have seen an initial recovery in tourism, both inbound and domestic. That will be joined by education, agriculture, business services and even mining and manufacturing. The recent fall in the dollar has helped. But more is required.

However, given sluggish business conditions and spare capacity, a generalised pick up in non-mining business investment will be slow to come through. Manufacturers' capital spend has been bumping around the bottom of the cycle since the collapse in 2012/13 brought about by the high dollar and a sharp weakening in domestic demand. While they have upgraded their expected spending recently, overall capital spending this year is likely to be nearly 14 per cent lower than last year. Meanwhile, 'other' selected industries (mainly services) have gradually downgraded their expectations having been overly optimistic early in the year.

When demand finally picks up, emerging capacity constraints will be another driver of business investment by non-mining sectors. However, that will take time. That said, firms will eventually shift their focus from cost-cutting to servicing growth in demand, including catching up computer software and hardware investment deferred in the difficult post-GFC operating environment.

Meanwhile, new public investment has been falling for some time. And we think it will fall for another year before turning around although the risk is on the downside. The main challenge, as always, is financing new infrastructure projects. Some projects will be financed by asset sales or leases, particularly in New South Wales and Victoria. The recent Queensland election may limit the source of project finance. Future PPPs will most likely require that the public sector takes more of the initial risk. Private investors in infrastructure, notably super and pension funds, are risk averse. Governments will have to act as developers, to Build, Own, Operate, then Transfer to the private sector to finance the next round of projects.

Overall, this is not a business-as-usual economy. We are on a threshold of structural change, switching from a mining-investment driven economy back towards balanced growth. The quicker the dollar falls to below US 70 cents, the faster we transition to a balanced economy.

Growth in the interim is supported by an upswing in dwellings building, a pick up in private consumption expenditure and growth in resources exports.

We expect the economy to remain weak for another 18 months before strengthening non-mining business investment (underwritten by a lower dollar and tightening capacity) pushes the economy closer to its potential. But it will be a 'soft cycle' as the potential growth rate of 3¼ per cent is unlikely to be realised on average. The next round of infrastructure and mining projects, plus another cycle in dwellings building (we will still have a deficiency of housing stock at the end of the current cycle), will underpin stronger growth towards the end of the decade.

2.2 Economic outlook: the detail

The next year to 18 months will be characterised by:

- falling mining investment, offset by strong housing and resources exports,
- continued tight business conditions - cutting costs and deferring investment,
- tight government expenditure,
- further rises in unemployment,
- subdued wage pressures and further labour productivity increases, offsetting the inflationary impact of falls in the dollar, and
- a sustained period of low interest rates until growth picks up.

We expect the economy to build momentum from late 2016 with growth still forecast to return to close to trend in 2016/17. Growth could ease in 2017/18 as interest rates rise, but quickly return to trend reflecting balanced growth in the final third of the decade.

The difficult period is now – waiting for the dollar to fall below US 70 cents and for structural change to deliver stronger non-mining business investment and broadly-based growth.

2.2.1 External demand

World Economic Outlook, Commodity Prices and the Australian Dollar

Prospects for **global economy** are improving, although the story is markedly different across regions. There are positive signs for growth in the US. Euro Zone economies remain in the doldrums while Japan's economy is expected to gradually pick up. And, China's economy is slowing. Geopolitical tensions in Russia and the Middle East have led to trade restrictions and volatility in energy prices. The unbalanced growth profile reflects the various policy settings and stimulus measures (including unconventional monetary policy) being implemented with differing levels of success.

Overall, the world economy experienced another sluggish year of 3.3 percent growth during 2014, weighed down by problems in Japan and ongoing concerns in Europe. Global growth is expected to gain momentum over the next few years. However, expectations around the pace of this expansion have been pared back following concerns about a moderating Chinese economy, Japanese growth stalling and the continued lack of confidence in Europe as adjustment takes its toll. On the positive side, the oil price decline provides a boost to the outlook through lower production costs for businesses and higher disposable incomes for households, particularly in emerging market economies as they are mostly net importers of oil.

The **United States** economy ended 2014 strongly following a patchy start to the year. Employment growth was exceptionally strong, taking the unemployment rate down to 5.6 percent by December (from 6.7 per cent the previous year). The growth in employment has helped fuel a surge in private consumption expenditure which has joined business investment as an area of strength, while public expenditure has ceased to be a drag on growth. The current momentum is

expected to carry over into the next few years with the Federal Reserve likely to take a cautious approach and avoid tightening monetary settings in an aggressive manner. Growth is expected to be broadly based with stronger consumer spending supported by a healthy labour market and lower oil prices. Meanwhile, housing activity is gathering momentum, and business investment is improving as input prices remain subdued and corporate profits rise.

On some measures, **China** is now regarded as the world's largest economy. The economy is rebalancing, shifting away from a heavy construction focus (residential and infrastructure) to a more consumption driven approach. Growth slowed to an estimated 7.4 percent during 2014, with a weaker property market impacting fixed capital investment, while exports were hampered by the continued poor performance of the European economies. The deceleration in Chinese growth is expected to continue. The Government has introduced stimulus measures including lower taxes for small businesses, further boosts to fiscal and infrastructure spending and cuts to the benchmark lending rates. While these measures are designed to prop-up the momentum in domestic activity, going forward we will likely have to get used to seeing Chinese growth in the 6-7 per cent range later this decade. This is still significant growth given China is a much bigger economy now after experiencing double digit growth for most of last decade.

The **Eurozone** economies are struggling from a lack of competitiveness. This is due to the imbalance in cost structures exacerbated by a fixed exchange rate system which is impeding the necessary adjustments. Within the Euro area, Germany is undervalued while the other countries are overvalued. Hence, the lack of growth and high unemployment across the Euro zone, while conditions in Germany are more favourable. Debt is of concern. However it is not the central issue holding back growth. It is the cost imbalances. The current deflationary pressures are a natural consequence of the current imbalances as countries attempt to reset their cost bases against a low inflation German economy, to a lower level. Quantitative easing can help boost demand. But the key concerns are supply side issues. Unfortunately these issues can not be solved quickly and will ultimately result in years of weakness before activity turning around. We expect growth to average a modest 1.6 per cent per annum over the next five years.

Over the past year, the **Japanese** government and central bank introduced some strong stimulus measures to boost growth prospects and eliminate the persistent threat of deflation. Unfortunately, the government also shot itself in the foot when it introduced a significant increase in the sales tax from April which triggered a sharp contraction in domestic consumption. Although the economy shrank through the middle of the year, prospects have improved as the stimulus measures have gained traction. Employment growth has picked up and the unemployment rate has dropped to 3.4 per cent, the lowest level since the late 1990s. Demographics will continue to plague the Japanese economy as a declining workforce population limits overall growth potential. Attempts to increase female participation will help but the economy will continue to be held back by a lack of capacity and will ultimately limit the level of overall growth to under 2 per cent annually over the next five years.

Commodity Prices, So Much for the 'Super Cycle'

The long lead times between executing investment decisions and when the new production reaches the market means that commodity prices will always contain a natural element of volatility as commodity markets swing from periods of under-supply to over-supply. For Australia's key bulk commodity exports, the supply/demand balance saw prices peak during 2011 (in US dollar terms) before sliding back over the subsequent years towards levels that appeared to be sustainable over the long-term.

Australia's key commodity exports have suffered a further large drop in prices over the past year. Amid a backdrop of slowing consumption growth in China along with ongoing weakness in the major European and Japanese markets, major international suppliers of iron ore, thermal

coal and metallurgical coal have significantly increased production. Much of this new supply has been due to the massive program of resource investment which were commissioned or committed to during the commodity price boom.

Major global producers have also ramped up output in order to lower overall unit costs. This has flooded commodity markets with an excess of supply and now producers are scrambling to further reduce their costs of production. A consolation for domestic producers has been the decline in the Australian dollar, which has softened the impact of the commodity price falls as revenues have not fallen as fast in Australian dollar terms.

Even so, the price weakness for commodities is expected to continue in the short term. We expect only a moderate recovery in the prices of oil, coal and iron ore over the next few years. A key element of the price recovery will be international producers reacting to weak prices and oversupply by closing uneconomic mines and/or cutting back production. The second driver will be strengthening demand for commodities as global economic growth gradually picks up.

The recent plunge in oil prices has been caused by a substantial increase in oil production by producers outside OPEC – namely the US, Canada and Brazil. Despite plunging prices, OPEC has committed to retaining current production levels. That will maintain the current oversupply and act to supress prices over the short term. Meanwhile, consumption growth has been modest, leading to large increases in inventories. At this stage, it appears the traditional lower cost producers are trying to regain market share and force out the newer US shale oil producers who have higher costs of production. The impact of these decisions will be twofold. Firstly, the current low prices would deter future US investment in new shale oil capacity. Secondly, we expect to see further volatility in prices going forward, although the trend is expected to point upwards.

The decline in coking and thermal coal prices is reflective of a recent oversupply and weaker import demand growth from major global consumers. With the significant decline in prices, producers will be increasingly reliant on the lower Australian dollar to mitigate some of the losses incurred at current prices. The outlook for thermal and coking coal prices is for a moderate recovery over the next couple of years as the global economy gradually strengthens and the availability of new sources of supply are restricted.

Exchange Rates

The fall in commodity prices and good news on the United States economy has driven the dollar lower in recent months. At the time of writing, the Australian dollar depreciated 17 per cent against the US dollar since July last year. Similarly, the Australian dollar has also declined against the currencies of our major trading partners, which measured on a trade weighted basis, depreciated 11 per cent.

While there may still be an element of volatility, we forecast commodity prices to bottom in mid-2015 and will start to achieve moderate gains through the second half of 2015. The forecast rise in commodity prices should stabilise the Australian dollar around US 75 cents over 2015/16 and 2016/17. That said, factors such as the Reserve Bank cutting the cash rate and a more buoyant US economy may see the exchange rate drift lower than our forecast. Eventually, we expect the dollar will attain around US 70 cents during 2018/19.

Strong external demand will underwrite Australia's GDP growth

The outlook for Australia's **exports**, in particular resources exports, is largely dependent on the prospects of the Chinese economy as China alone accounts for a nearly a third of Australia's merchandise exports.

As mentioned, China's economic growth, although slowing, is expected to remain solid, supported by near-term targeted stimulus measures and ongoing medium-term economic reforms aimed at reorienting growth toward domestic consumption and away from investment and exports. Overall, we expect economic growth in China to remain between 6½ and 7 per cent over the next five years.

The level of infrastructure in China however remains well below that in developed countries. This suggests that infrastructure investment — encompassing municipal infrastructure, utilities, transportation and social infrastructure such as schools and hospitals — is likely to remain strong well into the next decade and possibly beyond. As infrastructure investment is intensive in its use of steel which in turn requires iron ore and coking coal as inputs, the prospects of Australia's bulk commodity exports remain bright. A consumption driven Chinese economy is also good news for Australia as it will drive the demand for thermal coal higher.

Meanwhile, the expected improvement in world economic growth rates over the next two years coupled with the lower exchange rate, will facilitate a recovery in export volumes of non-commodity manufactures. Even though the Australian dollar has fallen 20.5 per cent since April 2013, improvements in manufacturing exports will still depend on future world economic conditions. We expect manufacturing year average export growth rates to reach 2.6 per cent in 2014/15, picking up even further over the next two years. This recovery will gain more speed over the medium term as world economies return to trend economic growth rates, and the dollar falls toward (and below) US 75 cents.

Service exports which is dominated by travel services (ie tourism and education exports) picked up in the September 2014 quarter and is expected to gather momentum over the next three to five years supported by a lower dollar. Overall, we forecast services exports to grow by 5.8 per cent per annum over the next five years compared to -0.2 per cent over the previous five years.

In summary, we expect export growth to ease to around 5.5 per cent per annum average over the next two years as China's economy slows, before strengthening to 6 per cent over the subsequent two years. Total goods and services export volumes are forecast to average a solid 5.5 per cent annual growth over the next five years, supported by improving world economic conditions and a further depreciation of the Australian dollar. Leading the charge is very strong growth in energy, mineral and metals exports volumes, currently accounting nearly 60 per cent of the value of exports of goods and services.

Import volume growth slowed dramatically from over 11 per cent in 2011/12 to 0.7 per cent in 2012/13 before declining by 2.1 per cent in 2013/14. Falls were recorded across most categories with only consumer goods maintaining growth. Much of the contraction can be directly attributable to the easing of mining and heavy industry construction, but the fall in the Australian dollar and weaker domestic demand were also contributing factors.

The fall in the dollar will help the competitiveness of local producers against importers, including domestic tourism. Still, the dollar really needs to fall to below US 70 cents before many local producers can really be competitive. Added to this is the lack of local production capacity in discretionary consumer goods and capital goods — often because that production has moved overseas — so there is effectively little prospect of replacing these imports.

Overall, net exports is expected to contribute 0.9 percentage points to real GDP growth over the next four years.

Australia's **current account deficit** (CAD) is expected to improve this year. The impact of falls in commodity export prices will largely be offset by a lower deficit in net income & transfers due to declines in repatriated profits from mostly foreign owned mining companies. Overall, strong trade balance surpluses in the second half of the decade will cause the CAD to fall. As a percentage of real GDP, CAD is forecast to average1.9 per cent per annum compared to 3.7 per cent over the past five years.

2.2.2 Domestic demand

Consumer expenditure to marginally outpace growth in incomes

Household consumption expenditure growth slowed sharply in the immediate aftermath of the global financial crisis as people cut spending and sharply increased savings. That came after the spending binge of the previous decade when the banks turned mortgages into lines of credit allowing households to borrow against the value of their home to boost current expenditure. And they did, sharply reducing savings ratios. Increased concern about high household debt was brought to a head by the GFC and concerns about job security. The decline in household consumption expenditure growth was more marked than the decline in real household disposable income with the household saving rate rising to its highest level since the 1980s.

Over the past three years, households have stayed cautious, keeping savings high and only slightly loosening the purse strings, resulting in growth in consumption expenditure marginally outpacing growth in household disposable income.

We expect that to continue over the next few years. Households have built up a considerable savings buffer after several years of high savings ratios. While household income growth slowed in 2012/13, it picked up last year. Improved financial security and record low interest rates (with the potential for another rate cut this year) will see expenditure continue to pick up. With the Australian dollar now lower, the ongoing growth in household consumption expenditure is expected to translate into increased retail turnover and activity in Australia over the next few years.

We expect the Reserve Bank to keep rates low while the economy stays weak, only beginning to increase interest rates from the second half of calendar year 2016 and through 2017. This would dampen consumer spending in 2017/18 before it picks up strongly towards the end of the decade. Overall, household consumption expenditure is forecast to average growth of 3.0 per cent per annum over the five years to 2018/19.

Over the longer term, population growth is expected to be the primary driver of household expenditure. As such, slowing population growth will see household consumption expenditure growth moderate slightly over the following decade, averaging 2.9 per cent per annum between 2019 and 2029. Although the economy is expected to remain healthy through this period, we do not expect a return to the debt-driven increases in consumption that occurred through the late 1990's and early 2000's when growth rates often approached and exceeded 5 per cent.

Offsetting cycles will keep investment subdued

Private investment will be characterised by offsetting cycles. The mining and heavy industry construction boom which underwrote the strength in Australia's GDP growth last decade peaked in 2013/14 and will detract from investment growth over the next four years. We initially estimated that **mining and heavy industry construction** would decline by 41 per cent over the next four years. We now believe the decline will be closer to 60 per cent as some projects included in our initial modelling will struggle to get off the ground given lower commodity prices.

It is important to note that total resources construction will still be above long-rung average levels. Projects already under construction and their outstanding activity (ie work yet-to-be-done), will place a floor under the level of work, ensuring investment remains at healthy levels with activity supported by roads and, to a lesser extent, investment in electricity generation, transmission and distribution.

On the bright side, the long-awaited recovery in **dwellings investment** is now entrenched. This upswing was delayed due to weak housing market sentiment and excessive caution by investors. However, with the expectation of low interest rates for an extended period, and a growing deficiency of stock, a solid increase in dwellings building is now well under way and will build momentum from here. We are comfortable that we have another two years of strong residential building along with improved alterations and additions activity before the current dwelling investment cycle runs out of puff. But this recovery will not be uniform between regions, with sizeable stock deficiencies set to drive the markets in parts of Queensland and New South Wales in particular.

Private non-dwelling building is also likely to experience solid growth over the next two years. But that will be offset by falling government building in particular hospital projects. A healthy pipeline of projects in the offices, retail accommodation, warehouses, aged care and entertainment and recreation segments will push overall building higher this year and next. However, completion of these projects and absence of new ones will cause activity to decline from 2016/17. Nonetheless, the longer term outlook is positive, as improving demand across non-mining industries will see capacity constraints emerge and prompt the next round of investment in commercial and industrial buildings.

The maturing of the mining investment boom will detract from private **plant and equipment investment** in the near-term. However, stronger spend by small-to-medium sized firms and businesses in the Agriculture, Education and Training, and Health Care and Social Services will offset some of this resulting in a modest rise in expenditure this year and next. Broad-based growth in equipment investment will return when capacity constraints emerge as demand picks up. That we think is at least another year away.

Table 2.1: Australia – Key Economic Indicators, Financial Years

Year Ended June	Actuals								Forecasts						
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Private Investment															
– Dwellings	-0.2	1.8	-1.4	1.2	3.8	-2.9	-3.8	5.1	6.5	2.4	-2.0	-5.5	1.8	7.1	5.6
– New Non-Dwelling Construction (+)	13.0	6.4	12.1	-10.2	18.5	35.7	10.7	-2.0	-10.7	-9.2	-9.5	-10.8	8.6	13.2	6.3
– New Non-Dwelling Building (+)	10.7	11.7	-3.9	-14.4	9.0	4.2	11.2	5.1	6.0	4.6	-0.1	-8.4	-1.7	9.2	8.6
– New Engineering Construction (+)	15.5	1.3	29.2	-7.0	25.1	54.8	10.6	-4.8	-18.0	-17.0	-16.2	-12.8	17.7	16.2	4.6
Total New Private Investment (+)	**5.2**	**8.3**	**1.2**	**-2.2**	**5.8**	**15.1**	**3.2**	**-2.0**	**-2.3**	**-1.0**	**-1.1**	**-3.5**	**5.6**	**10.9**	**6.1**
New Public Investment (+)	**4.8**	**10.6**	**8.1**	**22.5**	**-3.0**	**-3.6**	**-4.1**	**-1.8**	**-6.4**	**3.5**	**9.9**	**6.9**	**6.8**	**-0.3**	**1.7**
Gross National Expenditure (GNE)	**5.1**	**6.0**	**0.6**	**2.2**	**4.2**	**5.0**	**1.4**	**0.7**	**1.1**	**2.3**	**2.5**	**1.6**	**3.9**	**4.9**	**3.9**
GDP	**3.8**	**3.7**	**1.7**	**2.0**	**2.3**	**3.7**	**2.5**	**2.5**	**2.2**	**2.9**	**3.1**	**2.7**	**3.9**	**4.0**	**3.6**
Inflation and Wages															
CPI (Yr Avg)- RBA/Treasury forecasts (*)	3.0	3.4	3.1	2.3	3.1	2.3	2.3	2.7	2.0	2.6	2.5	2.5	2.5	2.5	2.5
Wage Price Index (Jun on Jun)(**)	4.0	4.2	3.8	3.1	3.8	3.7	2.9	2.6	2.7	3.1	3.5	3.6	3.4	3.8	3.8
Wage Price Index (Yr Avg)(**)	3.9	4.1	4.1	3.1	3.8	3.6	3.3	2.6	2.6	2.9	3.4	3.7	3.4	3.9	3.9
Average Weekly Earnings (Yr Avg)	3.6	4.9	5.5	5.6	4.2	4.3	4.6	3.0	3.3	3.9	4.5	4.9	4.3	4.9	5.1
Employment															
– Employment Growth (Yr Avg)	3.0	3.1	1.7	0.9	2.4	1.2	1.2	0.8	1.3	1.5	1.8	1.2	1.1	2.4	2.5
– Employment Growth (May on May) (%)	3.3	2.7	0.9	1.6	2.2	1.7	0.9	0.9	1.5	1.6	1.8	0.9	1.6	2.6	2.2
– Unemployment Rate (May) (%)	4.3	4.3	5.8	5.2	5.0	5.2	5.6	5.8	6.3	6.2	5.8	6.0	5.7	5.0	4.7
Labour Productivity Growth															
– Total	0.8	0.6	0.0	1.0	-0.1	2.5	1.3	1.6	0.8	1.4	1.2	1.4	2.8	1.5	1.0
– Non-farm	1.3	0.5	-0.4	1.1	-0.1	2.6	1.3	1.6	0.9	1.3	1.4	1.3	2.8	1.6	1.1
Exchange Rates															
– US$ per A$ (Yr Avg)	0.79	0.90	0.75	0.88	0.99	1.03	1.03	0.92	0.83	0.75	0.75	0.73	0.70	0.78	0.81

Source: BIS Shrapnel, ABS and RBA

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

*Headline CPI forecasts based on Reserve Bank of Australia's forecasts to June 2017 and then Commonwealth medium term projections.

** Based on Ordinary Time Hourly Rates of Pay

Total investment in **intellectual property products** (IPP) fell sharply in the September 2014 quarter, driven by a collapse in mining and petroleum exploration. Most commodity prices, while still high from a historical perspective, have retreated significantly from their record levels in 2011 as greater capacity led to supply catching up to demand. The miners are now shifting their attention toward production from existing projects, rather than exploration for new ones. Hence, we expect declines in exploration expenditure over the next two years.

However, computer software investment component of IPP rose in the third quarter of 2014 as did research and development. Both these categories will gradually strengthen over the next few years reflecting catch-up of necessary investment after a period of deferrals by many businesses. In addition, emerging capacity constraints when demand finally picks up will boost investment as firms begin to shift their focus from cost-cutting to servicing growth in demand. Overall, investment in IPP is expected to be flat this year before growing by 6.1 per cent per annum over the subsequent four years.

The completion of the last of the post GFC stimulus in particular health projects and belt tightening to control budget deficits and debt will be a drag on **public investment** in the short-term. However, we expect a recovery in the second half of the decade. This will be underwritten by the next round of infrastructure projects as governments embrace the process of 'asset recycling' where mature assets are taken off the balance sheet to finance new ones.

State Government finances in Queensland and Western Australia in particular will be boosted by increased royalties as the large mining projects come on stream, but the other states will remain dependent on the Commonwealth Government, and may not fare so well.

2.2.3 Labour demand and supply

Employment growth has generally been subdued since mid 2011 reflecting a weakening in employers' demand for labour due to a prevailing orthodoxy of cost cutting including labour costs. More recently, the slowdown in mining investment — and the transition to less labour-intensive production phase of the mining boom — have weighed on the demand for labour in mining and mining-related sectors such as employment services firms, engineering & technical services firms and vehicle and equipment leasing providers.

Notwithstanding the pick up in employment growth in the December 2014 quarter, the slow pace of employment growth over the past three years has not kept pace with the growth in the labour force (the number of people working or available and actually looking for work). This has resulted in the unemployment rate rising from 5.0 per cent in May 2011 to 6.1 per cent in December 2014 (seasonally adjusted).

Employment growth will remain weak over the next 18 months as trade-exposed businesses continue to focus on cost-cutting to deal with problems of competitiveness associated with the still too 'high' Australian dollar. Other businesses' demand for labour will also be weak due to slower growth in output. Miners are also cutting costs including labour to preserve profitability in the face of lower commodity prices. With the labour force expected to continue to outpace employment growth (albeit marginally), the unemployment rate is forecast to remain above 6 per cent well into 2016.

However, employment growth should pick up from the late 2016. This will see the unemployment rate drop to 5.9 per cent (seasonally adjusted) by mid-2017, before again rising to a peak of 6.2 per cent (seasonally adjusted) in the second half of 2018 when the economy slows.

Overall, we expect employment growth to average 1.5 per cent per annum over the next five years in line with the labour force growth. In the medium to longer term, continued solid

employment growth should see the unemployment rate cycle between 4.5 and 5.5 per cent, with any further decrease in the unemployment rate moderated by increases in migration and/or higher interest rates. An unemployment rate much below 5 per cent — which is thought to be the non-accelerating inflation rate of unemployment (NAIRU) — would cause a rise in wage inflation, as employers bid up wages for scarce skilled labour in a tightening labour market.

The labour supply will be critical for medium-term economic growth potential, given relatively low unemployment rates (ie there is not a large pool of spare labour currently available). We expect the labour force to grow at slightly below total population growth over the next 15 years as the 65 years and over category grows strongly. This is in contrast to previous decades where the baby boomers, immigration and increased participation rate provided a significant boost to the working age population.

2.3 Main risks to outlook

There is a risk that commodity prices don't rebound and we have a bigger collapse in mining investment. Our assumption is for a large decline in resources investment. A drastic deterioration in the prospects of mining projects could trigger a bigger fall in mining investment and a recession in Australia. However, we see this as a low probability (tail) event as the Federal Government has scope to loosen fiscal policy to support growth in Australia if needed.

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.

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 occurred during the 1980s and 1990s.

2.4 Medium term issues

The Australian economy is subject to strong internally generated cyclical swings. In addition, Australia's market economy orientation and non-interventionist policy means that the economy has to adjust to short-term external forces beyond our control with little regard to the longer term consequences. The commodities demand and price boom with the associated rise in the Australian dollar driving structural change is a case in point. The financial engineering boom followed by the GFC-induced correction was another.

A decade ago, the Australian economy was just recovering from the overinvestment of the 1980s debt-driven investment boom and the subsequent financial crisis and recession. It took a long time to absorb the excess capacity created during the boom. But capacity constraints eventually drove a recovery in business investment early last decade, spreading through to balanced growth in the economy by mid-decade.

The minerals boom, and the consequent minerals investment boom, left everything else in abeyance. Since that time, underwritten by the strong rise in the Australian dollar, we have built up our capability to service much higher levels of minerals investment at the expense of trade-exposed activity, focused in regions servicing those major projects. The boost to activity from strong mining investment, albeit just starting to decline, has been the primary driver of growth in the economy and masked the weakness of other sectors. That was aided by the boost from the Government's GFC (global financial crisis) stimulus package and lower interest rates.

We went through a process of structural change, shifting labour and operational resources towards mining investment and away from non-mining, and particularly non-mining trade-exposed export and import-competing, industries. This has resulted in a corresponding shift between regions. Those regions servicing mining investment, and the capital cities where much of that took place, prospered largely at the expense of non-mining-related activities and regions.

Many workers involved in those projects work on a fly-in/fly out rotation, boosting associated residential, hospitality, retail and transportation services. The cities servicing those projects have boosted their capacity to undertake design, construction, project management, legal, financial, accounting and other services, requiring increased facilities such as office space to house that activity and flowing on to stimulate the broader economy.

The main transmission mechanism for the shift of resources towards minerals investment was the rise in the Australian dollar. The resultant reduction in international competitiveness underwrote the process of structural change mentioned above, with the hollowing out of trade-exposed industries 'making room for the minerals boom'. Consequently, the continued loss of industry, regular announcements of job losses and shifting of activities offshore. These businesses are under enormous competitive pressure. Typically, in what has become an increasingly global economy, the decision whether to remain operating in Australia is made when the next major investment or retooling decision has to be made. Hence the protracted adjustment period.

That structural change process is ongoing as the impact of the 'still too high' Australian dollar continues to work its way through the system. We think the Australian dollar needs to be below US 75 cents for Australian trade-exposed industries to be competitive.

Nor has the weakness only been felt in the non-mining trade-exposed sectors. Much of the rest of the economy, sheltered from the impact of the high dollar, is still suffering from the consequences of the GFC. Weak confidence, revenue and profits continue to impact on business psychology. Further, cost-cutting and cash preservation is deferring and delaying investment. The weakness of non-mining business investment, coupled with long lead times between investment and capacity coming on stream, is setting up Australian industry for a period of tight capacity through the second half of the decade, leading to a surge in investment. But not yet. There is still sufficient capacity to cater for another 18 months to two years of growth, with weak confidence delaying the next round of investment. Hence the current weakness of the non-mining economy.

The 'new normal' of weak demand and profits driving cost-cutting 'productivity initiatives' is a child of the long period of weakness of non-mining-related industries since the GFC. This psychology is self-fulfilling, perpetuating the weakness of confidence, demand and profits. But it also contains the seeds of the next upswing. Eventually, inadequate investment will lead to capacity constraints, underwriting the next phase of investment. Indeed, investment delayed will require a catch-up to increase capacity to levels required to service demand, later adopting new labour-saving technologies to improve efficiency and allow companies to service market shifts. As the cycle moves into the investment phase, the psychology of business will shift from survival to growth mode.

Rolling investment cycles will continue to dominate as drivers of Australia's economic growth

The extraordinary stimulus to GDP from minerals investment growth is over. That contribution will turn negative from now on as minerals investment recedes from peak levels. Even so, minerals investment remains extraordinarily high, at a level adding substantially to our capacity to produce and export. That is both a strength and a weakness, the risk being that a substantial decline will have a major negative impact on demand and activity. Meanwhile, growth in resources production and exports is sustaining GDP growth, but with a lesser effect on employment.

And now a phase of residential investment has begun, with activity strengthening for another two years.

After that, the main driver of growth will be non-mining business investment. We do not think it will pick up pace for another year or two. However, once it picks up momentum, it will constitute a long and strong upswing. Some sectors, notably commercial property, look like peaking in some cities around the end of this decade, though others will turn down earlier. The delay to the commencement of this investment is setting the preconditions for a strong cyclical upswing.

We are a long way from stable, balanced growth. It looks as though the continuation of strong cycles in investment will continue to drive cyclical shifts in the economy.

2.5 The New South Wales Economy: Past Growth, Current Conditions and Short-to-Medium Term Outlook

In 2013/14, New South Wales posted 2.6 per cent growth in State Final Demand (SFD), second only to the LNG-driven Northern Territory and well above the national average of 1.0 per cent. Gross State Product (GSP) also improved on the previous year's growth, assisted by a material contribution from net exports.

The New South Wales economy struggled over much of the 2000s and into the early-2010s, tending to trail rival Victoria and the national average. While Victoria implemented a well-planned development strategy (by releasing affordable land in central and well-connected locations, supporting the burgeoning office market, and providing incentives for business investment), New South Wales suffered under the lack of land available for development and excessive government-imposed infrastructure charges. These reduced the financial feasibility of business and property investment in the state (and particularly Sydney) over this period.

Consequently, over the decade to 2013/14, total construction contribution to New South Wales' GSP (including dwelling and non-dwelling building and engineering construction) averaged just 0.5 per cent per annum. This compared with construction contributing an average of 2.2 per cent per annum to Australia's GDP over the same period (although it should be noted that this included construction related to the mining boom). However, between 2014/15 and 2016/17, we expect a turnaround in this trend, with New South Wales' construction contribution forecast to exceed 1.5 per cent while construction is likely to detract from Australia's GDP growth, largely due to steep declines in mining-related engineering construction.

Indeed, construction in New South Wales has already begun to recover, led by the upswing in residential investment. Growth in total dwelling investment in 2013/14 exceeded 6 per cent. Other dwellings were the biggest contributor, posting double-digit growth while houses saw slower, but still positive, growth. Alterations and additions recorded their first year of positive growth since 2010/11, albeit more modest growth than new dwellings.

The momentum in the residential sector will only continue to build. We believe that there currently exists a stock deficiency in excess of 50,000 dwellings – well over a year's worth of dwelling completions at the current rate. Consequently, we expect activity to escalate over the next three years, peaking in 2016/17 and supported by low interest rates. Strong growth is forecast across houses, other dwellings and alterations and additions.

Non-residential building expanded considerably during 2013/14, driven by double-digit growth in both the commercial and industrial and the social and institutional sectors. Retail and wholesale trade, factories, and offices are benefitting from higher levels of economic activity while a pipeline of publicly-funded projects are supporting growth in education and health facilities investment. The Barangaroo development will continue to underpin activity, while construction on the new Sydney Convention and Entertainment Centre (to commence this year) and the new Northern Beaches Hospital (scheduled commencement in 2015/16) should ensure that we see another few years of positive growth in non-residential investment before it turns around in the final third of the decade.

In addition, New South Wales will be the first cab off the rank with regard to the next round of infrastructure spending. A lot of this spending will be funded by asset sales; specifically, the privatisation of Port Botany and Port Kembla, the long-term lease of Port of Newcastle, and the prospective long-term lease of 49 per cent of the state's electricity network.

The $8.3 billion North West Rail Line, the multi-stage WestConnex, the $3 billion NorthConnex, and the Anzac Parade Light Rail development are just some of the major projects that will be ramping up over the next three years. Although New South Wales will face some exposure to the decline in mining investment over the coming years via its coal sector, the negative impact will be minor compared with mining-intensive Queensland and Western Australia. Overall, we expect a second consecutive year of falling engineering construction before a sustained recovery begins in 2015/16, driven mainly by the public sector.

The current period of construction-driven economic growth has had positive spill-over effects into other industries, meaning that New South Wales' unemployment rate is among the lowest in the country at around 6.0 per cent (seasonally adjusted) as at November 2014. On the downside, employment in property and business services (i.e. rental, hiring, and real estate services, professional, scientific, and technical services, and administration and support services) fell considerably through 2012/13 and has seen very little recovery since then. This is where Melbourne has a competitive edge over Sydney. Although we expect employment in these industries to improve from mid-decade on the back of the impending recovery in non-mining business investment, Victoria will likely continue to outpace New South Wales in the long run.

The relatively solid labour market, along with higher confidence and low interest rates, aided an acceleration in private consumption expenditure (PCE) growth to 2.8 per cent over 2013/14. Retail turnover saw a 4.9 per cent rise over the same period; the state's strongest result in almost a decade.

In the near-term, the New South Wales economy will continue to be driven by construction. This should soon be bolstered by the beginning of a recovery in non-mining business investment. Accordingly, we are forecasting New South Wales to continue to outpace most other states and territories over the next few years, with SFD growth of almost 4 per cent expected over the next three years.

2.6 The Australian Capital Territory Economy: Past Growth, Current Conditions and Short-to-Medium Term Outlook

The ACT economy looks set for at least another year – and probably two years – of weak growth, as a result of the new coalition government's austerity drive and further declines in local building and construction. This will follow two years of flat growth in SFD (0.3 and 0.1 per cent respectively for 2012/13 and 2013/14).

The cost cutting exercise begun by the previous Labor government appears to have intensified under the coalition, with the government targeting a reduction of 16,500 public service jobs over four years, or almost 10 per cent of the 167,000 staff across Australia. Less than a third of the Commonwealth public servants work in Canberra, but after a slow start in 2013/14, the ABS reported a fall of almost 8,000 employees classified to the Public Administration and Safety sector in the ACT over the 3 months to August 2014, from 69,400 persons to 61,500 persons. This sector accounts for almost one-third of ACT employment. The Commonwealth government has reported that in 2013/14 there was an overall decline in Commonwealth public servants Australia-wide of 7,925 persons (or 4.7 per cent), due to voluntary redundancies and retrenchments. These job reductions probably only showed up in the most recent industry employment numbers, while it is also possible that the ACT local government could also be culling employees. Partially offsetting lower employment in public administration will be increased employment in the business services sectors as the Commonwealth increases its outsourcing.

Although monthly labour force data is notoriously volatile (with the ABS having increased difficulties lately – refer to discussion earlier in this bulletin), the more reliable trend data for the ACT shows that employment has been trending down since the peak of 214,800 persons in April 2014 to 211,900 in September 2014, with the unemployment rate rising from a low of 3.5% in March 2014 to 4.6% in September, the latter despite declining participation rates. Overall, year-on-year employment declined -0.1 per cent in 2013/14, and further declines are expected in 2014/15.

The downturn in building and construction is also contributing to the weakness in employment, SFD and the overall economy, with this overall downturn to make a negative contribution to growth over the next two years:

Residential construction, including alterations and additions, turned down in 2012/13 and has fallen sharply in 2013/14 in the face of weakening demand (via weakening employment) and an oversupplied residential market. With the surplus of dwelling stock equal to around 3 years of underlying demand, this downturn is likely to continue into the second half of the decade.

Non-dwelling building has fallen 44 per cent over the past two years as major projects were completed. Offices and education, the two largest non-dwelling building sectors in the ACT, have come off relatively high periods of building and have now started to run at much weaker levels. A turnaround is expected over the next year, with a strong rise in 2015/16 (off a relatively low base), led by large health and education projects (in particular the $370 million University of Canberra hospital and the $100 million CSIRO building).

Engineering construction increased 4 per cent in 2013/14, driven by sharp rises in private sector electricity and telecommunications-related construction. Public sector engineering construction fell 22 per cent. Significant declines in overall engineering construction are predicted for 2014/15 and 2015/16.

This means total construction work done will decline for four successive years to 2015/16, impacting heavily on SFD. However, this will have less impact on GSP, because a prominent proportion of the building and construction materials an indeed the labour are imported from interstate (mainly NSW and particularly from Queanbeyan). Nevertheless, it will continue to impact on construction sector employment, which has already fallen 17 per cent in year-average terms since its peak in 2011.

The housing downturn will also continue to have a negative impact on those parts of retail sales demand related to furniture, fit-out, hardware, etc. Indeed, the weakness of employment and housing has already impacted on consumer spending over the past year, with retail turnover in real (or volume) terms falling 3.5 per cent through-the-year to the June quarter 2014 (with year-on-year growth of only 0.3 per cent in 2013/14). There appears to have been a rebound in the September quarter, but, given the benign outlook for employment, wages and housing, the recent strength in retailing is unlikely to be sustained. With considerable uncertainty surrounding job security, retail and overall household consumption expenditure is expected to remain weak for at least the next year, before recovering through 2015/16.

Cutbacks to public service employee numbers and other forms of spending restraint are expected to realise very weak growth (around 0.5 per cent) in government consumption expenditure in 2014/15. Government consumption expenditure comprises 56% of SFD, and this weakness, combined with poor growth in household spending and the construction downturn, will result in modest growth (or possibly a small contraction) in SFD in 2014/15. Meanwhile, GSP was barely positive in 2013/14 at 0.7 per cent and will be flat in 2014/15 – which will be the weakest growth in the ACT since 1995/96.

Looking forward, we expect growth and employment to recover over 2015/16 and strengthen markedly in 2016/17. A Federal election is due in late 2016, and – similar to what occurred after the Howard government's initial austerity drive in 1996 – we expect public sector employment numbers to move back toward previous levels within two-to-three years, particularly as the election looms and extra administrative staff are employed to fulfil previous and new promises.

3. INFLATION AND WAGES

3.1 Outlook for Australian inflation

Inflation eased in calendar year 2014 and is likely to remain weak over the next two years. Although the Australian dollar depreciated in the second half of last year, the inflationary impact of a lower dollar is likely to be swamped by ongoing weak demand inflationary pressures. Accordingly, underlying inflation is forecast to remain in the middle of the Reserve Bank's 2-3 per cent target band in calendar year 2015 providing scope for another rate cut. Interest rates will eventually shift back to neutral over the medium term. That said, we are not forecasting any rate rises over 2015/16.

Plummeting oil prices brings inflation down in the December 2014 quarter

The headline rate for the Consumer Price Index eased to 0.2 per cent in the December quarter, with the through-the-year increase also moderating to 1.7 per cent (December quarter 2014 compared to December quarter 2013). The annual rate represented a sharp deceleration from the 3 per cent reported in the June quarter 2014 and the 2.3 per cent recorded in the September 2014 quarter. Meanwhile, the Reserve Bank's measure of underlying inflation picked up in the December quarter, rising by 0.7 per cent (compared to 0.4% in the previous quarter). However, the annual rate of underlying inflation eased to 2.3 per cent from 2.5 per cent in the September quarter.

The overall outcome was driven by a sharp fall in petrol prices, due to tumbling global oil prices. Brent prices plummeted in December 2014 from an average of US$102/barrel in the September 2014 quarter to US$76/barrel in the December quarter, representing a decline of 26.6 per cent. Even though the A$ depreciated by 7.5 per cent as well, petrol prices fell by 6.8 per cent per cent in the December 2014 quarter, slicing 0.2 percentage points off the quarterly CPI inflation. If current global oil prices are maintained and the A$ holds near present levels, we could see another significant fall in petrol prices in the March 2015 quarter.

The fall in petrol prices combined with declines in fruit and vegetable prices (-2.2%), motor vehicles purchases (-1.1%), furniture (-0.2%) and a range of household appliances, utensils and tools pushed tradeables inflation lower (-0.6%) in the December quarter. Some of the price declines were offset by a 4.8 per cent increase in the price of tobacco, with the increase in excise adding 0.15 per cent to the total CPI outcome.

. . . non-tradeables inflation also weak

Non-tradeables inflation (ie. prices of those goods and services which are not imported or subject to competition from imported goods) rose by 0.6% in the quarter to be 2.3% higher through-the-year. Annual non-tradeables inflation is now at the lowest level since the September 2009 quarter, and is indicative of weak economy and subdued wages growth. However, a further 1.1% rise in the cost of new dwellings added 0.1% to the overall result in December 2014 quarter. The annual increase in the cost of a new dwelling is now 4 per cent higher than a year ago and is well above the average for the past 10 years.

Lower dollar will put upward pressure on import prices . . .

Changes in the Australian dollar impacts on consumer prices in two stages. Initially, exchange rate movements impact the Australian-dollar cost of imports when they arrive in the country. Historically, the relationship between exchange rate movements and the Australian dollar price of imports as measured when they arrive in the country (ie. 'across the docks prices') is close – see chart on exchange rate and import prices.

This suggests that exchange rate changes are usually passed through quickly to import prices. Typically, a 10 per cent appreciation in the exchange rate lowers import prices by around 8 per cent. Conversely, a 10 per cent depreciation of the Australian dollar raises import prices by about 8 per cent.

In the December 2014 quarter, changes in import prices tracked slightly below that suggested by history. Although the exchange rate in US$ terms was 7.5 per cent lower on average in the December quarter than the September quarter (for the Trade Weighted Index it was only 4.2 per cent lower), prices of imported consumption goods were only 3 per cent higher. For all import goods, prices rose by a modest 0.9 per cent, due to lower intermediate goods prices, the latter including an 11.1 per cent fall in fuel import prices.

. . . but the transmission of higher import prices to overall inflation is smaller and slow to come through

The second stage of the changes in exchange rate pass-through to inflation occurs when changes in the prices of imported goods impact on tradeables (which constitutes about 40 per cent of the CPI basket) and overall consumer prices. The transmission may be direct, for example when consumers buy imported goods, or it may be indirect, where the prices of domestically produced import-competing goods change in response to changes in the cost of imported goods.

In addition, some domestically produced goods prices may change in response to movements in the cost of imported inputs to production. Historically, the effect of import price changes on overall inflation, measured in underlying terms is smaller and slower (see chart on import prices and CPI inflation).

Some consumer prices, such as automotive fuel, tend to respond quickly to higher import prices. But we estimate that – in general – a 10 per cent rise in import prices would generally lift the underlying inflation by just over one percentage point over a period of three years.

At present, the tail end of the second year effect of the initial depreciation from May 2013 to January 2014 (when the A$ dropped from US$1.03 to US$0.89 before settling at US$0.93 from April to August 2014) and the first year effect of the more recent depreciation (September 2014 to now) should be reflected in final retail prices. However, given recent import prices haven't risen by as much as implied by our model, the flow through of recent exchange rate depreciation to final retail goods prices appears to be weaker than historical average. This is evidenced by retail turnover prices (excluding the cafes, restaurants and takeaway food services category) actually declining by -0.1 per cent in the December quarter.

Lower oil prices will mute tradeables inflation, offset by increase in tobacco excise

The recent plunge in oil prices has been caused by a substantial increase in oil production by producers outside OPEC – namely the US, Canada and Brazil. Despite plunging prices, OPEC has committed to retaining current production levels. That will maintain the current oversupply and act to supress prices over the short term. Meanwhile, consumption growth has been modest, leading to large increases in inventories. At this stage, it appears the traditional lower cost producers are trying to regain market share and force out the newer US shale oil producers who have higher costs of production. The impact of these decisions will be twofold. Firstly, the current low prices would deter future US investment in new shale oil capacity, and see some shale oil production shut down. Secondly, we expect to see further volatility in prices going forward, although the trend is expected to be on a gradual shift upwards. Global oil prices have already lifted over recent weeks from lows of below US$50/barrel in January to over

US$60/barrel for the benchmark Brent oil prices with local petrol prices also rising from recent lows. But even if Brent averages, say US$58/barrel in the March quarter, it will still realise much lower petrol prices in the March 2015 quarter.

The legislated increases in tobacco excise over 2015 and 2016 will add to headline inflation. However, given the proposed increases are quite large, we expect the price increase to drop out of calculations for the underlying rate.

Weak wages growth will be a drag on non-tradeables inflation

Wages growth has slowed considerably over the past 18 months due to spare capacity in the labour market. This, in turn, reflects weak domestic demand and cost cutting by businesses. Accordingly, much lower wage increases have been awarded to 50 per cent of workers who have their pay set by 'individual arrangements'. We estimate that wage increases for employees in this segment eased from 3.5 per cent in September 2012 quarter to 1.7 per cent in the September 2014 quarter. In year-average terms, wages growth as measured by WPI now stands at 2.6 per cent, the lowest level since the late 1990s when the ABS first published the data.

Year average growth in 2014/15 is expected to be only 2.6 per cent for the WPI and 3.3 per cent for AWOTE (average weekly ordinary time earnings). Meanwhile, productivity has picked over recent quarters with the mining sector driving the recovery. This is largely due to the sector transiting from labour intensive investment phase to less labour-intensive production phase. That said, productivity in a broad range of other sectors including wholesale and retail trade, and finance & insurance also shifted higher over 2013/14.

The subdued wage pressures and continued productivity improvements will help contain unit labour costs — the average cost of labour per unit of output — and put downward pressure on domestic goods and services inflation this year and next.

Overall, inflation to remain contained

Going forward, our view is that inflation will be weak in the March 2015 quarter driven by lower petrol prices. Beyond, the first quarter, we expect inflation to generally remain contained over the next 9 months (with prices rises fluctuating between 0.3 to 0.9 per cent per quarter) due predominantly to weak growth in unit labour costs (ie. price of labour such as wage price index inflation adjusted for productivity). However, higher import prices from the recent fall in the dollar will put upward pressure on tradeables goods and services, while petrol prices are likely to add to the CPI from the June quarter given a gradual upward trend in global oil prices.

This benign inflation outlook provides scope for the Reserve Bank to cut rates once more, particularly if it wants to induce more downward pressure on the dollar. We think the RBA will sit on their hands for a couple of months to see how the economy adjusts to the February rate cut. A rate reduction in the June quarter is likely. We believe that will be that last of rate cuts in this cycle as a lower dollar and improved prospects for the global economy particularly emerging market economies (in light of lower oil prices) should provide the assistance needed to trade exposed industries and hasten the transition to balanced growth.

However, we expect that underlying inflation will rise over calendar year 2016 and be pushed close to 3 per cent in the second half of 2016 and over 2017. The gradual rise in underlying inflation from 2016 will be driven by rising tradeables inflation, as depreciation of the Australian dollar feeds in to higher import prices and rising domestic services inflation, largely as a result of persistence of high rates of inflation in rents, utilities, child care services and other housing costs.

As the economic recovery gathers momentum through 2016, we believe retailers will rebuild margins and pass on some of the higher import costs of tradeable goods, to consumers. Reduction in spare labour capacity will also add to inflation from late 2016, via rising wages.

In year-average terms, BIS Shrapnel is forecasting CPI inflation to ease to 1.7 per cent in 2014/15 before rising to 2.6 per cent and 3.4 per cent over 2015/16 and 2016/17 respectively. We expect CPI inflation to fall back within the Reserve Bank's 2 to 3 per cent target range towards the end of the decade although inflation containment will remain a policy challenge beyond the medium term.

Table 3.1: Wages and Prices – Australia
Year Average Growth

Wages and Prices Growth - Australia

Year Ended June	Average Weekly Ordinary Time Earnings[1] $/week	%CH	Wage Price Index All Industries 2012=100	%CH	CPI Headline Inflation (BIS Shrapnel forecasts) 2012=100	%CH	Official Headline CPI [2] 2012=100	%CH
2000	765.4	3.2	64.7	3.0	69.4	2.4	69.4	
2001	804.2	5.1	66.9	3.5	73.6	6.0	73.6	6.0
2002	847.4	5.4	69.1	3.3	75.7	2.9	75.7	2.9
2003	890.0	5.0	71.5	3.5	78.0	3.0	78.0	3.0
2004	931.6	4.7	74.1	3.6	79.9	2.4	79.9	2.4
2005	972.9	4.4	76.9	3.7	81.8	2.4	81.8	2.4
2006	1 017.5	4.6	80.0	4.1	84.4	3.2	84.4	3.2
2007	1 054.1	3.6	83.2	3.9	86.9	3.0	86.9	3.0
2008	1 106.1	4.9	86.6	4.1	89.8	3.4	89.8	3.4
2009	1 166.5	5.5	90.2	4.1	92.6	3.1	92.6	3.1
2010	1 231.3	5.6	92.9	3.1	94.8	2.3	94.8	2.3
2011	1 282.5	4.2	96.5	3.8	97.7	3.1	97.7	3.1
2012	1 338.1	4.3	100.0	3.6	100.0	2.3	100.0	2.3
2013	1 400.3	4.6	103.3	3.3	102.3	2.3	102.3	2.3
2014	1 442.2	3.0	106.0	2.6	105.1	2.7	105.1	2.7
Forecasts								
2015	1 489.8	3.3	108.8	2.6	107.0	1.8	107.2	2.0
2016	1 547.2	3.9	111.9	2.9	110.0	2.8	109.9	2.6
2017	1 616.7	4.5	115.7	3.4	113.6	3.3	112.7	2.5
2018	1 695.9	4.9	120.0	3.7	117.0	2.9	115.5	2.5
2019	1 768.6	4.3	124.2	3.4	120.2	2.8	118.4	2.5
2020	1 854.9	4.9	129.0	3.9	123.5	2.7	121.4	2.5
2021	1 948.9	5.1	134.1	3.9	127.3	3.1	124.4	2.5
Compound Annual Growth Rates ([3])								
2001-2011	4.8		3.7		2.9		2.9	
2009-2014	4.3		3.3		2.5		2.5	
2014-2021	4.4		3.4		2.8		2.4	
2016-2021	4.7		3.7		3.0		2.5	

Source: BIS Shrapnel, ABS

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

(2) Headline CPI forecasts based on Reserve Bank of Australia forecasts to June 2017 quarter and then Commonwealth Treasury medium term projections.

(3) e.g. CAGR (Compound Annual Growth Rates) for 2016-2021 is CAGR for 2016/17 to 2020/21 inclusive (ie next regulatory period).

Table 3.2: Wages Growth, All Industries, Australia, (by Workforce Segmented by Pay Setting Method)

						Forecast							Averages	
Year Ended June	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2010-14	2015-21
Proportion of Workforce by Pay setting Method (a)														
Awards Only	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%
Collective Agreements	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%	41.9%
Individual Arrangements	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
AWOTE														
Awards Only	0.7	3.5	3.4	2.9	2.6	3.0	2.3	2.9	3.3	2.9	3.1	3.2	2.6	3.0
Collective Agreements	4.1	4.0	4.0	3.7	3.5	3.4	3.4	3.6	3.8	3.8	4.0	4.0	3.9	3.7
Individual Arrangements (b)	7.2	4.4	4.7	5.5	2.6	3.2	4.4	5.4	5.8	4.8	5.7	6.0	4.9	5.0
AWOTE (Persons)(c)	**5.6**	**4.2**	**4.3**	**4.6**	**3.0**	**3.3**	**3.9**	**4.5**	**4.9**	**4.3**	**4.9**	**5.1**	**4.3**	**4.4**
Wage Price Index														
Awards Only	0.7	3.5	3.4	2.9	2.6	3.0	2.3	2.9	3.3	2.9	3.1	3.2	2.6	3.0
Collective Agreements	4.1	4.0	4.0	3.7	3.5	3.4	3.4	3.6	3.8	3.8	4.0	4.0	3.9	3.7
Individual Arrangements (b)	2.6	3.7	3.4	3.0	1.9	1.8	2.6	3.3	3.7	3.2	4.0	4.0	2.9	3.2
Wage Price Index (Ord. Time)	**3.1**	**3.8**	**3.6**	**3.3**	**2.6**	**2.6**	**2.9**	**3.4**	**3.7**	**3.4**	**3.9**	**3.9**	**3.3**	**3.4**
Compositional Effects + Bonuses,etc	2.5	0.4	0.7	1.3	0.4	0.7	1.0	1.1	1.1	0.9	1.0	1.1	1.0	1.0

Source: BIS Shrapnel, ABS, Department of Employment

(a) Full-time Adult Persons

(b) Indiv Agreements picks up all the compositional effects and bonuses plus all the standard errors of WPI and AWOTE estimates by the ABS

(c) Full-time Adult Persons, excluding overtime

Table 3.3: 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 ans 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

3.1.1 Reserve Bank of Australia CPI forecasts

The Reserve Bank and the Federal Treasury provide the 'official' view of CPI forecasts. The RBA's November 2014 'Statement on Monetary Policy' projects the headline CPI rate at 1¾ per cent in the December quarter 2014, before rising to 2 per cent (mid-point of 1½ to 2½ per cent range) in the June 2015 quarter. According to the RBA, headline CPI inflation is then expected to be in the 2½ to 3½ per cent range through to December quarter 2016 (RBA current forecasts only extend to December 2016).

The Federal Treasury in their Budget 2014/15 projected CPI inflation at 2¼ per cent in 2014/15 and 2½ per cent in 2015/16. For the budget forward estimate period (ie 2016/17 and 2017/18), the Federal Treasury forecast CPI inflation at 2.5 per cent.

3.2 Wages outlook

3.2.1 Brief description of BIS Shrapnel's wages model

The key determinants of nominal wages growth are consumer price inflation, productivity and the relative tightness of the labour market (ie the demand for labour compared to the supply of labour). Price inflation, in turn, is primarily determined by unit labour costs. Other factors which influence price inflation include the exchange rate, the stage of the business cycle and the level of competition in markets generally.

BIS Shrapnel's model of wage determination 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 table 3.1):

- 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 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 (ie dollar value) increases, rather than as a proportional increase although the last two increases were given as a percentage increase. At the all industries level, 8.1 per cent of all full-time employees (data excludes those in agriculture, forestry and fishing) have their pay rises determined by this method. In the electricity, gas, water & waste services sector, only 2.7 per cent of workers have their pay set by this method.
- Collective agreements negotiated under enterprise bargaining account for 41.9 per cent of all employees, but 67.7 per cent of electricity, gas, water and waste services employees' wage increases are determined by this method.
- The remaining 50 per cent 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 currently estimated to be around 30 per cent.

The key influences on the different wage determination mechanisms of each discrete segment are described below:

- Fair Work Australia (the body responsible for setting minimum wages in Australia) is responsible for establishing and maintaining a safety net of fair minimum wages for employees' dependant on Awards. This requires maintenance of employees' cost of living. Hence, in setting minimum wages, Fair Work Australia takes into account the performance and competitiveness of the national economy, including productivity, business competitiveness and viability, inflation and employment growth.

Chart 3.1: Australia – Wages and Prices

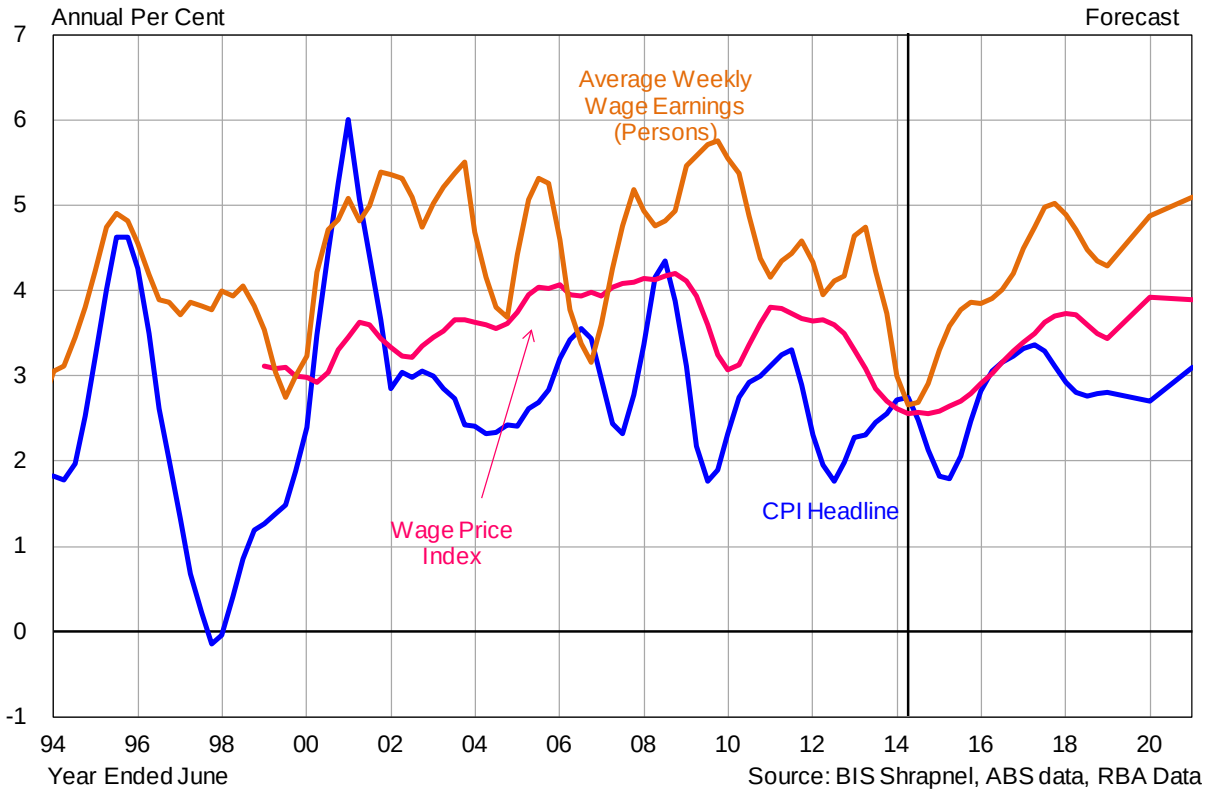
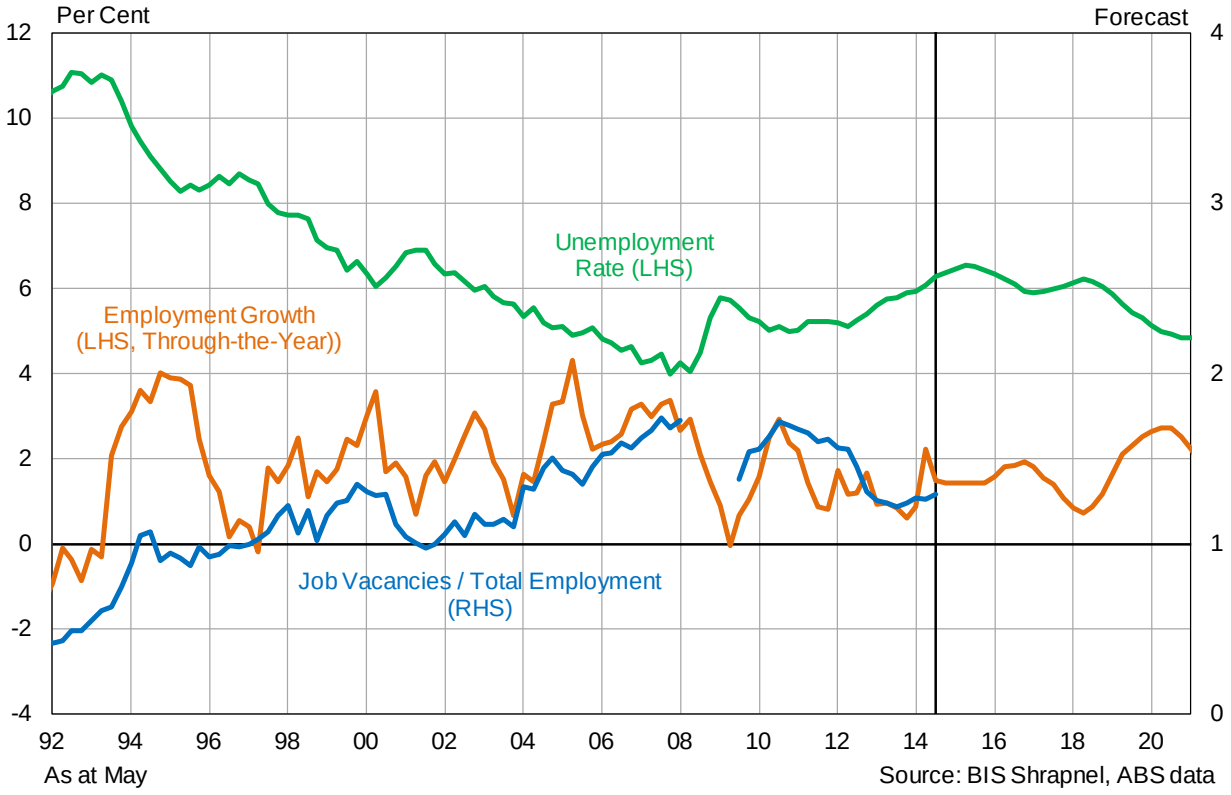


Chart 3.2: Employment and Unemployment



Accordingly, increases in the Federal Minimum Wage (on which a range of mostly lower paid awards are also based) granted by the Fair Work Australia each year are usually set in relation to recent increases in the CPI and with regard to the Fair Work Australia's view of both current and short-term economic conditions. Fair Work Australia granted a 3.0 per cent ($18.70) increase in minimum wages, effective July 2014. The $18.70 per week increase lifted the Federal Minimum Wage to $640.90 per week.

- 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.

3.3 Outlook for Australian all industries wages

Wages growth slowed considerably in calendar year 2013, following a mild easing through 2012. The wage price index (WPI) grew by 2.9 per cent in year average terms in calendar 2013. Through-the-year growth to December 2013 was even weaker at 2.5 per cent — the slowest pace since the early 2000s and lower than the post GFC weakening, when WPI growth troughed at 2.9 per cent through-the-year to December 2009. This follows growth in the WPI of 3.8, 3.6 and 3.3 per cent respectively in the 2010/11, 2011/12 and 2012/13 financial years.

The WPI improved marginally to 2.6 through-the-year to March 2014, remained at 2.6 per cent in June but eased once again to 2.5 per cent in September 2014 quarter. As mentioned, in real terms, overall wages growth (in WPI terms) is only marginally positive after being negative in the past three quarters. In other words, CPI inflation rose faster than wages in the first half of last year and in the December 2013 quarter. This is a relatively rare occurrence – last occurring (briefly) in 2008 and 2009/10.

The marked slowing in wages growth over the past 18 months is largely due to spare capacity in the labour market, reflecting weak domestic demand due to soft non-mining business investment, and cost cutting by businesses. This has resulted in much lower wage increases awarded to 50 per cent of workers who have their pay set by 'individual arrangements'. We estimate that wage increases for employees in this segment eased from 3.5 per cent in September 2012 quarter to 1.7 per cent in the September 2014 quarter. In year-average terms, wages growth as measured by WPI now stands at 2.6 per cent, the lowest level since the late 1990s when the ABS first published the data.

Among the industry sectors, over recent quarters there has been a significant slowing in wages growth in the mining, wholesale trade, transport, finance and insurance, professional, scientific and technical services (PSTS) and administrative and support services (see table 4.1). However, wages growth in the electricity, gas, water & waste services industry picked up in the September quarter to be 3.2 per cent higher than a year ago.

Year average growth in 2014/15 is expected to be only 2.6 per cent for the WPI and 3.3 per cent for AWOTE (average weekly ordinary time earnings). Meanwhile, productivity has picked over recent quarters with the mining sector driving the recovery. This is largely due to the sector transiting from labour intensive investment phase to les labour-intensive production phase. Notwithstanding, productivity in a broad range of other sectors including wholesale and retail trade, and finance & insurance shifted higher over 2013/14.

The subdued wage pressures and continued productivity improvements will help contain unit labour costs — the average cost of labour per unit of output — and put downward pressure on domestic goods and services inflation over the short-term. This means that wages growth poses no threat to our low inflation outlook over the next two years, at least.

A broadening in employment, profits and investment is expected from 2016 as the next set of economic drivers, in particular non-mining business and public investment, slowly come through. Meanwhile, current low interest rates will also stimulate wider economic activity, lifting confidence and spending and encouraging businesses to switch out of cost containment mode.

The acceleration in profits, rising price inflation through 2016 and 2017 and emerging skills shortages — with the unemployment rate approaching 6.0 per cent by late 2016 — will push up wages growth during 2016 and 2017. 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 3.7 per cent for WPI (4.9 per cent for AWOTE) in 2017/18 – which would be the strongest result in WPI terms in nearly a decade. While the RBA will not be too alarmed at wage inflation of around 3.7 per cent (which, with long term productivity of around 1.5 per cent puts unit labour costs around 2.2 per cent – below the mid-point of its target band), it will nevertheless raise rates through 2016 and 2017 to prevent any serious inflationary pressures emerging.

The higher interest rates are expected to cause a slowdown in economic and employment growth during 2018, and this will eventually feed through to wages growth, with wages growth in the individual arrangements segment slowing first. Wages growth is forecast to ease to 3.4 per cent in WPI terms in 2018/19, while AWOTE growth eases to 4.3 per cent at the same time. But with only a small rise expected in the average unemployment rate to 6.1 per cent in 2018 — because of slower labour force growth due to the deceleration in the ‘working population’ — the ongoing tight labour market is expected to see wage pressures re-emerge again towards the end of the decade once the subsequent recovery resumes from the second half of 2019.

4. GAS NETWORK-RELATED LABOUR COST ESCALATION FORECASTS

Gas network-related labour includes a range of skilled labour who work directly and indirectly on the maintenance, design and operation of the gas network. The workers work both in the field and in offices. The escalator which BIS Shrapnel proposes to use for the gas network-related labour is wages growth in the Electricity, Gas, Water and Waste Services (EGWWS or 'Utilities') sector for the Australian Capital Territory.

That said, we understand AAD outsources its field services and asset management and planning services to its New South Wales based business partner, Jemena Asset Management (JAM). We propose that AAD use forecasts of the ACT EGWWS WPI to escalate costs associated with field services work performed by JAM's Australian Capital Territory based sub-contractors. As JAM's asset management and planning services labour is primarily based in New South Wales, we also provide forecasts of NSW EGWWS wages to help AAD develop its total internal labour cost escalation factor for operational expenditure requirements over the next regulatory period.

In this section, we provide an outlook for EGWWS at the national level followed by a discussion and forecasts of EGWWS industry in New South Wales and the Australian Capital Territory. Note that our **wages model** is described in **section 3** and **Appendix A**.

Key points:

- 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 per cent higher over the decade to 2014 (see tables 4.1 and 4.5). 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 decade (mainly related to compositional effects), AWOTE growth in the sector has also usually been higher than the national average over the past decade (see tables 4.1 and 4.2).
- To a large extent, this has been underpinned by strong capital works program in the utilities sector since the beginning of the last decade (resulting in robust employment growth over the same period), strong competition from the mining and construction workers for similarly skilled labour and the powerful influence of unions in the utilities sector.
- In addition, the electricity, gas and water sector is a largely capital intensive industry whose employees have higher skill, productivity and commensurately higher wage levels than most other sectors. Further, the overall national average tends to be dragged down by the lower wage and lower skilled sectors such as the Retail Trade, Wholesale Trade, Accommodation, Cafés and Restaurants, and, in some periods, also Manufacturing and Construction (see tables 4.1 and 4.2). 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 hence retain skilled labour.
- 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 4.9 per cent per annum over the five years to 2020/21, 0.2 per cent higher than the national 'All Industries' AWOTE average of 4.7 per cent per annum over the same five 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 4 per cent

per annum (0.3 percentage points higher than the national 'All Industries' WPI average of 3.7 per cent per annum) over the five years to 2020/21.

- New South Wales utilities WPI growth is forecast to average 4.2 per cent per annum — 0.2 percentage points higher than the national utilities average of 4 per cent per annum — over the five years from 2016/17 to 2020/21 inclusive (ie over AAD's next regulatory period).
- The slightly stronger utilities wages growth in New South Wales in the second half of this decade is due to still strong demand for labour from the state's utilities sector as well as increased competition from the construction sector. The latter driven by an upswing in residential construction. NSW utilities engineering construction is projected to fall in 2014/15 but it is still expected to remain comfortably above historically high levels.
- The ABS does not provide WPI data for the Utilities sector in Australian Capital Territory, providing state utilities data only for NSW (since September quarter 2008) and Victoria. These two states collectively account for almost 54 per cent of total Australian utilities employment, with Queensland accounting for just over 22 per cent, then Western Australia and South Australia at 11.4 per cent and 7.4 per cent respectively. Forecasts of WPI for the EGWWS sector in Australian Capital Territory therefore is based on national EGWWS WPI forecasts, as well as movements in the 'unknown residual' for the utilities wage price index.
- The utilities wage forecasts for Australian Capital Territory are expected to ease over the next two years (in line with the national utilities sector average) and stay below the national average reflecting the relatively smaller size of the utilities sector in that state.

Utilities wages growth will ease over the next two years

The mining investment boom has passed its peak and will decline over the next four years. Similarly, utilities engineering construction reached its peak in 2012/13 and will fall over the next three years. Accordingly, wages growth in the utilities sector (in WPI terms) will be relatively modest over 2014/15 and 2015/16.

That said, with many of the specialised skills relevant to the electricity, gas and water sector expected to remain in relatively high demand (as reinforced by the 2013 industry survey conducted by Energy Skills Australia and Victorian Skills and Training Needs study of the Electricity, Gas and Water sector), wage increases are still expected to remain higher in this industry than the national average over the next two years. Our overall outlook for total utilities sector wages over the next five years — discussed below — is a function of individual drivers of the different pay setting methods (ie awards, collective agreements and individual agreements).

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

The key elements of the utilities wage forecast are set out in table 4.4. 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 decade, the outcomes from collective agreements have been 0.4 per cent higher, on average, than the all industries average, at 4.4 per cent compared to 4.0 per cent. We expect this trend to continue over the outlook period, with collective agreements achieving average increases of 3.8 per cent for the utilities sector, compared to 3.7 per cent for all industries.

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

Sector	% of Total Employment Aug '14	Wage Price Index [1] Annual Per Cent Change Jun'08	Jun'09	Jun'10	Jun'11	Jun'12	Jun'13	Jun'14	Sep'14	Five-Year Average
Private		4.4	3.6	2.7	3.9	3.8	3.0	2.5	2.5	3.2
Public		3.9	4.4	4.0	3.7	3.3	2.8	2.8	2.7	3.3
Industry										
Mining	2.0	6.7	4.2	3.8	4.1	5.2	3.5	2.5	2.5	3.8
Manufacturing	7.9	4.6	2.5	2.6	4.1	3.8	2.8	2.8	2.7	3.2
Electricity, Gas, Water and Waste Services	**1.2**	**3.5**	**4.7**	**4.7**	**3.7**	**3.7**	**3.9**	**3.0**	**3.2**	**3.8**
Construction	9.0	4.7	4.5	2.9	4.0	4.1	3.2	2.9	2.5	3.4
Wholesale Trade	3.5	4.6	3.3	1.7	4.8	4.8	3.4	2.0	2.1	3.3
Retail Trade	10.8	4.5	3.5	2.8	3.3	2.7	2.7	2.4	2.2	2.8
Accommodation and Food Services	6.7	2.3	3.4	2.0	3.0	3.3	2.6	2.2	2.5	2.6
Transport, Postal and Warehousing	5.2	3.9	4.4	3.2	4.0	3.8	2.9	2.4	2.5	3.3
Information Media and Telecommunications	1.9	3.9	3.0	2.0	3.2	3.5	2.9	2.4	2.5	2.8
Finance and Insurance Services	3.6	3.6	3.2	3.1	4.5	4.1	2.9	2.6	2.7	3.4
Rental, Hiring and Real Estate services	1.8	4.1	3.6	2.5	3.6	3.5	3.1	2.3	2.4	3.0
Professional, Scientific and Technical Services	8.0	5.1	5.1	2.9	4.0	4.6	2.9	2.0	2.1	3.3
Administration and Support Services	3.2	4.9	2.9	2.5	3.7	3.6	2.7	2.5	2.1	3.0
Public Administration and Safety	6.1	3.9	4.5	3.7	3.4	3.6	2.9	2.8	2.2	3.3
Education	8.0	4.0	4.5	3.9	3.8	3.6	2.5	3.2	3.2	3.4
Health Care and Social Assistance	12.2	3.6	3.9	4.0	3.6	2.6	3.3	2.9	2.9	3.3
Arts and Recreation Services	1.8	3.4	3.9	2.8	3.4	3.5	2.9	3.0	3.6	3.1
Other Services	4.2	3.3	3.3	2.3	3.6	3.8	3.0	2.3	2.0	3.0
State/Territory										
New South Wales	31.1	4.0	3.6	3.1	3.7	3.6	2.8	2.5	2.6	3.1
Victoria	24.8	4.2	3.4	2.7	4.1	3.5	3.0	2.7	2.7	3.2
Queensland	20.3	3.9	4.1	3.3	3.9	3.8	2.7	2.6	2.5	3.2
South Australia	7.0	4.6	3.7	2.9	3.3	3.4	3.3	3.1	2.7	3.2
Western Australia	11.8	5.6	4.6	3.4	3.8	4.8	3.5	2.4	2.2	3.6
Tasmania	2.0	3.6	4.2	3.6	3.5	3.2	2.9	2.3	2.5	3.1
Northern Territory	1.1	4.2	3.8	3.4	3.9	3.6	3.2	2.8	2.9	3.4
Australian Capital Territory (ACT)	1.8	4.0	4.1	3.0	3.5	3.9	2.9	2.3	1.7	3.1
Total All[2]	100	4.2	3.8	3.1	3.8	3.7	2.9	2.6	2.5	3.2

(1) Measures changes in the price of labour. Ordinary hourly rates of pay (excludes overtime and bonuses) Source: BIS Shrapnel, ABS data
(2) Excludes Agriculture, Forestry and Fishing sector

Table 4.2: Australia
AWOTE Growth by Industry Sector

Industry Sector	% of Total Employment May '14	Average Weekly Earnings[1] $ / Week May'14	Annual Per Cent Change May'09	May'10	May'11	May'12	May'13	May'14	Five-Year Average
Mining	2.3	2 493	7.3	7.2	6.5	6.2	6.8	4.2	6.2
Manufacturing	8.0	1 294	5.3	1.8	2.8	2.3	3.9	4.8	3.1
Electricity, gas, water and waste services	1.3	1 659	6.1	7.6	9.1	2.5	6.1	2.0	5.5
Construction	8.9	1 449	7.8	7.7	5.0	3.5	4.3	2.1	4.5
Wholesale trade	3.3	1 463	5.9	2.2	3.9	11.3	4.6	0.5	4.5
Retail trade	10.7	1 040	2.7	5.5	0.9	3.2	4.0	2.5	3.2
Accommodation and food services	6.6	1 048	2.5	4.5	3.5	3.7	5.5	3.9	4.2
Transport, postal and warehousing	5.1	1 443	4.5	5.3	8.9	7.0	5.9	1.8	5.8
Information media and telecommunications	1.7	1 665	4.3	5.4	4.6	3.0	4.8	1.7	3.9
Finance and insurance	3.5	1 665	2.8	4.6	6.1	2.0	4.3	1.1	3.6
Rental hiring and real estate services	2.0	1 269	6.5	3.8	-2.1	0.4	6.6	-1.1	1.5
Professional, scientific and technical services	8.1	1 716	5.8	5.6	4.5	4.3	3.2	3.8	4.3
Administration and support services	3.4	1 287	7.1	7.4	-0.1	-1.9	7.9	1.7	3.0
Public administration and defence	6.3	1 531	5.4	6.7	5.7	3.2	4.7	3.5	4.8
Education and training	7.8	1 552	4.6	5.6	4.8	4.6	3.8	3.3	4.4
Health and social assistance	12.1	1 373	4.7	6.2	2.5	2.8	5.3	3.9	4.1
Arts and recreational services	1.6	1 305	7.2	4.1	5.6	3.5	5.5	4.6	4.7
Other services	4.4	1 088	6.8	3.1	3.6	2.7	4.2	-0.4	2.6
Total All Industries[2]	100%	1 454	5.5	5.6	4.2	4.3	4.6	3.0	4.3

1) Full Time Adult Ordinary Time earnings for persons Source: BIS Shrapnel, ABS data
2) Excludes Agriculture, Forestry and Fishing sector

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).

BIS Shrapnel analysis shows collective agreements in the EGWWS sector have been on average around 1.5 per cent higher than CPI inflation over the decade to 2010 (excluding the effects of GST introduction in 2000/01). In the five years to 2010 when the labour market was very tight, collective agreements were on average 1.7 per cent 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 1.1 per cent above the CPI in 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 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' (ie an agreement has been 'reached' or 'approved') over recent quarters.

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

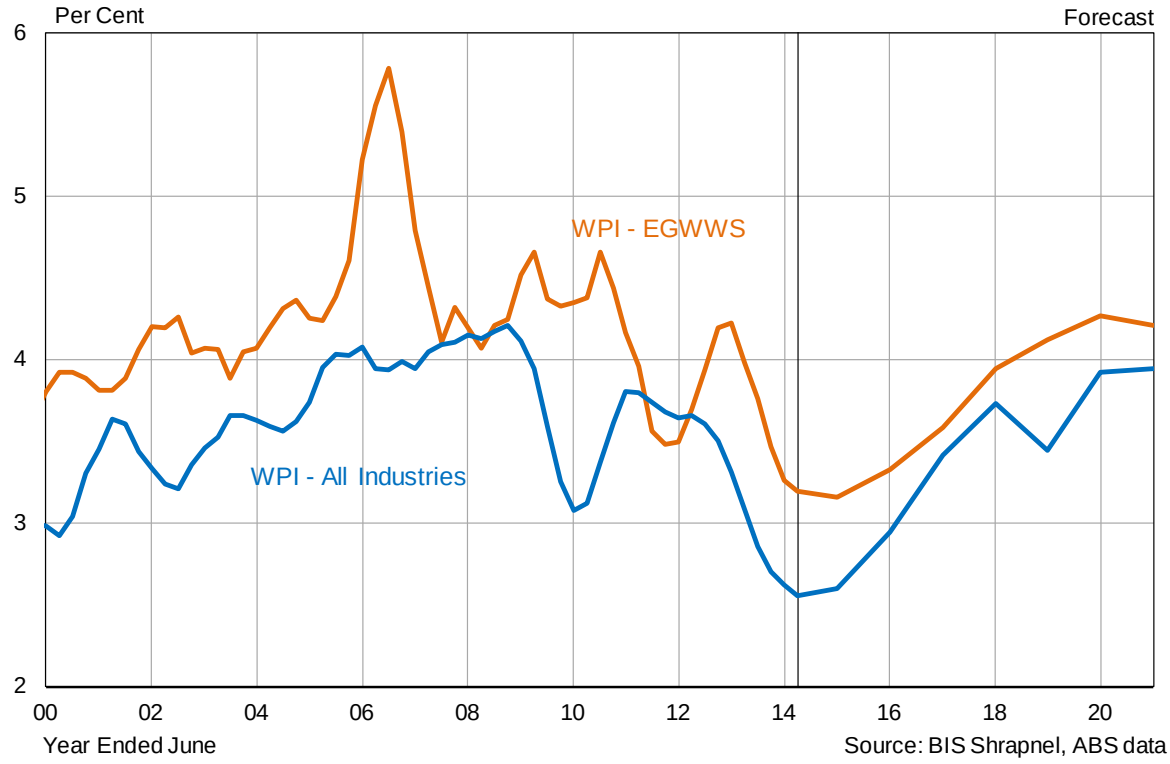


Table 4.3: Federal Wage Agreements – Collective Agreements by Industry (Average Annualised Wage Increase)

Selected Industry (ANZSIC 2006)	Collective Agreements											
	Average Annualised Wage Increase[1]											Average
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2004-2014
Electricity, Gas, Water and Waste Services	**4.3**	**4.2**	**4.4**	**4.5**	**4.7**	**4.8**	**4.8**	**4.4**	**4.2**	**4.1**	**3.6**	**4.4**
Agriculture, Forestry and Fishing	3.3	3.0	3.0	2.9	3.0	3.7	3.7	3.7	3.8	3.7	3.4	3.4
Mining	3.3	3.6	3.7	4.0	4.3	4.4	4.3	4.2	4.5	4.6	4.1	4.1
Manufacturing	4.1	4.1	4.2	4.3	4.2	4.1	3.9	3.9	3.9	3.8	3.5	4.0
Construction	4.3	4.4	4.9	4.9	4.6	5.3	5.4	4.8	5.1	5.3	4.9	4.9
Wholesale Trade	3.9	4.0	3.7	3.6	3.8	4.1	4.0	3.7	3.8	3.8	3.4	3.8
Retail trade	3.2	3.4	3.5	3.5	3.5	3.6	3.5	3.4	3.6	3.3	3.1	3.4
Accommodation and Food Services	2.8	3.2	3.3	3.4	3.2	3.6	3.9	3.9	3.8	3.7	3.0	3.4
Transport , Postal and Warehousing	3.6	3.7	3.7	3.9	4.0	4.2	4.2	4.0	3.9	3.9	3.6	3.9
Information Media and Telecommunications	4.2	4.1	3.6	3.2	3.3	3.8	3.8	3.4	3.4	3.5	3.3	3.6
Financial and Insurance Services	4.2	4.1	4.1	4.1	3.8	4.0	3.6	3.7	3.5	3.3	3.0	3.8
Rental, Hiring and Real Estate Services	4.1	4.1	3.8	4.8	4.5	3.5	3.7	3.9	4.7	4.4	4.2	4.2
Professional, Scientific and Technical Services	4.1	4.1	3.8	4.0	4.0	4.5	4.3	4.0	4.1	4.1	4.0	4.1
Administrative and Support Services	4.1	4.1	3.8	3.6	3.6	3.8	3.7	3.6	4.2	4.3	4.0	3.9
Public Administration and Safety	4.4	4.3	4.0	4.1	4.2	4.3	3.9	3.7	3.7	3.7	3.5	4.0
Health Care and Social Assistance	4.0	4.1	4.0	4.0	4.0	4.1	4.0	4.0	3.6	3.3	3.1	3.8
Education and Training	4.5	4.7	4.9	4.8	4.9	4.4	4.6	4.6	4.7	3.9	3.6	4.5
Arts and Recreation Services	3.5	3.8	3.5	3.8	4.0	4.1	3.5	3.5	3.4	3.3	3.2	3.6
Other Services	4.4	4.0	4.0	4.1	4.0	3.9	3.7	3.6	4.5	4.4	3.7	4.0
ALL INDUSTRIES	3.9	4.0	4.1	4.1	4.0	4.2	4.1	4.0	4.0	3.7	3.5	4.0

[1]Current agreements in June of each year.

Source: Department of Education, Employment & Workplace Relations (DEEWR)

Table 4.4: Electricity, Gas, Water and Waste Services Forecasts – Australia

	Year Average Percent Change													
						Forecast							**Averages**	
Year Ended June	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2010-14	2015-21
Proportion of Workforce by Pay setting Method (a)														
Awards Only	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%
Collective Agreements	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%	67.7%
Individual Arrangements	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
AWOTE														
Awards Only	0.7	3.2	3.4	2.9	2.6	3.0	2.3	2.9	3.3	2.9	2.8	2.8	2.6	2.9
Collective Agreements	4.8	4.4	4.2	4.1	3.6	3.3	3.4	3.6	4.0	4.1	4.2	4.3	4.2	3.9
Individual Arrangements (b)	14.0	18.7	-0.6	10.0	-0.7	3.4	4.6	5.9	6.4	6.9	7.1	5.7	8.3	5.7
AWOTE (Persons)(c)	**7.6**	**9.1**	**2.5**	**6.1**	**2.0**	**3.4**	**3.8**	**4.4**	**4.9**	**5.1**	**5.2**	**4.8**	**5.5**	**4.5**
Wage Price Index														
Awards Only	0.7	3.2	3.4	2.9	2.6	3.0	2.3	2.9	3.3	2.9	2.8	2.8	2.6	2.9
Collective Agreements	4.8	4.4	4.2	4.1	3.6	3.3	3.4	3.6	4.0	4.1	4.2	4.3	4.2	3.9
Individual Arrangements (b)	3.7	3.7	1.9	4.6	2.5	2.7	3.2	3.6	3.9	4.2	4.6	4.1	3.3	3.8
Wage Price Index (Ord. Time)	**4.3**	**4.2**	**3.5**	**4.2**	**3.3**	**3.2**	**3.3**	**3.6**	**3.9**	**4.1**	**4.3**	**4.2**	**3.9**	**3.8**
Compositional Effects + Bonuses,etc	3.2	4.9	-1.0	1.9	-1.2	0.2	0.5	0.8	0.9	1.0	1.0	0.6	1.6	0.7

(a) Full-time Adult Persons.

Source: BIS Shrapnel, ABS, Department of Employment

(b) Because of relatively small workforce (and therefore small sample size) in EGWWS, Indiv Agreements picks up all the standard errors of WPI and AWOTE estimates by ABS.

(c) Full-time Adult Persons, excluding overtime.

We expect EBA outcomes to ease over the next two years but remain above inflation and the 'all industries' average given that the skilled labour market remains tight 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 3.8 per cent per annum remains below that experienced over much of the past decade.

Demand for skilled labour also a key driver of utilities wages

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

We believe investment in the sector, particularly engineering construction, has been the key driver of employment growth in the sector over the past decade.

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 per cent in 2001 to 5 per cent by 2005, and to 4.0 per cent 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 and wage pressures, and this has weighed down on the labour market through to the present, with the unemployment rate reaching a peak of 6.3 per cent in November 2014.

However, with the economy expected to grow close to trend in about two years, employment growth will outpace population and labour force growth and the unemployment rate is expected to dip below 6.0 per cent by early 2017. Hence, we expect to again witness the re-emergence of skilled labour shortages and competition for scarce labour through 2017, particularly from the construction sector, which will push up wage demands in the utilities sector towards the end of the decade.

Table 4.5: Average Weekly Ordinary Time Earnings and Wage Price Index Total Australia and Electricity, Gas, Water and Waste Services Sector (Year Average Growth)

Year Ended June	Average Weekly Ordinary Time Earnings (1)				Wage Price Index (2) 2011/12=100			
	All Industries		Electricity, Gas, Water and Waste Services		All Industries		Electricity, Gas, Water and Waste Services	
	$	%CH	$	%CH	Index	%CH	Index	%CH
1989	487.3	7.2	513.4	6.4				
1990	521.0	6.9	559.2	8.9				
1991	555.4	6.6	585.2	4.7				
1992	580.8	4.6	620.5	6.0				
1993	591.0	1.8	638.3	2.9				
1994	609.1	3.1	657.9	3.1				
1995	634.9	4.2	668.6	1.6				
1996	663.8	4.6	707.6	5.8				
1997	688.5	3.7	748.6	5.8				
1998	716.0	4.0	796.1	6.3	60.9		56.7	
1999	741.4	3.5	827.1	3.9	62.8	3.1	58.4	3.0
2000	765.4	3.2	866.8	4.8	64.7	3.0	60.6	3.8
2001	804.2	5.1	918.5	6.0	66.9	3.5	62.9	3.8
2002	847.4	5.4	981.0	6.8	69.1	3.3	65.6	4.2
2003	890.0	5.0	1,001.3	2.1	71.5	3.5	68.2	4.1
2004	931.6	4.7	1,056.7	5.5	74.1	3.6	71.0	4.1
2005	972.9	4.4	1,090.6	3.2	76.9	3.7	74.0	4.3
2006	1 017.5	4.6	1,110.9	1.9	80.0	4.1	77.9	5.2
2007	1 054.1	3.6	1,151.9	3.7	83.2	3.9	81.6	4.8
2008	1 106.1	4.9	1,182.8	2.7	86.6	4.1	85.0	4.2
2009	1 166.5	5.5	1,255.5	6.1	90.2	4.1	88.9	4.5
2010	1 231.3	5.6	1,350.8	7.6	92.9	3.1	92.8	4.3
2011	1 282.5	4.2	1,473.9	9.1	96.5	3.8	96.6	4.2
2012	1 338.1	4.3	1,510.0	2.5	100.0	3.6	100.0	3.5
2013	1 400.3	4.6	1,602.5	6.1	103.3	3.3	104.2	4.2
2014	1 442.2	3.0	1 635.0	2.0	106.0	2.6	107.6	3.3
Forecasts								
2015	1 489.8	3.3	1 689.8	3.4	108.8	2.6	111.0	3.2
2016	1 547.2	3.9	1 754.4	3.8	111.9	2.9	114.7	3.3
2017	1 616.7	4.5	1 831.7	4.4	115.7	3.4	118.8	3.6
2018	1 695.9	4.9	1 920.7	4.9	120.0	3.7	123.5	3.9
2019	1 768.6	4.3	2 019.1	5.1	124.2	3.4	128.6	4.1
2020	1854.9	4.9	2 125.1	5.2	129.0	3.9	134.1	4.3
2021	1948.9	5.1	2 227.3	4.8	134.1	3.9	139.7	4.2
Compound Annual Growth Rates (3)								
1991-2001	3.8		4.6					
2001-2011	4.8		4.8		3.7		4.4	
2009-2014	4.3		5.4		3.3		3.9	
2014-2021	4.4		4.5		3.4		3.8	
2016-2021	4.7		4.9		3.7		4.0	

Source: BIS Shrapnel, ABS

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

(2) Ordinary time hours excluding bonuses.

(3) e.g. CAGR (Compound Annual Growth Rates) for 2016-2021 is compound annual growth for 2016/17 to 2020/21 inclusive (ie next regulatory period).

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, recent profitability of relevant enterprises (which influences bonuses and incentives, etc.), current business conditions and the short-term economic outlook.

Across all industries, wage growth from individual agreements rose by just 1.9 per cent in 2013/14, reflecting general weakness in the economy and the labour market. However, this is expected to gradually recover over the next five years. With the economy expected to grow close to trend in about two years, we expect further growth in wages in the segment to come through, as employers bid up wages for skilled labour in scarce supply. 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 second half of the decade.

Two other factors which will act to push up EGWWS wages growth attributable to the individual arrangements segment — that is the compositional effects — include the up skilling of the workforce and, later in the period, the ageing of the workforce. 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 outlook period, 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 (ie on higher pay), although the 'base' movement — the nominal increase in EBA's — will not reflect this, so this upgrading will end up as compositional increases in the individual arrangements segment.

A related aspect is an ageing labour profile, which will particularly affect the 'professionals' on non-EBA's, who tend to be older and more experienced.

The net result is that all the compositional effects from the up skilling of the workforce will fall into the individual arrangements wage setting residual. This is because the electricity, gas and water sector has a relatively small workforce and the individual arrangements segment picks up the standard errors of WPI and AWOTE estimates by the ABS. Overall, BIS Shrapnel expects individual wage agreements for the EGWWS sector to grow by 3.8 per cent per annum, on average, over AAD's next regulatory period.

Together with the awards and collective agreements, 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 4.9 per cent per annum over the five years to 2020/21, 0.2 per cent higher than the national 'All Industries' AWOTE average of 4.7 per cent per annum over the same five year period (see table 4.5). 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 4 per cent per annum (0.3 percentage points higher than the national 'All Industries' WPI average of 3.7 per cent per annum) over the five years to 2020/21.

4.1 Outlook for utilities wages growth in New South Wales

New South Wales utilities WPI growth is forecast to average 4.2 per cent per annum (0.2 percentage points higher than the national utilities average of 4 per cent per annum) over the five years from 2016/17 to 2020/21 inclusive (ie over AAD's next regulatory period, see table 4.6).

The slightly stronger utilities wages growth in New South Wales in the second half of this decade is due to still strong demand for labour from the state's utilities sector as well as increased competition from the construction sector. The latter driven by an upswing in residential construction. Chart 4.3 shows BIS Shrapnel's engineering construction forecasts for the utilities-related segments. NSW utilities engineering construction is projected to fall in 2014/15 but it is still expected to remain at historically high levels. Construction work done is expected to be elevated in the second half of the decade as the surplus in generation capacity is slowly eroded through continued population growth and industrial activity, placing greater demands on electricity supply. Chart 4.3 also shows that utilities investment is a key influence on employment growth in the utilities sector (even though some capital projects are outsourced to the construction sector). The combination of high levels of utility engineering construction and overall construction in the state means increased wage pressures in the NSW utilities sector (relative to other states) over the five years to 2020/21.

4.2 Outlook for utilities wages growth in Australian Capital Territory

The ABS does not provide WPI data for the Utilities sector in Australian Capital Territory, providing state utilities data only for NSW (since September quarter 2008) and Victoria. These two states collectively account for almost 54 per cent of total Australian utilities employment, with Queensland accounting for just over 22 per cent, then Western Australia and South Australia at 11.4 per cent and 7.4 per cent respectively. Forecasts of WPI for the EGWWS sector in Australian Capital Territory therefore is based on national EGWWS WPI forecasts, as well as movements in the 'unknown residual' for the utilities wage price index.

The utilities wage forecasts for Australian Capital Territory are expected to ease over the next two years (in line with the national utilities sector average) and stay below the national average reflecting the relatively smaller size of the utilities sector in that state.

Chart 4.2: New South Wales – Utilities Employment, Output and Investment

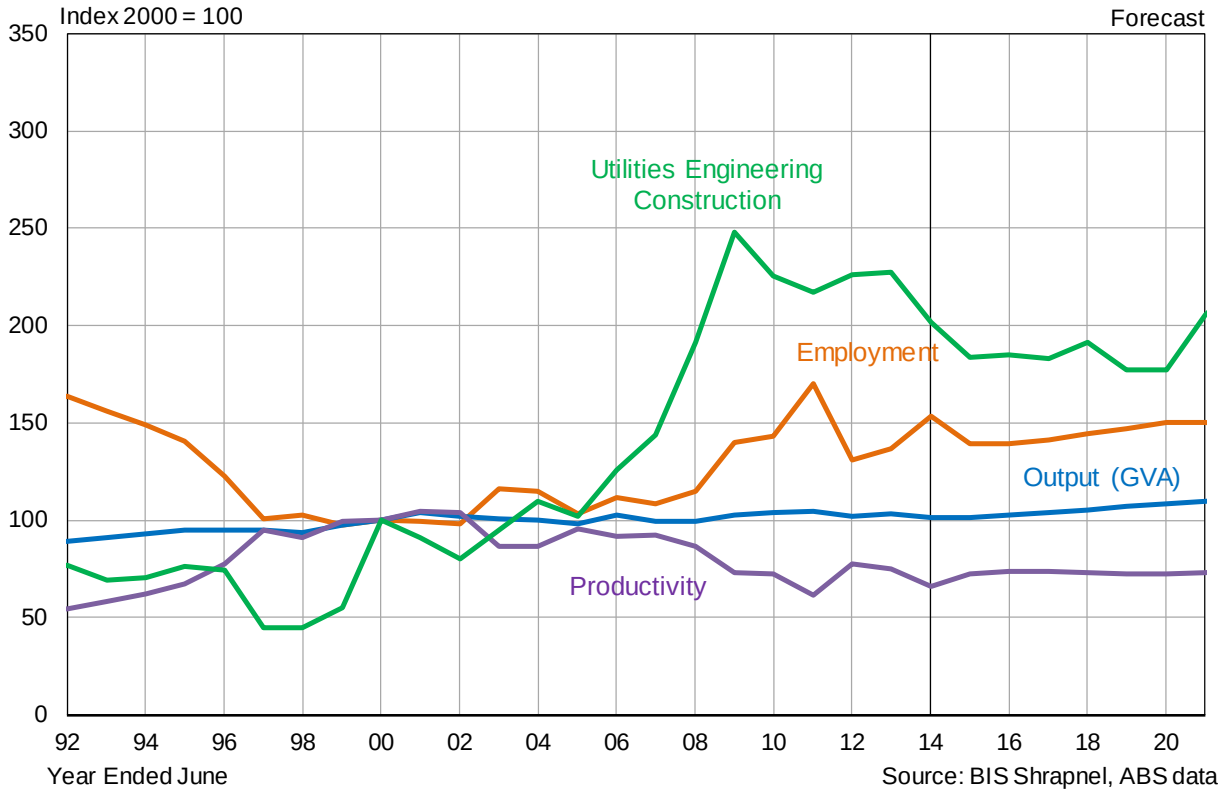


Chart 4.3: Australian Capital Territory – Utilities Employment, Output and Investment

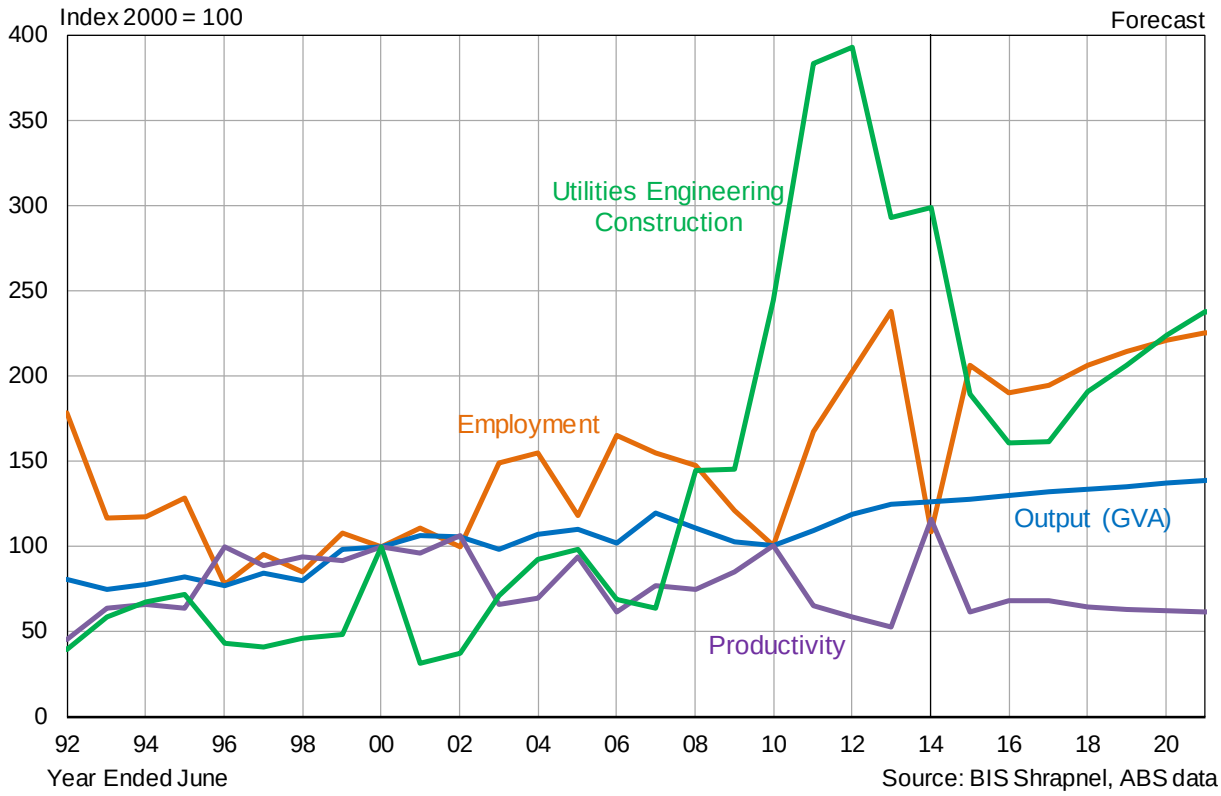


Table 4.6: Electricity, Gas, Water and Waste Services – New South Wales, Australian Capital Territory and Australia, Year Average Growth

	New South Wales - Nominal				Australian Capital Territory - Nominal				Australia- Nominal			
Year Ended	AWOTE [1]		WPI [2]		AWOTE [1]		WPI [2]		AWOTE [1]		WPI [2]	
June	$	A% CH	Index	A% CH	$	A% CH	Index	A% CH	$	A% CH	Index	A% CH
2000									866.8	4.8	68.2	3.8
2001									918.5	6.0	70.8	3.8
2002									981.0	6.8	73.8	4.2
2003									1,001.3	2.1	76.8	4.1
2004									1,056.7	5.5	79.9	4.1
2005									1,090.6	3.2	83.3	4.3
2006									1,110.9	1.9	87.6	5.2
2007									1,151.9	3.7	91.8	4.8
2008									1,182.8	2.7	95.7	4.2
2009	1,325.2		100.0		1,394.9		100.0		1,255.5	6.1	100.0	4.5
2010	1,397.8	5.5	103.9	3.9	1,473.7	5.6	103.9	3.9	1,350.8	7.6	104.4	4.3
2011	1,459.9	4.4	107.5	3.5	1,582.7	7.4	108.0	3.9	1,473.9	9.1	108.7	4.2
2012	1,481.7	1.5	111.0	3.2	1,660.3	4.9	111.6	3.4	1,510.0	2.5	112.5	3.5
2013	1,557.3	5.1	115.1	3.7	1,744.9	5.1	116.1	4.0	1,602.5	6.1	117.3	4.2
2014	1,584.2	1.7	118.5	3.0	1,775.1	1.7	119.7	3.1	1,635.0	2.0	121.1	3.3
Forecast												
2015	1,632.6	3.1	122.6	3.5	1,827.5	3.0	123.4	3.1	1,689.8	3.4	124.9	3.2
2016	1,688.5	3.4	126.8	3.4	1,888.2	3.3	127.1	3.0	1,754.4	3.8	129.1	3.3
2017	1,767.9	4.7	131.4	3.6	1,967.7	4.2	131.4	3.4	1,831.7	4.4	133.7	3.6
2018	1,857.4	5.1	136.8	4.1	2,063.2	4.9	136.2	3.6	1,920.7	4.9	139.0	3.9
2019	1,950.7	5.0	142.9	4.4	2,166.9	5.0	141.5	3.9	2,019.1	5.1	144.7	4.1
2020	2,053.0	5.2	149.2	4.5	2,278.4	5.1	147.1	4.0	2,125.1	5.2	150.9	4.3
2021	2,153.8	4.9	155.8	4.4	2,385.7	4.7	152.7	3.8	2,227.3	4.8	157.2	4.2
Long Term Averages												
2000-2010									4.5		4.3	
2009-2014									5.4		3.9	
2014-2021	4.5		4.0		4.3		3.5		4.5		3.8	
2016-2021	5.0		4.2		4.8		3.7		4.9		4.0	

(1) Earnings of persons. Data is year ended May. Source: BIS Shrapnel, ABS

(2) Ordinary time hours excluding bonuses.

5. CONTRACTOR LABOUR COST ESCALATION FORECASTS

In this section we provide an escalator for JAM's sub-contractors involved in the delivery of capital programs, which we proxy by wages growth (as measured by the WPI) in the Australian Capital Territory construction sector. For comparison purposes, we also provide forecasts of New South Wales construction industry.

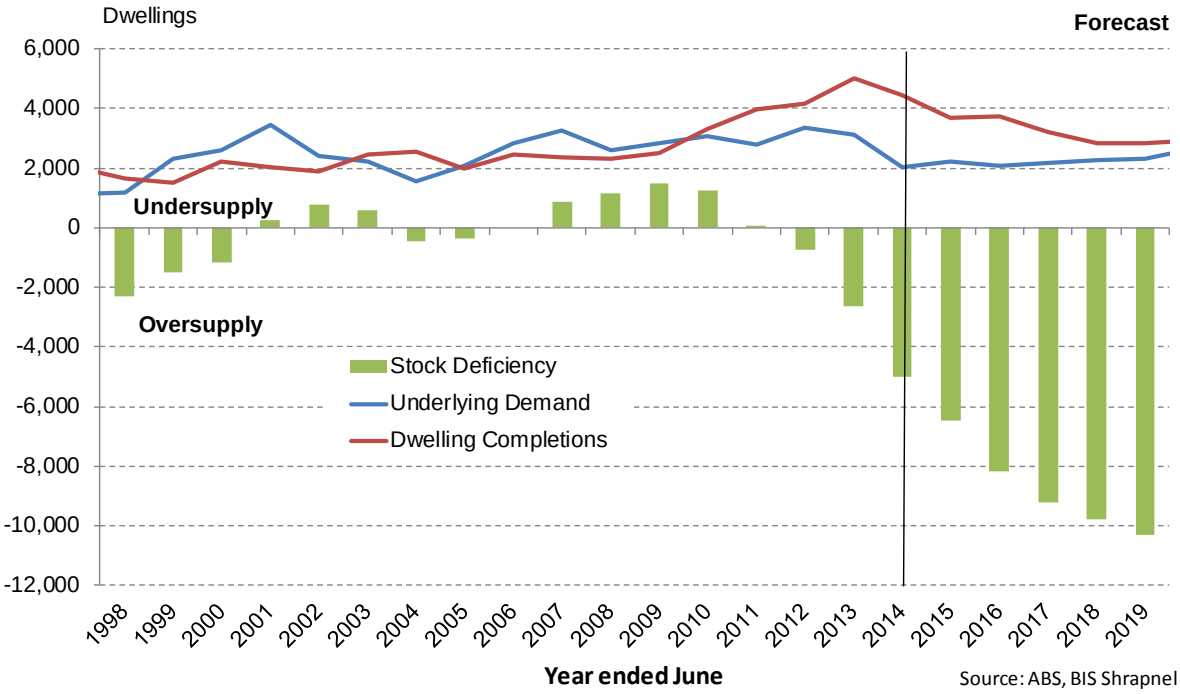
Our research has shown that construction activity (ie work done in the sector) normally has a strong influence on construction wages. Hence, our wage forecasts are based on BIS Shrapnel's forecasts of construction activity by state (which includes residential and non-residential building, plus engineering construction) as well as predicted movements in the construction wages at the national level.

5.1 Construction Sector Wages Growth in the Australian Capital Territory

Total construction in the Australian Capital Territory has been declining over the past two years and is expected to fall for another two years before flattening out. Falling dwellings building will be a key driver of weak construction activity in that state.

Residential construction, including alterations and additions, turned down in 2012/13 and has fallen sharply in 2013/14 in the face of weakening demand (via weakening employment) and an oversupplied residential market. With the surplus of dwelling stock equal to around 3 years of underlying demand (see chart below), this downturn is likely to continue into the second half of the decade.

Australian Capital Territory: Underlying demand, dwelling completions and stock deficiency



Non-dwelling building has fallen 44 per cent over the past two years as major projects were completed. Offices and education, the two largest non-dwelling building sectors in the ACT, have come off relatively high periods of building and have now started to run at much weaker levels. A turnaround is expected over the next year, with a strong rise in 2015/16 (off a relatively low base), led by large health and education projects (in particular the $370 million University of Canberra hospital and the $100 million CSIRO building).

Over the last three years, engineering construction in the ACT has run at record levels, averaging almost $800 million per year and peaking in 2011/12 at $830 million. In comparison, the long term average prior to 2010/11 was around $300 million per year. The much higher level of activity over the last three years has been primarily underpinned by major projects in the water and roads sectors. The water sector benefited from investment in the $409 million Cotter Dam enlargement as well as projects related to Googong Dam. Road construction benefited from a number of projects, the largest being the $82 million second stage of the Gungahlin Drive duplication project.

While the $279 million Majura Parkway project is keeping roads activity at near record levels, the completion of this project will drive a decline in total work done from 2015/16. Additionally, electricity construction is expected to fall back to more sustainable levels, while recreation work done is likely to fall back to its long term average. Over the three years to 2016/17, engineering construction work done is forecast to fall by 40 per cent. Still, at $500 million work done in 2016/17, activity would still be significantly higher than the long term average.

Given our outlook for construction activity, we think construction wages in the Australian Capital Territory will, on average, remain below the national mean over the next seven years.

5.2 Construction Sector Wages Growth in New South Wales

Much like the other states and territories, wages growth in the New South Wales construction sector generally tracks growth in total construction activity, although changes in wages tend to lag construction (in work done terms) by around one to two years.

NSW construction wages over the next five years, on average, are expected to be stronger than the national average (see table 5.1). After underperforming the Australian average for most of the last decade, construction activity in NSW is expected to grow substantially over the three years to 2016/17. Private dwelling construction will be the initial driver, followed by a new round of public sector infrastructure projects. The latter will be driven by a need to make up for underinvestment over the next few years as well as increased ability to finance it through asset recycling.

However, dwelling investment will underpin the initial growth in construction. The major problem, through last decade, was a significant fall in residential building — the result of over-aggressive infrastructure charges imposed by the government at the beginning of the decade to claw back revenue from developers and landowners. Residential building has a strong multiplier through the economy.

The housing market has picked up already with the start of what will become a strong surge in residential building. Last decade's under-building led to a significant deficiency of residential stock, underpinning the current upswing and pushing overall construction higher. Non-residential building will also be strong the next few years.

NSW construction wages will follow the recovery in dwelling construction and the improvement in total construction. Construction wages (in WPI terms) is expected to average 3.8 per cent per annum over the next seven years.

Chart 5.1: Total Construction – Australian Capital Territory
Value of Work Done, Constant 2011/12 Prices

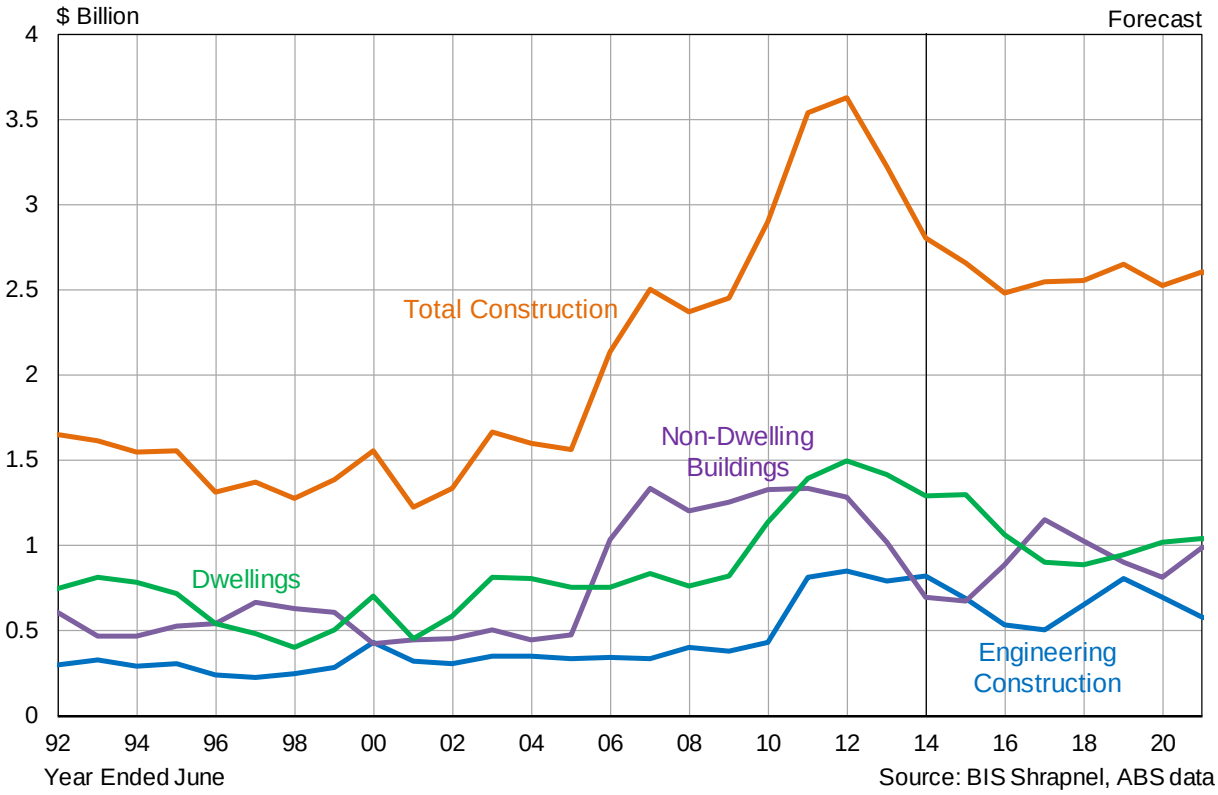


Chart 5.2: Total Construction – New South Wales
Value of Work Done, Constant 2011/12 Prices

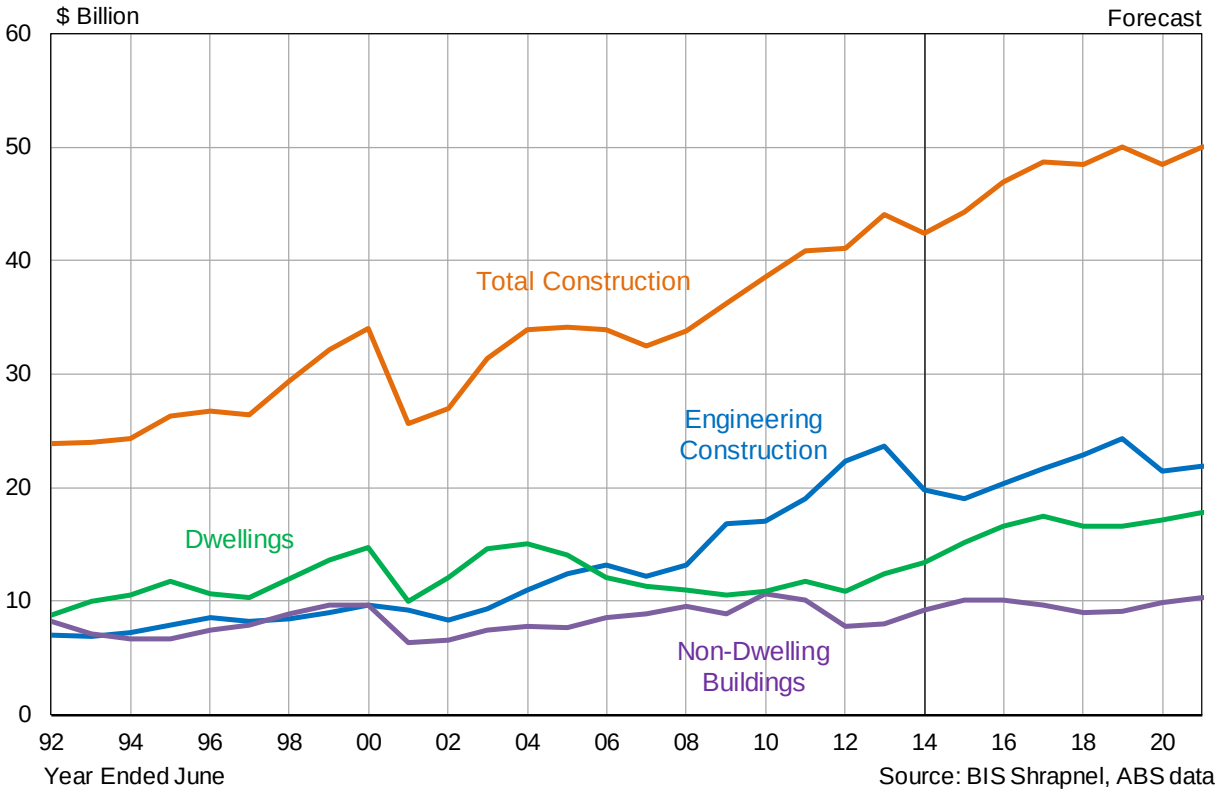


Table 5.1: Construction Wages Growth – Australian Capital Territory, New South Wales and Australia, Year Average Growth

	New South Wales - Nominal				Australian Capital Territory - Nominal				Australia- Nominal			
Year Ended June	AWOTE (1)		WPI (2)		AWOTE (1)		WPI (2)		AWOTE (1)		WPI (2)	
	$	A% CH	Index	A% CH	$	A% CH	Index	A% CH	$	A% CH	Index	A% CH
2000	781.3		71.2		740.7	1.8			722.1	4.8	68.5	3.8
2001	771.1	-1.3	74.7	5.0	788.5	4.4			730.5	1.2	71.3	4.1
2002	835.9	8.4	76.9	2.9	805.1	0.8			769.6	5.3	73.6	3.3
2003	922.4	10.3	79.3	3.1	859.3	7.6			832.3	8.2	76.1	3.3
2004	941.7	2.1	81.9	3.3	774.8	-6.8			875.2	5.1	78.9	3.7
2005	988.6	5.0	85.3	4.2	810.7	0.1			924.6	5.7	83.0	5.2
2006	964.9	-2.4	88.8	4.1	1,121.4	40.4			941.8	1.9	87.0	4.9
2007	1,000.4	3.7	92.9	4.6	1,027.9	-3.8			987.8	4.9	91.3	4.9
2008	1,120.6	12.0	96.8	4.3	1,248.5	10.3			1,078.2	9.2	95.6	4.7
2009	1,185.3	5.8	100.0	3.3	1,184.5	1.6	100.0		1,162.0	7.8	100.0	4.7
2010	1,209.9	2.1	102.5	3.9	1,342.8	0.8	103.7	3.7	1,250.9	7.7	103.3	3.3
2011	1,154.2	-4.6	106.7	4.1	1,448.9	7.9	107.7	3.9	1,313.7	5.0	107.4	4.0
2012	1,204.2	4.3	110.2	3.2	1,546.0	6.7	112.0	4.0	1,359.8	3.5	111.7	4.1
2013	1,258.4	4.5	113.8	3.3	1,606.0	3.9	116.6	4.1	1,418.1	4.3	115.5	3.3
2014	1,287.6	2.3	117.2	2.9	1,636.9	1.9	120.9	3.7	1,448.2	2.1	118.9	3.0
Forecast												
2015	1,331.3	3.4	120.8	3.2	1,685.9	3.0	124.7	3.2	1,494.5	3.2	122.3	2.9
2016	1,382.9	3.9	125.2	3.6	1,742.8	3.4	128.8	3.3	1,549.4	3.7	126.4	3.4
2017	1,444.5	4.5	130.1	3.9	1,804.8	3.6	133.6	3.7	1,615.3	4.3	131.3	3.8
2018	1,509.3	4.5	135.6	4.2	1,873.1	3.8	138.7	3.8	1,681.3	4.1	136.3	3.8
2019	1,574.2	4.3	141.1	4.1	1,949.9	4.1	143.9	3.7	1,757.0	4.5	141.7	4.0
2020	1,648.4	4.7	147.2	4.3	2,026.2	3.9	149.6	4.0	1,846.8	5.1	147.8	4.3
2021	1,728.4	4.9	153.6	4.4	2,116.4	4.5	155.8	4.2	1,945.6	5.4	154.3	4.4
Long Term Averages												
2000-2010	4.5		3.7		6.1				5.6		4.2	
2009-2014	1.7		3.2		6.7				4.5		3.5	
2014-2021	4.3		3.9		3.7		3.7		4.3		3.8	
2016-2021	4.6		4.2		4.0		3.9		4.7		4.1	

(1) Earnings of persons. Data is year ended May. Source: BIS Shrapnel, ABS

(2) Ordinary time hours excluding bonuses.

6. GAS NETWORK RELATED MATERIALS

Table 6.1: Gas Network Related Materials Summary

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	5 yr Avg (h)
	Actuals				Forecasts		Next Regulatory Period					
Nominal Price Changes												
1. Steel - Asia (a)		-3.8	-9.6	3.4	4.1	11.8	1.2	6.2	6.2	-8.6	-1.4	0.7
2. Aluminium (a)		-7.0	-12.0	6.7	15.3	19.2	4.4	7.6	6.2	-8.5	-2.3	1.5
3. Brass (a)				9.5	12.1	15.3	3.0	5.4	4.5	-9.5	-3.5	0.0
4. Copper (a)		-1.8	-8.4	3.9	5.5	12.2	3.1	6.1	4.4	-9.9	-3.4	0.1
5. Zinc (a)		-8.6	-6.2	17.9	22.0	19.8	2.8	4.3	4.7	-8.9	-3.5	-0.1
6. Plastics Prices												
a) Nylon-11 (b)	-0.7	2.5	2.7	14.4	-7.0	2.8	3.9	6.7	5.6	-5.1	-1.0	2.0
b) HDPE (Polyethylene) (c)	-0.7	2.5	2.7	14.4	-7.0	2.8	3.9	6.7	5.6	-5.1	-1.0	2.0
7. Concrete (d)	5.9	6.2	4.2	1.7	2.5	4.5	5.1	1.8	0.5	1.2	3.0	2.3
8. Gas and Fuel Construction Price Index (e)	-8.3	-1.2	1.1	3.6	3.2	1.8	0.2	3.0	3.3	3.4	3.7	2.7
9. General Materials Prices (f)	3.1	2.3	2.3	2.7	2.0	2.6	2.5	2.5	2.5	2.5	2.5	2.5
Consumer Price Index (g)	**3.1**	**2.3**	**2.3**	**2.7**	**2.0**	**2.6**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Real Price Changes (i)												
1. Steel - Asia (a)		**-6.1**	**-11.8**	**0.7**	**2.1**	**9.2**	**-1.3**	**3.7**	**3.7**	**-11.1**	**-3.9**	**-1.8**
2. Aluminium (a)		**-9.3**	**-14.3**	**4.0**	**13.3**	**16.6**	**1.9**	**5.1**	**3.7**	**-11.0**	**-4.8**	**-1.0**
3. Brass (a)				**6.8**	**10.1**	**12.7**	**0.5**	**2.9**	**2.0**	**-12.0**	**-6.0**	**-2.5**
4. Copper (a)		**-4.1**	**-10.6**	**1.2**	**3.5**	**9.6**	**0.6**	**3.6**	**1.9**	**-12.4**	**-5.9**	**-2.4**
5. Zinc (a)		**-10.9**	**-8.5**	**15.2**	**20.0**	**17.2**	**0.3**	**1.8**	**2.2**	**-11.4**	**-6.0**	**-2.6**
6. Plastics Prices												
a) Nylon-11 (b)	**-3.8**	**0.2**	**0.4**	**11.7**	**-9.0**	**0.2**	**1.4**	**4.2**	**3.1**	**-7.6**	**-3.5**	**-0.5**
b) HDPE (Polyethylene) (c)	**-3.8**	**0.2**	**0.4**	**11.7**	**-9.0**	**0.2**	**1.4**	**4.2**	**3.1**	**-7.6**	**-3.5**	**-0.5**
7. Concrete (d)	**2.8**	**3.9**	**1.9**	**-1.1**	**0.5**	**1.9**	**2.6**	**-0.7**	**-2.0**	**-1.3**	**0.5**	**-0.2**
8. Gas and Fuel Construction Price Index (e)	**-11.4**	**-3.5**	**-1.2**	**0.9**	**1.2**	**-0.8**	**-2.3**	**0.5**	**0.8**	**0.9**	**1.2**	**0.2**
9. General materials Prices (f)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Source: BIS Shrapnel

(a) Price growth from Consensus Economics, converted to Australian dollars
(b) Castor Oil is the key raw material of Nylon-11. Because we do not have any historical data on Castor Oil, we have approximated Nylon-11 by using HDPE growth rates.
(c) HDPE (Polyethylene) prices are proxied using an established relationship with WTI crude oil.
(d) Concrete price growth in Australian dollars. Forecasts from BIS Shrapnel modelling.
(e) Gas and Fuel Construction Price Index forecasts from BIS Shrapnel modelling.
(f) General Materials are proxied using CPI forecasts.
(g) Headline CPI forecasts based on Reserve Bank of Australia forecasts to December 2016 quarter and then Commonwealth Treasury medium term projections.
(h) Average Annual Growth Rate for 2016/17 to 2020/21 inclusive ie for next regulatory period.
(i) Real price changes are calculated by deducting the inflation rate from nominal price changes.

Prices of all gas network related materials (in nominal terms) are forecast to increase on average over the five year period to 2020/21. However, after adjusting for the expected impacts of inflation (ie in real terms) most gas network-related material prices turn negative. This is predominantly driven by the exchange rate appreciation in 2019/20 and to a lesser extent in 2020/21. Zinc is expected to achieve the largest real price fall over AAD's next regulatory period, at an average of 2.6 per cent per annum followed by brass (2.5%), copper (2.4%), steel (1.8%), aluminium (1%) and polyethylene pipe prices (0.5%). On the other hand, gas and fuel IPD (implicit price deflator) is forecast to decline by 0.2% per annum on average. Given the variety of supply and demand drivers affecting prices of these commodities, each will be discussed in detail in the following section.

As well as individual supply and demand drivers, consumers of these commodities in Australia are also affected by movements in the exchange rate. Specifically, movements in the Australian dollar (A$) against the US dollar (US$) can have significant effects on the domestic price of minerals and metals. At the time of writing, the A$ had fallen 20.5 per cent since April 2013. This drove Australian-denominated commodity prices higher through 2013/14 and in 2014/15.

The reversal of this trend is a key component of the forecast price declines through 2020/21. The A$ is expected to appreciate by nearly 10 per cent over 2019/20 and a further 3.8 per cent in 2020/21, directly flowing through to lower commodity prices for Australian consumers.

The remainder of this section identifies and explains the key drivers of prices for each material, and their resultant forecasts.

6.1 Steel

Steel price forecasts are derived from the Consensus Economics Energy & Metals Consensus Forecasts publication. This publication provides steel price forecasts for Hot Rolled Coil in the Asia market, measured in US$ per metric tonne. This methodology (as described in Appendix C)

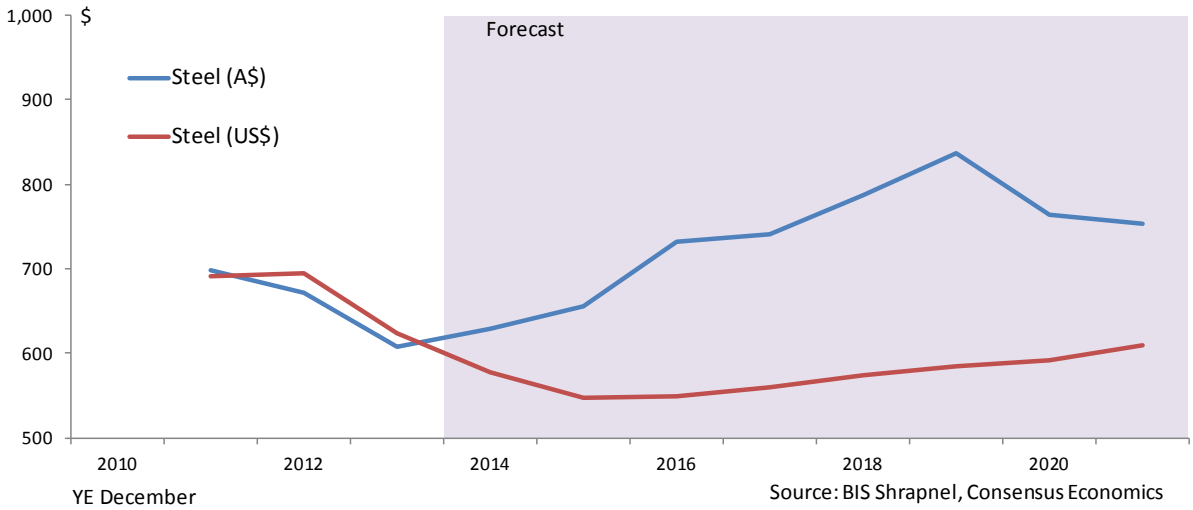
has previously been accepted by the AER.[1] However, this previous methodology used the average of Consensus steel forecasts for the USA and Europe markets. BIS Shrapnel believe the Asia market is more appropriate in this situation. This is based on ABS data on the source of steel imports to Australia. As shown in table 6.2, the majority of source-identified steel imports to Australia are from the Asia region, rather than Europe or the USA. As a result, we believe the Asia market price more accurately reflects the prices faced by Australian steel consumers.

Table 6.2: Australia Steel and Iron Imports, 2013/14

Source Country	2013/14 (Tonnes)[1]
China	202,026
Taiwan	141,103
New Zealand	138,027
Singapore	100,968
Japan	79,582
South Korea	56,944
Malaysia	44,752
United Kingdom	33,217
Sweden	28,287
South Africa	21,388
1) Some data are not identified due to confidentiality.	Source: ABS data, BIS Shrapnel

Steel prices fell over the two years to 2012/13, due to the unsustainable peaks in prices reached prior to the GFC, combined with the strength of the Australian dollar. Steel prices are now forecast to rise over much of the forecast period, although there are significant differences between the outlook for global steel prices in US$, and A$ terms. These differences (for the Asia market) are shown in chart 6.1.

Chart 6.1: Steel Price



Prices in US$ are expected to continue to fall over 2014/15, driven by the recent collapse in iron ore prices. The price of iron ore fell significantly through 2014, and currently sits around just US$63 per tonne. Strong supply growth from Australia and Brazil underpin a weak price

[1] AER, *Final Decision, Distribution Determination 2009/10 to 2013/14*, April 2009, p. 480.

forecast despite rising steel demand, resulting in an outlook of prices remaining well below US$100 per tonne over the next decade. However, the fall in steel prices is expected to cease by 2014/15, as the iron ore price begins a slow recovery, and coking coal prices remain solid as demand is likely to remain constrained. As a result, steel prices are forecast to rise slowly over 2016 to 2021.

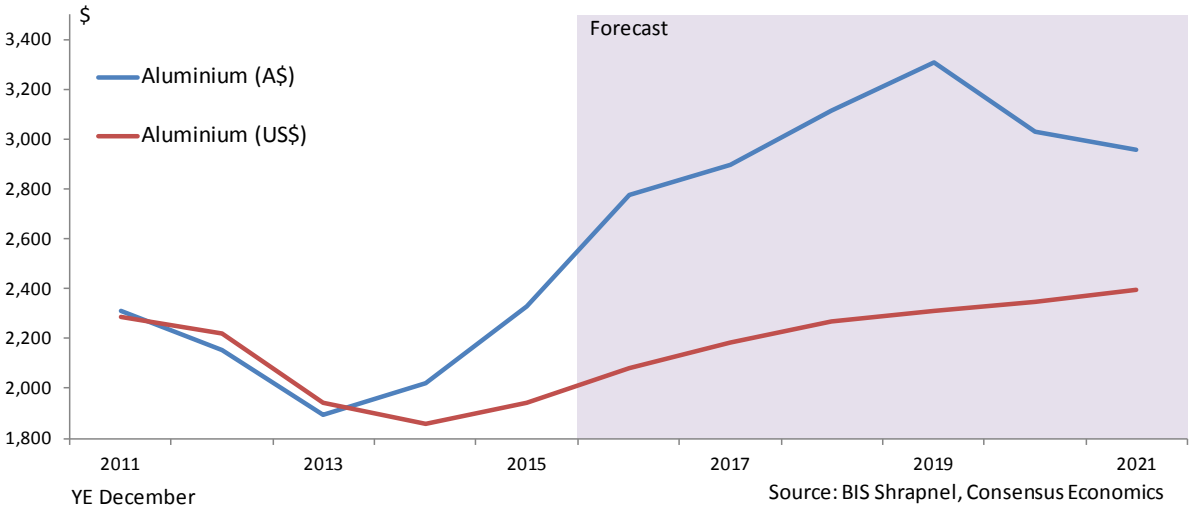
On the other hand, the price faced by AAD in Australian dollar terms will be significantly affected by exchange rate movements. Declines in the Australian dollar so far in 2014/15 are expected to see the dollar end the year down around 9 per cent, which will result in steel prices actually rising in Australian dollar terms in 2014/15. Ongoing depreciation of the Australian dollar over the subsequent four years will see solid growth in steel prices through to a peak in 2018/19. Thereafter, an appreciation of the dollar back above US 80 cents will outweigh continued growth in US$ steel prices, and ensure the price paid by Australian consumers' declines over 2019/20 and 2020/21.

Overall, we expect Asia steel prices to rise by an average of 0.7 per cent per annum over the five years to 2019/21. However, this translates into a decline of 1.8 per cent per annum in real terms, ie after allowing for inflation.

6.2 Aluminium Prices

Similar to steel, aluminium prices fell over the two years to 2012/13, due to a combination of unwinding record high US$ prices, as well as the strength of the A$. However, we believe the trough in prices has now been reached, meaning prices will continue to climb from here.

Chart 6.2: Aluminium Price



Solid growth is expected in A$ prices over the next five years, rising a cumulative 47 per cent. Over the near term, the primary driver of this will be the significant depreciation of the A$ over the current financial year. This is expected to see A$ aluminium prices rise by 15.3 per cent (in nominal terms) compared to an increase of just 4.7 per cent in US$ terms.

Beyond here, A$ prices will continue to rise, due to both a weaker A$, and rising US$ prices. A rising middle class in China, and an accelerating US consumer economy should lift international consumption. Further, the rising cost of electricity, as the major input to production, will place upward pressure on aluminium operating costs over the medium term. Higher operating costs will discourage additions to smelting capacity and will act to keep a floor on prices. This will contribute to a slowing in the rate of growth in production over the longer term, and ensure prices remain around historically strong levels.

Overall, aluminium prices (in real terms) are forecast to fall at an average of 1 per cent per year over the 2016/17 to 2020/21 period.

6.3 Brass Prices

It is our understanding that brass is produced from two key inputs – copper and zinc. To derive a cost escalator for brass, we forecast these two components individually. We then weight these forecasts according to research that suggests that brass, although consisting of several types with different weightings, generally uses 60 per cent copper, and 40 per cent zinc in its manufacture.

As shown in table 6.3, brass prices are expected to decline at an average of 0.2 per cent per annum over the five years 2020/21 CAGR (compound annual growth rate). This is primarily due to falls in the zinc price towards the end of the forecast horizon. The outlook for each component is explained in detail below.

Table 6.3: Brass and Component Prices

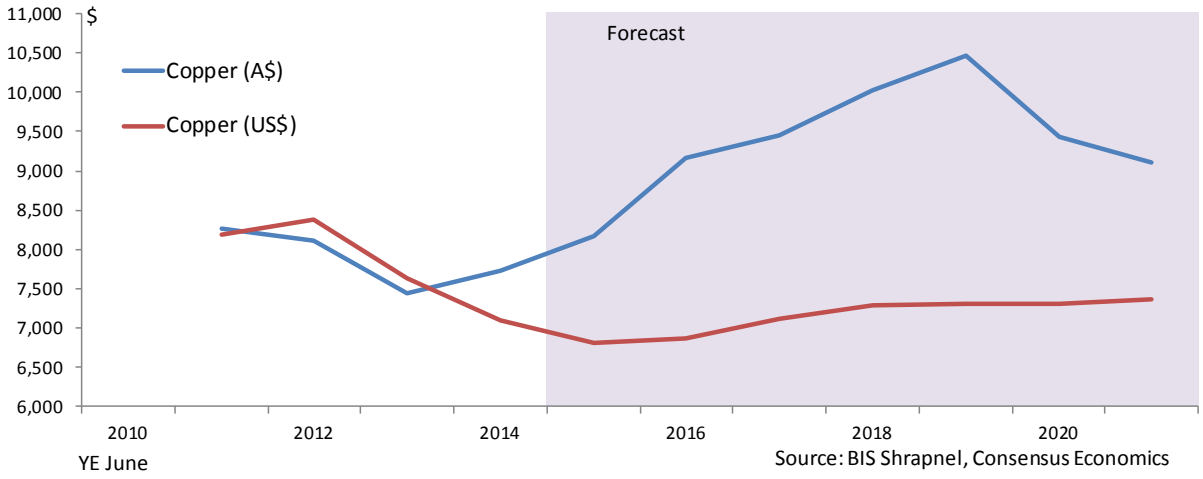
Year Ended June	A$ Copper	A%Ch	A$ Zinc	A%Ch	Brass Index Brass	A%Ch
2010						
2011	8268.9		2197.4			
2012	8118.3	-1.8	2008.4	-8.6		
2013	7439.4	-8.4	1883.0	-6.2	100.0	
2014	7732.7	3.9	2219.4	17.9	109.5	9.5
Forecast						
2015	8161.7	5.5	2707.4	22.0	122.8	12.1
2016	9158.8	12.2	3243.6	19.8	141.5	15.3
2017	9445.6	3.1	3334.9	2.8	145.8	3.0
2018	10017.9	6.1	3478.5	4.3	153.6	5.4
2019	10454.5	4.4	3642.1	4.7	160.5	4.5
2020	9424.7	-9.9	3319.6	-8.9	145.3	-9.5
2021	9102.3	-3.4	3202.6	-3.5	140.3	-3.5
Period Averages and Compound Annual Average Growth Rates						
2017-2021	9689.0	-0.1	3395.5	-0.3	149.1	-0.2

Source: Consensus Economics and BIS Shrapnel

6.3.1 Copper

Weak world demand alongside new production capacity saw world copper stocks continue to edge upward through 2013/14, resulting in prices in US$ terms fall for the second year in a row. However, the falling Australian dollar offset this, and caused prices in A$ terms to rise.

Chart 6.3: Copper Price



Over the next few years, we expect copper supply will continue to outstrip demand, lifting copper stocks and apply downward pressure on prices. On the demand side, the outlook for Chinese growth is critical due its dominant (43 per cent) world copper consumption share, followed by key advanced economies (US, Germany, Japan and South Korea) and emerging economies (Brazil, India and Mexico). Chinese growth, while slowing is expected to remain solid at around 6.5 per cent for the next five years. This will still support relatively robust world copper consumption growth.

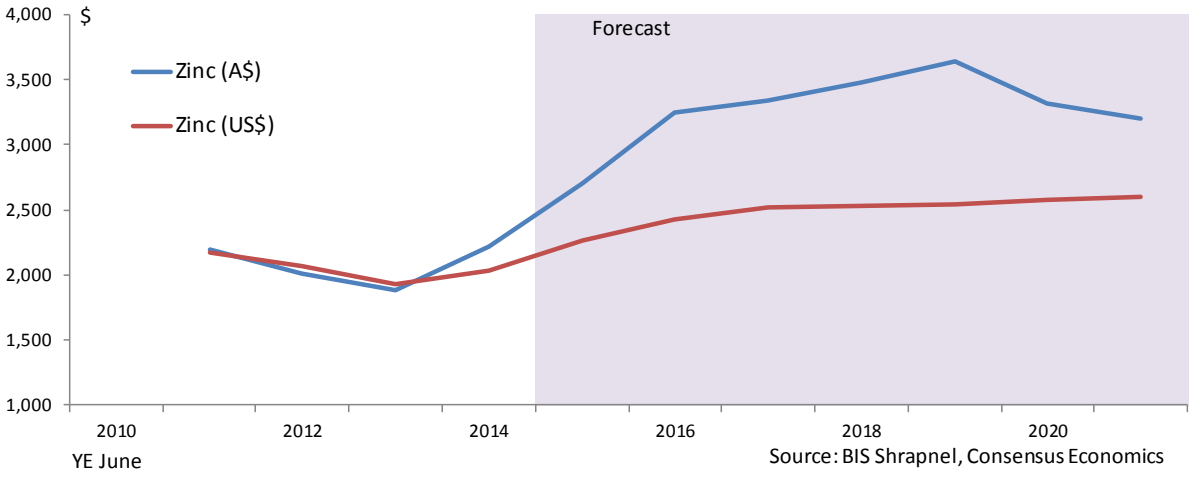
However, on the supply side, new world production coming on-stream (sourced from Indonesia, Peru and Mongolia) will substantially outpace expected demand growth, seeing copper stocks rise and apply downward pressure on prices. Therefore, copper prices are expected to gradually fall to below US$7,000/t over the next two years, before marginally recovering through reduced supply (mothballing more marginal copper operations) and increased world demand by 2016/17.

The A$ is expected to depreciate further over the next few years, ensuring that copper prices in A$ terms continue to rise, despite initial declines in US$ terms. A$ prices are forecast to rise a cumulative 31.3 per cent over the next five years, before easing back as the A$ climbs back above US 80 cents.

6.3.2 Zinc

Zinc prices fell over the two years to 2012/13 (in US$ terms) due to weak demand and subsequently rising stock levels. However, strengthening global demand caused prices to recover in 2013/14.

Chart 6.4: Zinc Price



Over the near term, strengthening global demand and a reduction of stock levels will begin to underwrite more solid zinc prices. The recent closure or mothball of production facilities (in response to successive years of lower prices) will likely see supply growth outpaced by demand growth, which will apply upward pressure to prices. As a result, prices are expected to increase in US$ terms over the entire outlook period, well and truly offsetting the recent weakness.

The story is similar, and even exacerbated in A$ terms. Successive years of double digit growth rates will see A$ zinc prices climb a cumulative 53.6 per cent over the next five years.

6.4 Plastics Prices

6.4.1 Nylon-11

Given the absence of historical series of Nylon-11, we are unable to provide forecasts. We have proxied price growth of Nylon-11 by growth in Polyethylene pipes, as described in section 6.4.2.

6.4.2 HDPE (Polyethylene)

Because polyethylene accounts for the majority of price movements in polyethylene pipe, the price movements of crude oil (and therefore polyethylene) is the key driver of polyethylene pipe prices over the outlook period.

Table 6.4: Polyethylene Pipe Prices

	Key Determinants of Polyethylene Pipe Prices												
Year Ended	Crude Oil (a)		Thermoplastic PPI US$		Exchange Rate		Thermoplastic PPI A$		Labour Costs - Manufacturing		Transport & Other Overhead Costs		Growth in Polyethylene Pipe
June	WTI $US/bbl (e)	%CH	Index	%CH	US$/A$	%CH	Index	%CH	($)	%CH	CPI	%CH	%CH
2004	34.9	8.5	63.2	5.3	0.714	22.0	88.5	-13.7	892.2	4.3	79.9	2.4	-9.4
2005	51.4	47.2	77.5	22.7	0.745	4.4	103.9	17.5	920.0	3.1	81.8	2.4	13.8
2006	67.9	32.0	84.3	8.9	0.747	0.3	112.9	8.6	960.3	4.4	84.4	3.2	7.4
2007	67.0	-1.3	82.1	-2.7	0.786	5.2	104.4	-7.5	1005.8	4.7	86.9	3.0	-4.6
2008	102.7	53.3	87.7	6.8	0.897	14.1	97.8	-6.3	1048.2	4.2	89.8	3.4	-3.8
2009	73.8	-28.2	84.6	-3.5	0.746	-16.9	113.5	16.1	1103.9	5.3	92.6	3.1	13.2
2010	79.0	7.1	85.1	0.6	0.883	18.4	96.4	-15.1	1123.7	1.8	94.8	2.3	-10.8
2011	94.1	19.1	93.6	9.9	0.989	12.0	94.6	-1.9	1155.1	2.8	97.7	3.1	-0.7
2012	100.0	6.3	100.1	7.0	1.032	4.3	97.0	2.5	1181.7	2.3	100.0	2.3	2.5
2013	97.3	-2.7	102.1	2.0	1.027	-0.5	99.4	2.5	1227.6	3.9	102.3	2.3	2.7
2014	107.1	10.0	107.6	2.8	0.919	-10.5	117.1	17.8	1287.1	4.8	105.0	2.7	14.4
Forecast													
2015	81.2	-24.1	87.8	-18.4	0.835	-9.1	105.2	-10.2	1321.0	2.6	107.1	2.0	-7.0
2016	72.7	-10.4	80.9	-7.9	0.749	-10.2	107.9	2.6	1371.1	3.8	109.9	2.6	2.8
2017	77.3	6.3	84.7	4.8	0.754	0.6	112.4	4.1	1426.1	4.0	112.7	2.5	3.9
2018	81.5	5.4	88.2	4.1	0.728	-3.5	121.2	7.9	1477.6	3.6	115.5	2.5	6.7
2019	83.8	2.8	90.1	2.2	0.699	-4.0	129.0	6.4	1533.7	3.8	118.4	2.5	5.6
2020	86.2	2.9	92.1	2.2	0.775	11.0	118.8	-7.9	1596.6	4.1	121.3	2.5	-5.1
2021	89.3	3.6	94.6	2.8	0.810	4.5	116.8	-1.7	1596.6	0.0	124.4	2.5	-1.0
							Compound Annual Growth Rates						
1999-04	18.1		5.1		2.6		2.4		5.1		3.3		3.6
2004-09	16.1		6.0		0.9		5.1		4.4		3.0		5.2
2009-14	7.7		4.9		4.3		0.6		3.1		2.5		1.6
Forecasts													
2014-21	-2.6		-1.8		-1.8		0.0		3.1		2.4		0.8

(a) Crude oil forecasts are from Consensus Economics
(b) Exchange rates are forecast using BIS Shrapnel's internal methodology
(c) The historical data and forecasts were generated from BIS Shrapnel's input cost model for polyethylene pipe prices.

Source: BIS Shrapnel

The oil price has been in free fall over recent months, slipping below US$50 per barrel. This has been driven by significant volumes coming on stream from the US, as the shale gas industry picks up. At the same time, the OPEC countries are steadfastly refusing to cut production as they do not want to lose market share. This has essentially sparked a price war, and sent prices plummeting. This is expected to drive down the price of thermoplastic resin over the near term.

Beyond the near term, oil prices are expected to recover to around US$70 to US$80 per barrel over the rest of the forecast period. The currently low prices are not expected to persist over the long term as the more marginal producers will eventually shut down production. Improving economic recoveries will also see demand improve, and underpin a return to more sustainable prices. However, the market is still expected to be dominated by strong levels of supply, which will essentially place a ceiling on price growth.

Some of the impact of lower oil prices over the near term will be offset by the weakening A$. However, the lower oil price is expected to be the dominant factor, and will drive thermoplastic prices lower this year. The subsequent four years will see a combination of gradually rising crude oil prices, and a further weakening in the A$. The net result will be sharp increases in thermoplastic prices. Overall, the price of thermoplastic resin is expected to be flat over the forecast period.

Further, rising prices of transport and other overhead costs (CPI, averaging 2.4 per cent) and manufacturing wages (averaging 3.7 per cent) will add to polyethylene pipe prices. The net result is that polyethylene pipe prices are forecast to increase by 0.8 per cent per annum over the seven years to 2020/21.

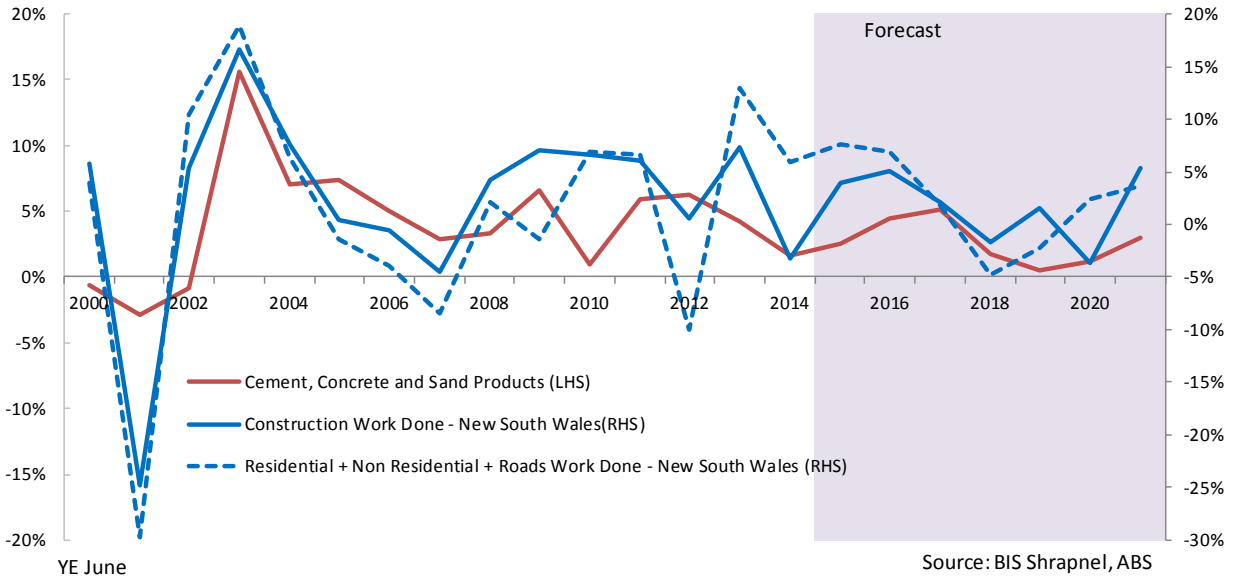
6.5 Concrete Prices

Sydney region Concrete, Cement and Sand prices lifted strongly in the early 2000s, on the back of a strong upswing in construction activity. Price growth eventually slowed by 2006/07 as construction activity retreated, but prices remained in the positive territory. Thereafter, price growth hovered around 4 per cent, on average, in the years leading up to 2012/13, as construction activity remained at high levels but with supply adjusting to demand. Price growth eased to a five-year low of just 1.7 per cent in 2013/14, due to a gap in major projects in the region.

This is not expected to remain the case. The Sydney construction industry is entering a period of considerable strength, which will drive solid increases in concrete prices. Price growth is forecast to peak at 5.1 per cent in 2016/17, after several years of strong construction activity across the vital roads and residential sectors.

As demand from the construction sector tapers off through the latter part of the decade, concrete, cement and sand prices are forecast to follow suit, with growth slipping to an average of just 1.2 per cent over the three years to 2019/20. Overall, concrete prices are forecast to rise by an average of 2.3 per cent per annum over AAD's next regulatory period.

Chart 6.5: Concrete, Cement and Sand Prices vs Construction Activity



6.6 Gas and Fuel Construction Price Index

Table 6.5: Gas and Fuels Forecasts

As at	Construction Wages (WPI)		Manufacturing Wages (WPI)		Steel Pipe and Tube (PPI)		Other Fabricated Metal Products		Plant & Equipment Hire (PPI)		Re-Constructed Index (BIS)		Gas & Fuels IPD (ABS)	
June	Index	a%ch	Index	a%ch	Index	a%ch	Index	a%ch	Index	a%ch	Index	a%ch	Index	a%ch
2004	78.9	3.7	82.7	3.2	93.2	4.5	78.0	1.9	84.5	4.5	85.9	3.8	108.7	2.5
2005	83.0	5.2	85.8	3.8	108.6	16.6	81.2	4.1	86.9	2.9	94.0	9.4	117.1	7.7
2006	87.0	4.9	89.2	4.0	112.0	3.1	84.4	4.0	88.0	1.2	97.1	3.3	120.6	3.0
2007	91.3	4.9	92.5	3.7	143.8	28.4	88.3	4.6	90.4	2.7	111.9	15.2	138.2	14.6
2008	95.6	4.7	96.6	4.5	151.2	5.2	91.1	3.2	93.4	3.3	117.0	4.6	144.3	4.5
2009	100.0	4.7	100.0	3.5	150.9	-0.2	102.1	12.0	93.5	0.1	119.7	2.3	149.6	3.6
2010	103.3	3.3	102.4	2.3	132.7	-12.1	101.0	-1.1	94.6	1.2	113.2	-5.4	144.6	-3.4
2011	107.4	4.0	106.2	3.7	104.6	-21.2	100.0	-1.0	98.7	4.3	103.7	-8.5	132.6	-8.3
2012	111.7	4.1	110.2	3.8	100.0	-4.4	100.0	0.0	100.0	1.3	103.3	-0.4	131.0	-1.2
2013	115.5	3.3	113.7	3.2	96.1	-3.9	98.7	-1.3	98.0	-2.0	102.3	-1.0	132.4	1.1
2014	118.9	3.0	117.0	2.9	98.5	2.6	99.0	0.3	96.7	-1.3	104.1	1.8	137.1	3.6
Forecast														
2015	122.3	2.9	120.9	3.3	103.0	4.5	100.7	1.8	95.2	-1.5	107.1	2.8	141.5	3.2
2016	126.4	3.4	125.2	3.6	105.5	2.5	103.0	2.3	93.7	-1.6	108.2	1.1	144.1	1.8
2017	131.3	3.8	129.9	3.7	101.3	-4.0	103.0	0.0	92.0	-1.8	108.3	0.1	144.4	0.2
2018	136.3	3.8	134.6	3.6	105.4	4.0	104.6	1.5	91.6	-0.5	111.5	3.0	148.7	3.0
2019	141.7	4.0	139.3	3.5	109.3	3.5	107.2	2.5	92.0	0.5	115.0	3.2	153.6	3.3
2020	147.8	4.3	144.5	3.8	112.9	3.3	110.4	3.0	93.7	1.8	118.8	3.3	158.8	3.4
2021	153.8	4.1	150.2	3.9	117.4	4.3	114.3	3.5	95.5	1.9	123.2	3.7	164.7	3.7

WPI - Wage Price Index
PPI - Producer Price Index
BIS - BIS Shrapnel
ABS - Australian Bureau of Statistics

Source: ABS Data, BIS Shrapnel

Construction wages to soften from recent levels in line with construction activity

Our research has shown that construction activity (ie work done) normally has a strong influence on construction wages. In addition, wages growth reflects 'spare' supply (latent capacity) among the different construction-related skills types.

Booming construction activity since the 2000/01 economic downturn has been a key driver of construction employment and construction wages. In particular, construction sector WPI wages grew at an average rate of 4.1 per cent per annum over 2004–2014, well above the all industry measure at 3.6 per cent per annum.

Over the next six years, construction sector wages are tipped to enter a phase of weaker growth, averaging 3.7 per cent per annum, although this is still above the all industry measure.

Our projections are based on spare capacity developing across the industry as national construction activity declines, specifically engineering construction activity, where workers traditionally earn higher salaries than their non-residential building counterparts. However, wages are expected to recover to around the 4 per cent mark by 2018/19, underpinned by a return to stronger levels of construction activity, with most segments of the industry expected to lift during this period.

Manufacturing wages to remain sluggish as the sector contracts

The manufacturing sector has suffered in recent years from Australia's high cost base (relative to competing countries) and the record strength of the A$. Weakness in the industry has culminated in the closure of manufacturing plants and businesses, and has resulted in wage growth below the all industry measure.

This sluggish growth is likely to continue over the outlook period, with average growth in manufacturing wages of 3.6 per cent. The recent announcements of several significant closures, particularly in the automobile industry, will create excess capacity in the labour market as workers search for new opportunities, and are willing to accept lower pay increases. Wages growth will increase mildly by the end of the forecast period, to a peak of 3.9 per cent. We cannot see any growth past this level due to what is likely to be the ongoing trend decline of the Australian manufacturing industry.

Steel pipes and tubes prices to begin a recovery after recent declines

Steel pipes and tubing form the largest component of the gas and fuel IPD and can be attributed to 40 per cent of the indices movement. The series is predominantly driven by international steel prices (in A$ terms), and also includes the cost of manufacturing the pipe and tube products. Steel pipes and tubes prices showed phenomenal growth over the years to 2007/08, but have since fallen back by nearly 40 per cent.

However, the run of price declines is now thought to be at an end. The weaker A$ is likely to see steel prices increase steadily over the medium term, and this will be transferred to the cost of producing steel pipes and tubes.

Other fabricated metal products will steadily rise

The gas and fuel IPD also includes non-ferrous piping, which we assume mainly includes copper pipes. Copper prices are expected to increase over the next four years, as discussed in section 6.3. This will lead the non-ferrous pipe component of the gas and fuel IPD to increase through the forecast period.

Plant and equipment hire to help slow growth in overall gas and fuel costs

Plant hire and equipment hire rates move closely in line with construction activity. When activity is booming, leasing companies have greater ability to increase their margins, and vice versa. The weak outlook for nationwide construction activity, as discussed above, will see equipment utilisation rates fall from their current record levels, and leasing companies will be forced to lower their prices and margins in order to attract custom. As a result, we anticipate plant and equipment hire rates falling over the next four years, before a mild recovery over the final two years of the outlook period. This particularly weak outlook means that plant and equipment hire rates will be the weakest component of the gas and fuel engineering IPD over the coming years.

Overall, gas and fuel engineering construction costs are expected to experience moderate growth over the next 6 years, averaging 2.5 per cent per annum. Growth will peak over the near term at 3.2 per cent in 2014/15, driven by rising A$ steel prices, and the flow-through effect to steel pipes and tubes manufacturing. Price growth will then slow until later in the outlook period, when the construction sector begins the next upswing, and drives demand and price growth of key components such as construction wages and plant and equipment hire rates.

6.7 General Materials Prices

The general materials include a range of items used in most businesses and organisations, such as stationary, office furniture, electricity, water, fuel, rent, etc. Across the range of items, the average price increase would be similar to consumer price inflation. Accordingly, the appropriate cost escalator for general materials will be the Consumer Price Index (CPI).

6.8 Conversion to Real Prices

All price forecasts are conducted in nominal terms. These are converted to real prices (ie inflation adjusted prices) using the 'official' inflation forecasts, as described in section 3.

APPENDIX A: 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 per cent — since the 1980s or basically since the equal pay legislation was enacted through the 1970s.

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

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

For this reason, BIS Shrapnel prefers using AWOTE as the measure that best reflects the increase in wage cost changes (or unit labour costs ie net of productivity increases) 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 3.1 and 3.2):

- 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 (ie dollar value) increases, rather than as a proportional increase. At the all industries level, 8.1 per cent 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 per cent of workers have their pay set by this method.

- Collective agreements negotiated under enterprise bargaining account for 41.9 per cent of all employees, but 67.7 per cent of electricity, gas, water and waste services employees' wage increases are determined by this method.

- The remaining 50 per cent 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 per cent.

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

- 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 per cent 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 per cent in the March quarter and to 4.5 per cent in the June quarter). It also reflected the strong economic conditions apparent around mid-2008 (the unemployment rate was just over 4 per cent). 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 3.1, wage increases under 'individual arrangements' are calculated by deduction. Data from DEEWR (Department of Education, Employment and Workforce Relations) are used for wage increases under collective agreements.

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

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

We believe that BIS Shrapnel's institution-based or bottom-up wage model for the EGWWS sector 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 for the EGWWS or utilities sector is superior to methodology utilising purely econometric regression techniques, in particular linear regression models to forecast wages. This opinion is based on a number of factors, some of which are described below:

- 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.

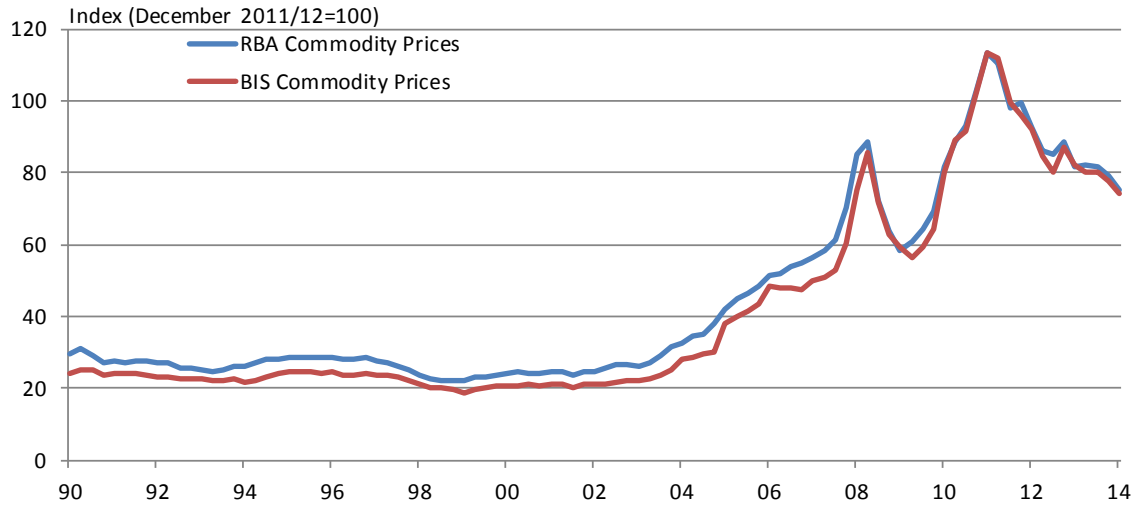
APPENDIX B: EXCHANGE RATE FORECAST METHODOLOGY

BIS Shrapnel's exchange rate forecast is a function of three key drivers:

- Commodity price forecast
- Interest rate differentials between Australia and the US
- 'VIX' volatility index

The commodity price series that we consider is an internal (ie BIS Shrapnel generated) composite commodity price index. This index is a weighted average index of metals and mineral commodity prices and agriculture commodity prices with each commodity price weighted according to the export share of the commodity. Historically, our index closely tracks the RBA's own commodity price index (see chart B.1). We consider the following metals and minerals in the composite index: LNG and LPG (using the WTI price, US$/bbl), thermal coal (average export price, US$/t), coking coal (average export price, US$/t), aluminium & alumina (London Metals Exchange price, US$/t), copper (LME price, US$/t), gold (US$/oz), iron-ore (average export price US$/t), lead (LME price, US/t), nickel (LME price, US$/t) and zinc (LME price, US$/t). The agriculture commodities included in the composite commodity index include beef (USc/kg), cotton (USc/lb), sugar (USc/lb), wheat (US$/t) and wool (AUDc/kg).

Chart B.1: BIS Shrapnel Commodity Price Index



The quarterly historical data is sourced from the ABARES (Australian Bureau of Agricultural and Resource Economics and Sciences) *Australian Agricultural Commodities* and BREE (Bureau of Resources and Energy Economics) *Resources and Energy Quarterly* and *Australian Mineral Statistics* publications, plus data from the Australian Financial Review.

The other key driver of our exchange rate forecasts is the interest rate differential between Australia and the US interest rates. Here, we take the difference between the 90 day bank bill rate in Australia and the 3-month bank accepted bill rate in the United States. Quarterly historical interest rate data is sourced from the Reserve Bank of Australia.

The final driver is the VIX volatility index. This measures volatility of the US sharemarkets, with the rationale being that a lower level of market volatility increases investor's confidence, and causes them to look outside the US when investing, lowering the US$. This variable has had considerable swings and effects on the exchange rate over time, although when forecasting we assume it returns to its long-term average level, thus reducing the effect on the exchange rate forecast.

Table B1: Exchange Rate Model - Eviews

Dependent Variable: LOG(AUD_USD)
Method: Least Squares
Date: 09/22/14 Time: 09:54
Sample: 1990Q1 2014Q2
Included observations: 98
LOG(AUD_USD)=C(1)+C(2)*_90_DAY_NOM+C(3)*LOG(COMMODITY_PRICES)+C(4)*VIX

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.185328	0.068760	-17.23861	0.0000
C(2)	0.015122	0.005288	2.859810	0.0052
C(3)	0.277553	0.018740	14.81050	0.0000
C(4)	-0.007468	0.001234	-6.053642	0.0000

R-squared	0.775247	Mean dependent var	-0.287379
Adjusted R-squared	0.768074	S.D. dependent var	0.183215
S.E. of regression	0.088234	Akaike info criterion	-1.977690
Sum squared resid	0.731811	Schwarz criterion	-1.872182
Log likelihood	100.9068	Hannan-Quinn criter.	-1.935014
F-statistic	108.0787	Durbin-Watson stat	0.230934
Prob(F-statistic)	0.000000		

All commodity forecasts are converted into Australian dollars using BIS Shrapnel's in-house methodology as described above. This is used instead of forward exchange rates from the Chicago Mercantile Exchange (CME). There are two primary reasons for this:

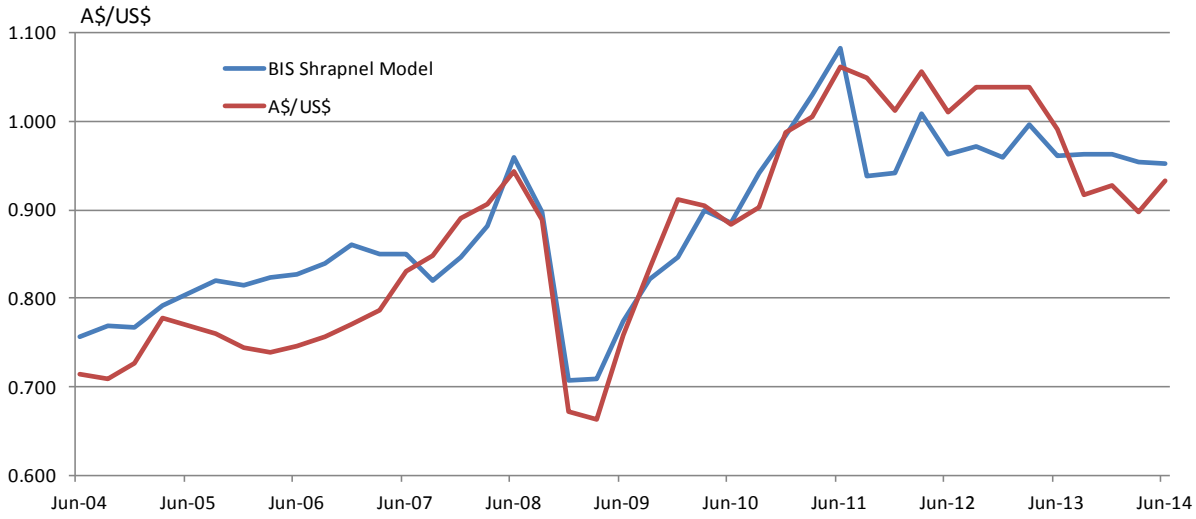
- It is difficult to track the historical accuracy of CME futures, also making it difficult to place weight on current expectations.
- BIS Shrapnel's exchange rate model is explicitly included in the report above. It is a simple model, and the resulting forecasts can be readily quantified in terms of the drivers that caused the results. We believe this makes it a more transparent and reproducible forecast than the market-driven CME futures. As shown in charts B.1 and B.2, the model has a high degree of accuracy, which provides a level of confidence for future forecasts.

Interpretation of the model

The outputs of the model can be interpreted as follows:

- A 1 point increase in the interest rate differential will increase the value of the Australian dollar by 1.5 per cent. For example, if Australian interest rates rise by 1 percentage point while US interest rates remain constant, the Australian dollar will rise by 1.5 per cent.
- A 1 per cent increase in the commodity price index will increase the value of the Australian dollar by 0.27 per cent. For example, if the commodity price index rises by 10 per cent, the value of the Australian dollar will rise by 2.7 per cent.
- A 1 point increase in the value of the VIX volatility index will decrease the value of the Australian dollar by 0.7 per cent. Note, however, that this variable is assumed to trend toward its long term historical average, and therefore has no impact on forecast values of the Australian dollar.

Chart B.2: BIS Shrapnel Exchange Rate Model



APPENDIX C: GAS NETWORK RELATED MATERIALS FORECAST METHODOLOGY

Steel, Aluminium, Copper, Zinc and Oil

Steel, Aluminium, Copper, Zinc and Oil price forecasts are derived from the Consensus Economics Energy & Metals Consensus Forecasts publication.

This publication provides price forecasts measured in US$ per metric tonne. Quarterly forecasts are provided for two financial years, followed by calendar year forecasts for the next three years. Long term forecasts are provided by a five-year average. We assume a constant growth rate beyond the final annual forecast to yield annual forecasts over the remaining five year period (i.e. for the 2020 to 2024 period).

These forecasts, which are denominated in US$, are then converted into Australian dollars. Due to the lack of authoritative forecasts over the long term, we apply BIS Shrapnel's internal exchange rate forecasts. Details of our methodology can be found in appendix B.

Brass

It is our understanding that brass is produced from two key inputs – copper and zinc. Forecasts of these commodities are described above. We then weight these forecasts according to research that suggests that brass, although consisting of several types with different weightings, generally uses 60 per cent copper, and 40 per cent zinc in its manufacture.

HDPE (Polyethylene)

To the best of our knowledge, there isn't a long term data series on polyethylene pipe prices that we can model in order to understand its key drivers. Nonetheless, from our discussion with various industry players, we understand that polyethylene is the key input into the production of polyethylene pipes. Our research suggests that the price of polyethylene pipe is driven by three components:

- Polyethylene (75 per cent)
- Manufacturing wages (15 per cent)
- Transport and other overhead costs (10 per cent)

Forecasts for each of these components are provided separately, and when combined, create price forecasts for polyethylene pipe. Transport and other overhead costs are assumed to be in line with by CPI growth, while manufacturing wages are modelling using our in-house methodology.

Because there is not even a historical series of polyethylene prices, we used a Producer Price Index (PPI) published by the US Bureau of Labor Statistics for Thermoplastic Resins and Plastic Materials. As polyethylene is one of the thermoplastic resins, we believe the producer prices for thermoplastic resins and plastic materials are a good proxy for polyethylene prices. We strongly believe that this data series is the best representation of longer term data series that is available to allow for meaningful analysis of polyethylene prices and, by extension, polyethylene pipe prices.

Note that this is different to the AER's previous assertion that the use of a series published by the ABS (SITC Index Number 57, Plastics in Primary forms) *"is likely to provide more reliable information on price changes faced by AAD than the price index used in the revised CEG cost escalator report, which relies on prices of plastics in the United States of America.".*

BIS Shrapnel believes that SITC 57 is not the best measure of polyethylene prices available. This is because SITC 57 is a highly aggregated measure, and includes components as varied as polystyrene and PVC. This means that the measure is unlikely to capture the volatility of sub-components, such as the relevant polyethylene.

Instead, we believe the thermoplastic resin series as described above is the best measure of polyethylene prices. A compound called PE80 is a key component of making polyethylene, and this compound is a thermoplastic resin. As a result of these direct relationships, we believe the measure of US thermoplastic resin prices is the best available proxy of polyethylene prices.

We had previously used econometric modelling to establish a relationship between crude oil prices, and the thermoplastic PPI. However, the AER has rejected all previous attempts to quantify this relationship. To avoid getting bogged down in the econometric details, we believe a better strategy is to simply use the historical correlation between crude oil prices and the thermoplastic PPI.

This correlation, over the past two decades, is 0.76, suggesting a very strong relationship between crude oil and the thermoplastic PPI. We therefore forecast crude oil prices, and apply this correlation to establish thermoplastic price forecasts.

Crude oil prices are derived from Consensus Economic forecasts, and are shown in table 6.3. We note that this is not the same methodology as the AER's currently preferred 'no-change' forecast. We believe that the use of Consensus forecasts is the best forecast available in the circumstances, in the same manner that Consensus forecasts are considered the best available for Steel prices, which are also difficult to predict into the future.

The earliest Consensus Economics forecasts to which we have access is October 2011. At a spot price of US$91.10/barrel, the Consensus forecast for the March 2014 quarter was $98.94. This is particularly close to the realised result of $98.68. This is an increase of over 8 per cent which would not have been allowed for under the AER's 'no change' position. Although this degree of accuracy is unlikely to occur for all given time periods, it highlights that Consensus forecasts have a solid grounding, given the collective expertise of the forecasters involved.

The crude oil price forecasts are converted to forecasts of thermoplastics (as a proxy for polyethylene). This price is then converted into Australian dollars (using BIS Shrapnel's exchange rate forecasts) and combined with out wages and other overhead forecasts, to create forecasts for polyethylene pipe.

Concrete

Historical concrete prices are sourced from the Australian Bureau of Statistics (ABS), publication 6427 Producer Price Indexes, Cement, Concrete and Sand series. This series is used as a proxy for concrete prices because it is available at the State level (i.e. New South Wales). Prices have been steadily rising over the past decade, in line with a particularly strong period in nationwide construction activity, which is a key driver of demand for concrete. Specifically, key industries which support demand for, and therefore prices of concrete include Engineering Construction, Residential Building and Non-Residential Building.

BIS Shrapnel provides detailed forecasts of each of these industries in existing reports[2]. The summation of each of these industries, yielding total construction in Australia, is used as the key driver to forecast future movements in concrete prices. These relationships are shown in chart 6.5.

Gas and Fuel

The gas and fuel engineering construction price deflator measures changes in the construction costs of gas and fuel infrastructure and pipelines as well as other distribution lines. The gas and fuel engineering construction price deflator is measured by the ABS using an input pricing basis where the major components consist of:

- Construction Wages (15 per cent)
- Manufacturing Wages (15 per cent)
- Steel Pipe and Tube (40 per cent)
- Other Fabricated Metal Products (15 per cent)
- Plant and Equipment Hire (15 per cent)

This is one of six unpublished IPD's (obtained under ABS subscription service) which make up the total engineering construction price deflator. Only total Australia IPDs are available for these unpublished IPDs – state breakdowns are unavailable.

These components are regularly forecast individually by BIS Shrapnel, and are summated to recreate and forecast the ABS series. Note that BIS Shrapnel's recreation of the IPD using these components is essentially an input index, whereas the ABS engineering IPD is an output index. The difference between the two likely represents margins along the supply chain, and this is incorporated into the final Gas and Fuel Construction Price Index forecast.

[2] *Engineering Construction in Australia, 2013/14 to 2027/28*, and *Building in Australia, 2014 to 2029*.

APPENDIX D: TERMS OF REFERENCE

To be inserted by ActewAGL Distribution Gas Network.

APPENDIX E: 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.

APPENDIX F: CURRICULUM VITAES OF KEY PERSONNEL

Richard Robinson, B.Comm (Hons),
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).

Kishti Sen, B.A., M.Ec. (Hons), Ph.D.
Senior Economist

Kishti works across both the Economics and Infrastructure and Mining units at BIS Shrapnel. As a senior economist, Kishti contributes to the formulation of BIS Shrapnel’s economic forecasts, at the Australia, State, and industry level. In addition, he is a contributing author for BIS Shrapnel’s subscriptions services including Economic Outlook, Long Term Forecasts and Engineering Construction in Australia.

As a consulting economist, Kishti has advised blue-chip clients in the Mining, Construction and Utilities industries, investment banks, private equity firms, industry associations and trade unions.

Prior to joining BIS Shrapnel, Kishti worked as a Senior Economist at the Reserve Bank of Fiji where he managed the Policy and Research Team. He was also a senior member of Bank’s monetary policy advisory committees. Kishti holds a PhD in Economics from the University of Sydney and has special interest in labour economics, cost escalation, benefit-cost assessments and econometric modelling.

Daniel Gradwell, B.Com (Hons, Economics)
Economist

Daniel joined BIS Shrapnel in 2010, where he works across both the Economics and Infrastructure and Mining units. Since joining the company, Daniel has worked on a number of projects, including contributing the analysis of consumer demand in the Economic department's recent *Long Term Forecasts* report, forecasting maintenance expenditure for the Electricity Supply and Gas Pipelines sector for the forthcoming Maintenance in Australia 2012 report, analysis and forecasts to the Engineering Construction in Australia, Road Construction in Australia and Road Maintenance in Australia publications. Daniel has also assisted in the preparation of several cost escalation reports for private clients.

Daniel achieved First Class Honours in Economics at the University of Otago, New Zealand.

Jehanesan Konesan, B.Ec (Hons)
Research Associate

Jehanesan joined BIS Shrapnel in December 2013, after completing his university studies. He graduated with a Bachelor of Actuarial studies and a Bachelor of Economics double degree from Macquarie University in 2011, and then completed his honours in economics degree from the University of New South Wales in 2013. Jehanesan works across both the Economics and the Infrastructure and Mining divisions, and has contributed to various subscription reports and private client jobs.

