Labour Cost Growth Forecasts
2007/08 to 2016/17

This report was prepared for the
Australian Energy Regulator
by Econtech Pty Ltd.

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Background

In accordance with its responsibilities under the National Electricity Rules (NER), the Australian Energy Regulator (AER) is required to make transmission and distribution revenue determinations for energy companies in Australia. The AER is currently making determinations for transmission and distribution companies in NSW, Tasmania and the ACT for the regulatory period 1 July 2009 to 30 June 2014.

These revenue determinations require AER to assess claims regarding expected capital and operating expenses. Labour costs are a key input into the electricity transmission and distribution expenses of these companies. In 2007, Econtech developed a Labour Cost Model (LCM) to assist AER in reviewing annual labour cost growth forecasts submitted by SP AusNet and VENCorp in Victoria.

Against this backdrop, AER has engaged Econtech to update the LCM and provide annual labour cost forecasts for NSW, Tasmania, the ACT and Australia over the period 2007/08 to 2016/17. Labour cost growth forecasts and commentary are provided for the Mining, Electricity, Gas & Water Supply and Construction industries.

Modelling Approach

To forecast annual wages, Econtech has utilised the LCM which provides forecasts of labour costs by state by industry over the period 2007/08 to 2016/17. The LCM allows an independent assessment of labour cost conditions for the Mining, Electricity, Gas and Water and Construction industries (and indeed all 17 ANZSIC broad industries) in each state and territory. Since 2007 the LCM has been updated for changes in the macroeconomic environment as well as having its forecasting period extended. The methodology for the LCM has also been enhanced.

Macroeconomic Outlook

The LCM forecasts of labour costs are consistent with the outputs from Econtech's macroeconomic forecasting model, Murphy Model 2 (MM2). It is therefore important to summarise the current macroeconomic outlook from MM2.

Following three solid quarters of growth in 2007/08, the Australian economy is expected to slow as weaker global growth and financial market turmoil create difficult business conditions. At the same time, higher home lending costs and rising energy and food prices are dampening consumer confidence. Final GDP growth in 2007/08 is expected to be a healthy 3.7 per cent, but the weak current outlook has the 2008/09 GDP growth forecast moderating to just 2.2 per cent, mainly due to weaker business investment. However, a turnaround is expected in 2009/10 supported by an improving trade performance driven by mining and agriculture, lifting economic growth towards a normal rate of 3.2 per cent.

In its September meeting the Reserve Bank has lowered the official interest rate by 25 basis points to 7.0 per cent. Household spending has slowed as has credit expansion from within the household and business sectors. The rise in the terms of trade continues to work in the opposite direction, which means the outlook for inflation remains uncertain. High oil prices

and rising costs of raw materials will keep upward pressure on inflation in the short term but the Reserve Bank expects these pressures to ease over time.

Table A contains historical data and forecasts for key macroeconomic variables from MM2 and the LCM.

Table A
Key Macroeconomic Variables (% pa)

	Real GDP Growth	Unemployment Rate	Employment Growth	CPI Inflation	Nominal Wage Growth
History					
1996-97	3.9	8.3	0.8	1.3	3.3
1997-98	4.5	8.0	1.2	0.0	4.0
1998-99	5.2	7.4	1.9	1.3	3.4
1999-00	4.0	6.5	2.2	2.4	2.8
2000-01	1.9	6.5	2.0	6.0	4.7
2001-02	3.8	6.7	1.3	2.9	4.5
2002-03	3.2	6.1	2.6	3.1	4.0
2003-04	4.0	5.6	1.6	2.4	5.3
2004-05	2.8	5.2	2.7	2.4	4.2
2005-06	3.0	4.9	2.6	3.2	4.4
2006-07	3.2	4.5	2.6	2.9	4.1
Forecasts					
2007-08	3.7	4.2	2.7	3.3	3.9
2008-09	2.2	5.0	1.1	3.7	4.8
2009-10	3.2	5.3	1.3	2.5	3.6
2010-11	3.6	5.2	1.7	2.6	3.4
2011-12	3.0	5.2	1.5	3.0	3.6
2012-13	2.8	5.4	1.2	3.0	3.7
2013-14	3.3	5.6	1.0	2.6	3.2
2014-15	4.1	5.5	1.6	2.2	2.9
2015-16	4.2	5.0	2.0	2.5	3.6
2016-17	3.6	4.5	1.9	3.5	5.1

Source: MM2, LCM (All figures are annual growth rates except the unemployment rate which is an annual rate)

The slowdown in economic growth is forecast to lead to unemployment climbing from a low point of 4.0 per cent in February 2008 to over 5 per cent by mid-2009. In our forecasts unemployment then remains around that rate, but could be higher or lower depending on the final details of the Rudd Government's changes to industrial relations.

Upside risks to inflation remain. The terms of trade is expected to peak in 2008/09 driven by large increases in the price of coal and iron ore as well as some rural commodities. In addition, the personal income tax cuts outlined in the 2008/09 Federal Budget will boost household disposable income. However, the RBA is confident that although inflation may remain high over the short term it will return to a comfortable level over the medium term.

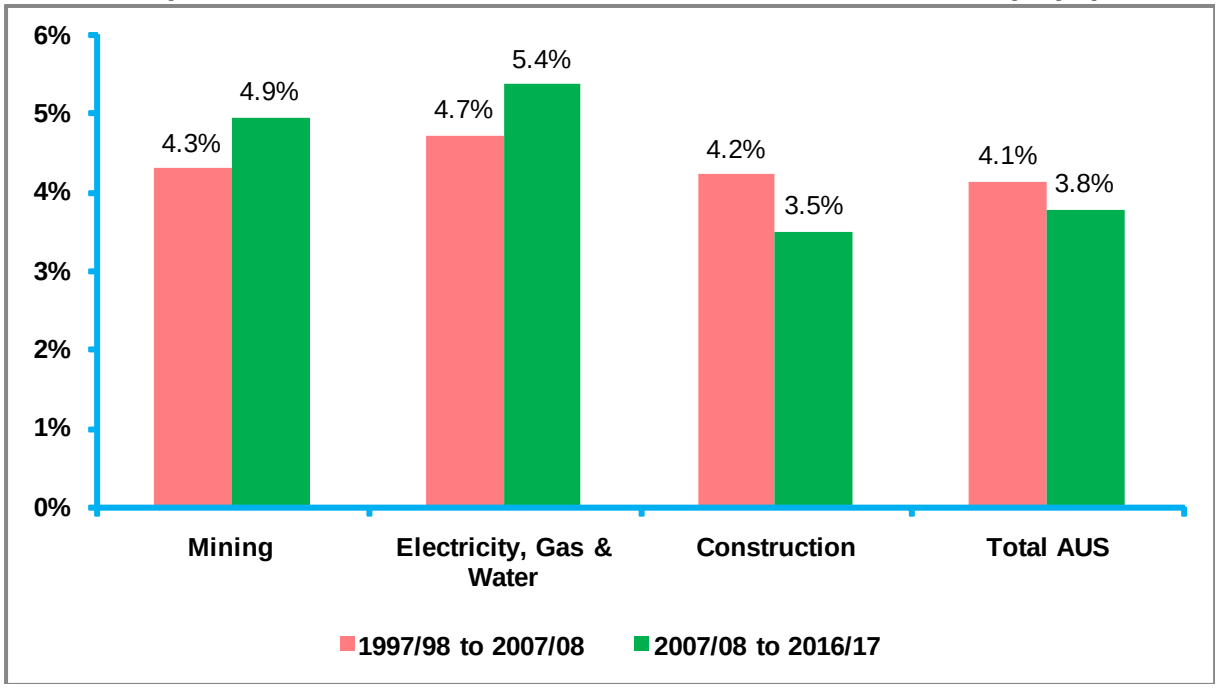
Results

The LCM was used to provide annual labour cost forecasts for NSW, Tasmania, the ACT and Australia over the period 2007/08 to 2016/17. The industries of most relevance to AER include the mining, electricity, gas and water supply (utility) and construction industries.

Chart A below shows historical and forecast compound average annual wage growth rates for the relevant industries in Australia. Compound growth rates measure the rate of change (per annum) in a value between two points in time. It differs from a simple average, by only focusing on the beginning value and the ending value.

Booming demand for materials is continuing to be driven by manufacturing and construction activity in the developing world. Despite the threat of slowing export growth in countries like China and India, domestic consumption has so far cushioned these economies from the effects of the US subprime mortgage crisis. As such, the outlook for the Mining sector remains positive, with Australian miners poised to capitalise on the favourable conditions in 2008/09. This will support above average wage growth in the mining sector.

Chart A
Compound Nominal Labour Cost Growth Rates in Australia (% pa)



Source: LCM

Engineering construction has been the star performer for the construction industry, with the commodities boom prompting miners to invest heavily in expanding production capacity. Mining construction is expected to remain high by historical standards, but the focus of engineering construction is likely to shift gradually towards infrastructure projects over the next few years. Non-residential construction is expected to feel the impact of deteriorating global economic conditions, as lower business investment leads to a drop off in activity. Recent levels of investment in office buildings are unlikely to be maintained as the economy slows, and growth in accommodation will continue to suffer as the high AUD restricts tourism activity. Tensions between demand and supply within the residential sector are also

likely to persist over the short run. High borrowing costs have impeded the recovery in housing investment, despite the strength in underlying demand. As such, a recovery in residential construction is expected in 2009/10, roughly in line with an easing of interest rates. Overall, annual wage growth in the construction industry is expected to be slightly under the national average over the forecast period.

Annual wage growth in the utility sector has historically been higher than the national average. This has been due to a number of factors. Firstly, progressive deregulation of the energy sector since the early 1990's has facilitated strong productivity growth. This in turn has supported strong growth in wages within this industry up until the turn of the century.

Over time, the utility sector has also experienced a relatively higher increase in the proportion of highly-skilled occupations, compared to the economy as a whole. Given that the price of skilled labour has also grown faster than labour generally, wages growth within the utility sector has been growing faster than average. To this extent, the stronger growth in utility sector wages could be due to composition effects which may not be associated with a true labour cost increase.

In more recent times, an extremely tight labour market has put pressure on the available supply of skilled labour, and a skills shortage currently exists in most professional occupations and trades. The effect of such a tightening in the labour market has been to place upward pressure on wages in some sectors, as businesses are being forced to offer higher wages to attract skilled workers. The utilities sector in particular has been hit hard by the skills shortage, given the constant nature of demand for its output and the large number of occupations in this industry where there is a recognised skill shortage. In addition, the utilities industry is forced to compete for skilled workers with the recently booming construction and mining industries.

Over the forecast period, the shortage of skilled workers in the utilities sector will continue to be an important driver of labour costs across Australia. While there are initiatives in place to increase the supply of skilled workers, most represent longer-term solutions. The Australian Government, through its Skilling Australia policy, will provide an additional 450,000 new training places. The Australian Government has also lifted permanent and temporary migration in its 2008/09 budget, however, there are remaining concerns over the ability of this additional labour to meet industry demand. With projected annual growth of 5.4 per cent, national wages in the utility industry are expected to grow, on average, 1.6 percentage points higher than the national average.

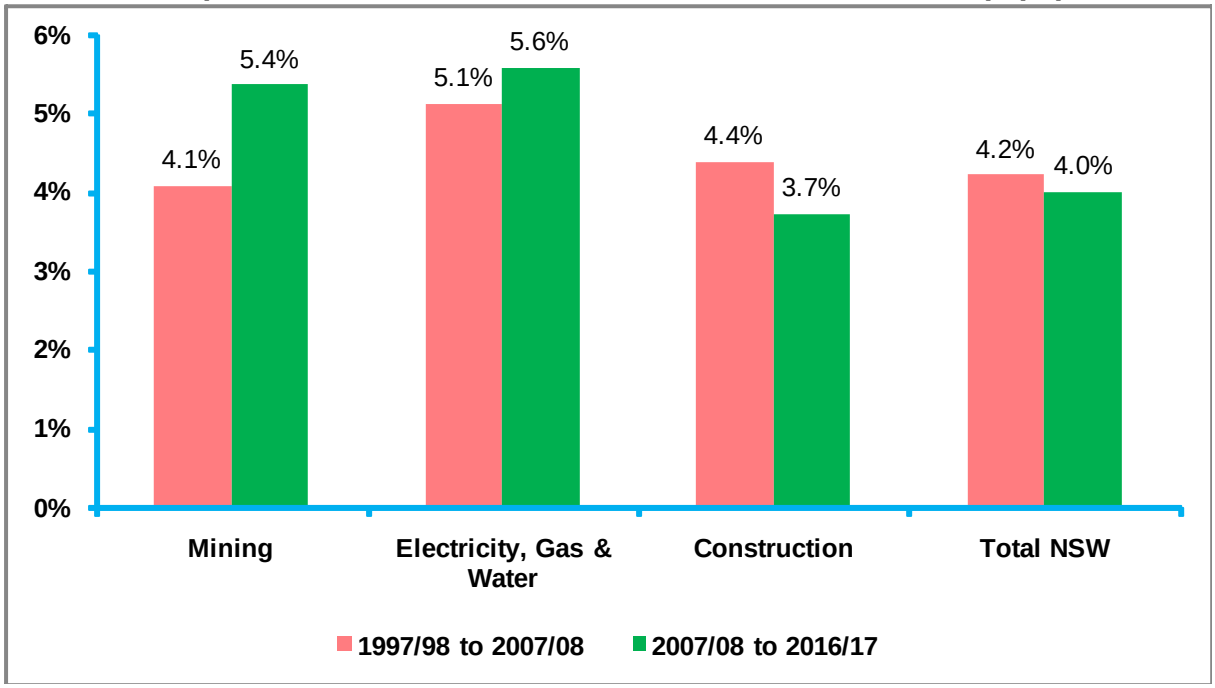
Selected State and Territory Results

The economic factors driving growth in wages are more significant between industries than between states. This is because the labour market is generally mobile and will move between states, but labour cannot as easily move between industries where additional training and qualifications are required. For this reason, the wages growth for an industry does not tend to vary significantly between states and territories. Thus the factors that contribute to growth in utility industry wages being above average are also not significantly different between states and territories.

Chart B shows historical and forecast compound average wage growth rates for the relevant industries in NSW.

The NSW Premier's Office has recently released details of an investment package for the NSW energy sector. The reforms include a Government withdrawal from the electricity retail market while retaining Government-owned power generation assets. The expected effect of the privatisation will be to put downward pressure on retail prices and improve productivity. Econtech predicts utility wages in NSW to grow at an annual rate 1.6 percentage points higher than the state average over the forecast period.

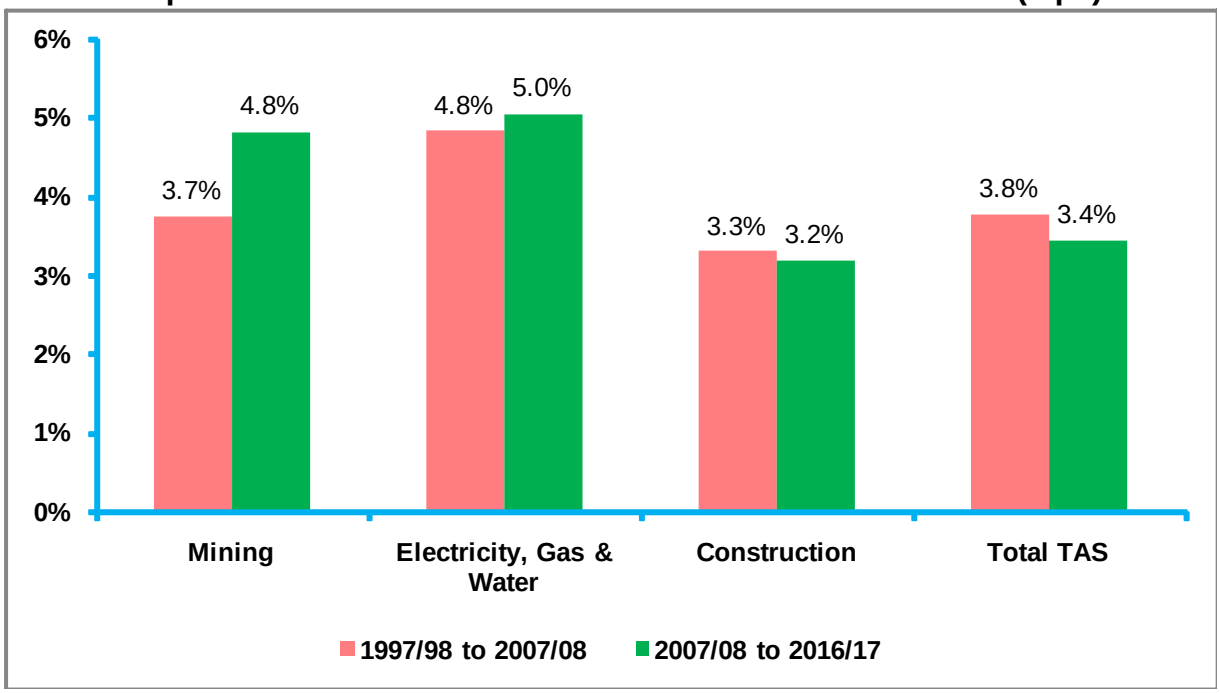
Chart B
Compound Nominal Labour Cost Growth Rates in NSW (%pa)



Source: LCM

Historical and forecast compound average wage growth rates for relevant industries in Tasmania are provided in Chart C below.

Chart C
Compound Nominal Labour Cost Growth Rates in Tasmania (%pa)



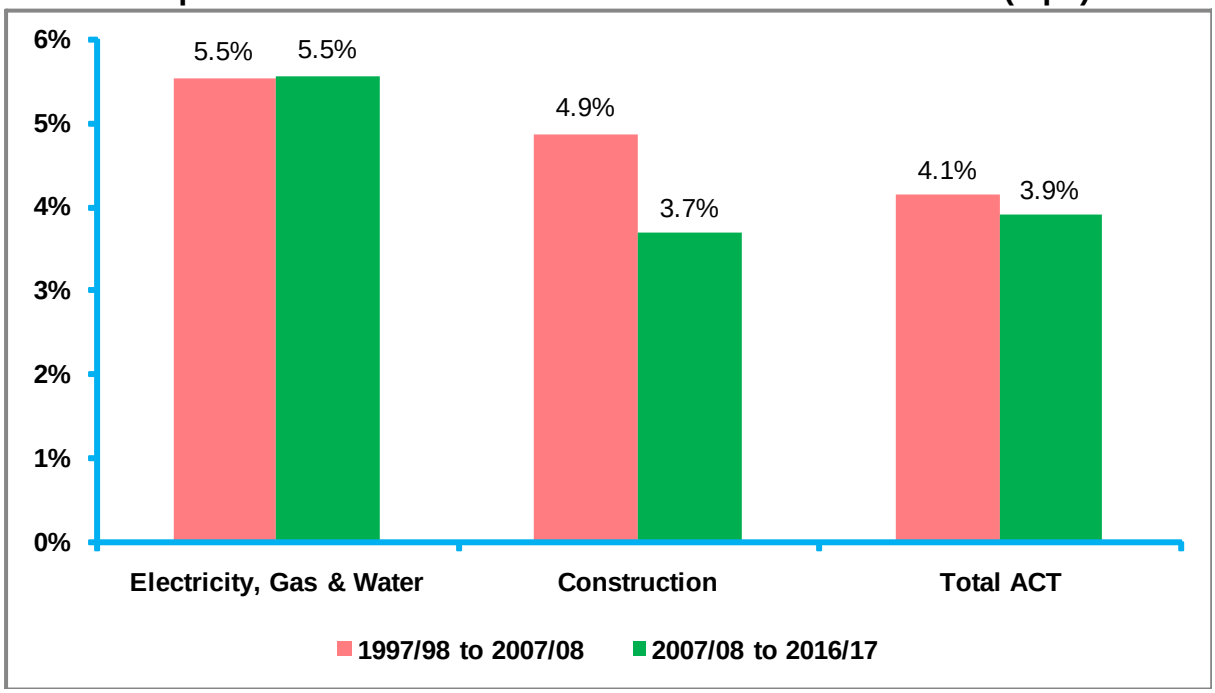
Source: LCM

A more modest economic outlook for Tasmania compared to NSW contributed to lower overall wages growth in Tasmania. Both the utility and mining industries are expected to achieve above average wage growth. Annual growth in construction industry wages is projected to be lower than the state average.

Major projects such as the Tamar Valley Power Station will create demand for many occupations including engineers and electrical tradespersons. Competition for these skilled workers is expected to increase in the short to medium term and put upward pressure on wages, particularly in the mining and utility industries.

The mining industry does not have a significant presence in the ACT and therefore there is insufficient data to forecast labour costs. Accordingly, Chart D contains labour costs forecasts for just the utility and construction industries.

Chart D
Compound Nominal Labour Cost Growth Rates in the ACT (%pa)



Source: LCM

Growth in utility industry wages is expected to be above average, consistent with the findings in NSW and Tasmania. This is broadly due to the fact that the issues driving utility industry wages growth are generally being felt across Australia, and not just confined to specific geographic regions.

Demand for skilled workers in the utility industry is likely to continue with projects such as a gas-fired power station in southern Canberra and the extension of the Cotter Dam. While plans for the power station have recently been scaled down in reaction to strong community opposition, the requirement for skilled workers such as engineers and electricians will continue in the ACT, placing upward pressure on utility industry wages.

The results of the labour cost forecasting indicate that annual wage inflation in the utility industry will continue to be above average. In the selected states and territory, annual growth rates for utility industry wages are projected to be on average 1.6 percentage points higher than the all-industry average over the forecast period.

1. Introduction

In accordance with its responsibilities under the National Electricity Rules (NER), the Australian Energy Regulator (AER) is required to make transmission and distribution revenue determinations for energy companies in Australia. The AER is currently making determinations for transmission and distribution companies in NSW, Tasmania and the ACT for the regulatory period 1 July 2009 to 30 June 2014[1].

These revenue determinations require AER to assess claims regarding expected capital and operating expenses. Labour costs are a key input into the electricity transmission and distribution expenses of these companies. In 2007, Econtech developed a Labour Cost Model (LCM) to assist AER in reviewing annual labour cost growth forecasts submitted by SP AusNet and VENCorp in Victoria.

Against this backdrop, AER has engaged Econtech to update the LCM and provide annual labour cost forecasts for NSW, Tasmania, the ACT and Australia over the period 2007/08 to 2016/17. Labour cost growth forecasts and commentary will be provided for the Mining, Electricity, Gas & Water Supply and Construction industries.

This report is structured as follows.

- Section 2 describes the modelling approach used to forecast labour cost growth rates.
- Section 3 provides an outlook for the national and selected state and territory economies and relevant industry sectors.
- Section 4 provides detailed results and discussion of national and selected state and territory labour cost forecasting.
- Section 5 reviews the methodology used to forecast labour costs proposed by the electricity network businesses in NSW and Tasmania.

While all care, skill and consideration has been used in the preparation of this report, the findings refer to the terms of reference of AER and are designed to be used only for the specific purpose set out below.

The purpose of this report is to provide annual labour cost forecasts for NSW, ACT, Tasmania and Australia over the period 2007/08 to 2016/17. Econtech has provided labour cost growth forecasts and commentary for the mining, electricity, gas & water supply and construction industries. The full Terms of Reference are provided at Attachment E.

The findings in this report are subject to unavoidable statistical variation. While all care has been taken to ensure that the statistical variation is kept to a minimum, care should be taken whenever using this information. This report only takes into account information available to Econtech up to the date of this report and so its findings may be affected by new information.

[1] These companies for NSW and the ACT include EnergyAustralia, Integral Energy, Country Energy and ActewAGL for distribution and Energy Australia and TransGrid for transmission. For Tasmania, this includes the transmission company Transend Networks.

2. Modelling Approach

This section describes in detail the modelling approach used in this report.

To forecast annual wages, Econtech has utilised its Labour Cost Model (LCM) that provides forecasts of labour costs by state by industry over the period 2007/08 to 2016/17. The LCM allows an independent assessment of labour cost conditions for the mining, electricity, gas and water supply and construction industries (and indeed all 17 ANZSIC broad industries) in each state and territory. The LCM was purpose-built for AER in 2007. Further details about the LCM are provided at Attachment A.

The LCM forecasts are fully consistent with Econtech's Murphy Model 2 (MM2) modelling outputs, including the existing national wage forecast and the state and industry employment forecasts. More details on MM2 are available in Attachment B.

Labour market forecasts from MM2 are used as inputs into the LCM model. As MM2 is a macro-computable general equilibrium (CGE) model, the labour market forecasts that are used in the LCM are grounded in sound economic theory. For instance, as labour market conditions tighten, the MM2 will predict an increase in wages. Further, over the long term, the Australian economy will converge to a natural rate of unemployment. As such, total employment figures will depend on total labour supply. MM2 also accounts for temporary workers such as those on a 457 visa.

The general structure of the LCM is illustrated in Table 2.1 below. The key steps involved in the LCM modelling process are summarised below.

Data Analysis

The first step involves collecting the appropriate data sources to forecast labour costs. There are a number of ways in which labour costs could be measured. The Australian Bureau of Statistics (ABS) publishes several wage indicators including Average Weekly Earnings (AWE), Wage Price Index (WPI), Mean Weekly Earnings (MWE) and Compensation of Employees (CPE).

Econtech analysed all data sources at the detailed state by industry level. For the purpose of this study, the detailed unpublished state by industry AWE data appears to be the best source to measure wage movements. There was insufficient historical data (approximately ten years) for the WPI to allow robust econometric analysis. At the detailed state by industry level, MWE was found to be too volatile. On balance, AWE was generally less volatile than CPE across industries and states and therefore AWE is considered the most appropriate wage measure for the AER. The AWE data series in this report includes total earnings for all employees.

Further details regarding AWE and the other wage measures listed above are provided at Attachment C.

Forecasting Employees by State and by Industry Separately

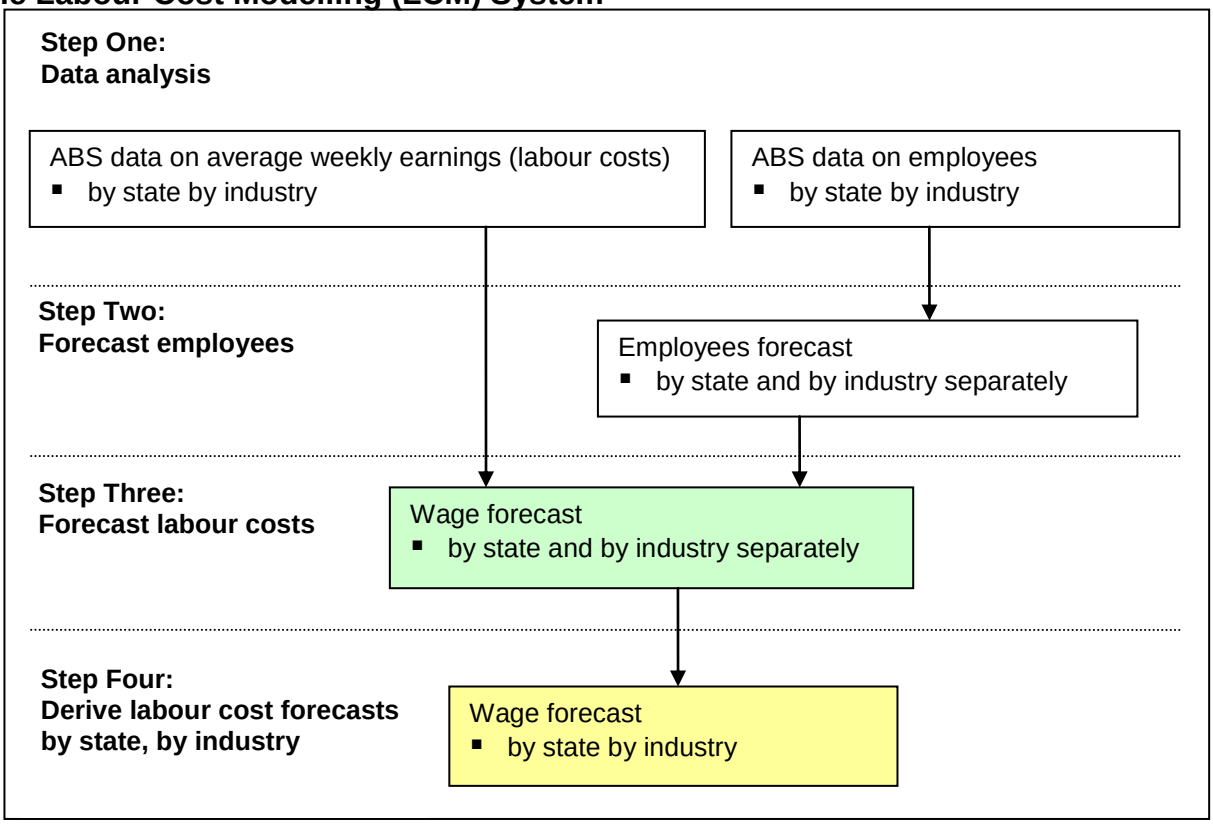
Step 2 is to forecast employees by state and by industry separately. As mentioned above, Econtech's MM2 provides forecasts of total employment by state and by industry separately.

Total employment, by definition, includes both employees and self-employed persons. Therefore, to estimate wages per employee it is necessary to convert the total employment figures produced by MM2 into total employee figures. This conversion is based on an economic analysis of the historical employee share of employment in each industry and in each state.

Forecasting Labour Costs by State and by Industry Separately

The next step in the modelling involves forecasting labour costs by state and by industry separately. This is done by using historical state and industry wage data in combination with Econtech's existing MM2 forecast of the national wage. These two data sources are used to forecast consistent wage relativities for each state and territory, and for each of the 17 ANZSIC broad industries, separately, using robust econometric analysis. The key driver of these forecasts is the tightness of the labour market in each state and in each industry.

Table 2.1
The Labour Cost Modelling (LCM) System



Forecasting Labour Cost by State by Industry

The final step is to forecast labour costs by state, by industry. A widely accepted estimation technique known as Residual Allocation System (RAS)[2] is applied to the forecast of wages for each separate state and each separate industry. This technique allows for the estimation of wages by state for each industry. Importantly, this technique ensures that the wage figures by state by industry are fully consistent with the national numbers.

[2] This technique is also used by the ABS – for example in producing their input-output tables.

LCM Updates

Econtech's last detailed forecasts of labour cost growth rates were provided to AER in August 2007. Since this time, there have been a number of updates which will be reflected in the current LCM forecasts. In this regard, forecasts from the LCM in this report specifically incorporate:

- A simplified, but enhanced approach to labour cost forecasting, as described above and in detail in Attachment A;
- National accounts data from December 2007 (published by the Australian Bureau of Statistics in early March 2008);
- AWE data obtained by special request from the Australian Bureau of Statistics in August 2008;
- Policy measures introduced in the 2008/09 Federal Budget; and
- An extension of the forecast period from 2015/16 to 2016/17.

In the next section, an economic outlook is provided for the national and selected state and territory economies along with various industries of relevance to AER.

3. Macroeconomic, State and Industry Overview

The labour cost forecasts in this report are consistent with Econtech's national outlook. Therefore, this section describes the current macroeconomic outlook in Australia, as presented in Econtech's *Australian, State and Industry Outlook (ANSIO)* publication dated June 2008, where March 2008 was the last historical data point.

The economic climate has changed considerably since Econtech provided forecasts of labour cost growth rates to AER in August 2007. Section 3.1 provides an overview of the national economy. Section 3.2 provides Econtech's outlook for the relevant state and territory economies and Section 3.3 covers relevant industry sectors. Section 3.4 summarises the historical factors leading to above average growth rates in utility sector wages.

3.1 National Outlook

The Australian economy delivered solid growth of 0.6 per cent in the first quarter of 2008, driven by strong levels of business investment and non-residential construction, supported by firm household expenditure. The main detractor from growth during the quarter was higher imports (Chart 3.1), reflecting a strong Australian dollar (AUD) and domestic economy.

Table 3.1
Key Macroeconomic Variables (%pa)

	Real GDP Growth	Unemployment Rate	Employment Growth	CPI Inflation	Nominal Wage Growth
History					
1996-97	3.9	8.3	0.8	1.3	3.3
1997-98	4.5	8.0	1.2	0.0	4.0
1998-99	5.2	7.4	1.9	1.3	3.4
1999-00	4.0	6.5	2.2	2.4	2.8
2000-01	1.9	6.5	2.0	6.0	4.7
2001-02	3.8	6.7	1.3	2.9	4.5
2002-03	3.2	6.1	2.6	3.1	4.0
2003-04	4.0	5.6	1.6	2.4	5.3
2004-05	2.8	5.2	2.7	2.4	4.2
2005-06	3.0	4.9	2.6	3.2	4.4
2006-07	3.2	4.5	2.6	2.9	4.1
Forecasts					
2007-08	3.7	4.2	2.7	3.3	3.9
2008-09	2.2	5.0	1.1	3.7	4.8
2009-10	3.2	5.3	1.3	2.5	3.6
2010-11	3.6	5.2	1.7	2.6	3.4
2011-12	3.0	5.2	1.5	3.0	3.6
2012-13	2.8	5.4	1.2	3.0	3.7
2013-14	3.3	5.6	1.0	2.6	3.2
2014-15	4.1	5.5	1.6	2.2	2.9
2015-16	4.2	5.0	2.0	2.5	3.6
2016-17	3.6	4.5	1.9	3.5	5.1

Source: MM2, LCM (All figures are annual growth rates except the unemployment rate, which is an annual rate)

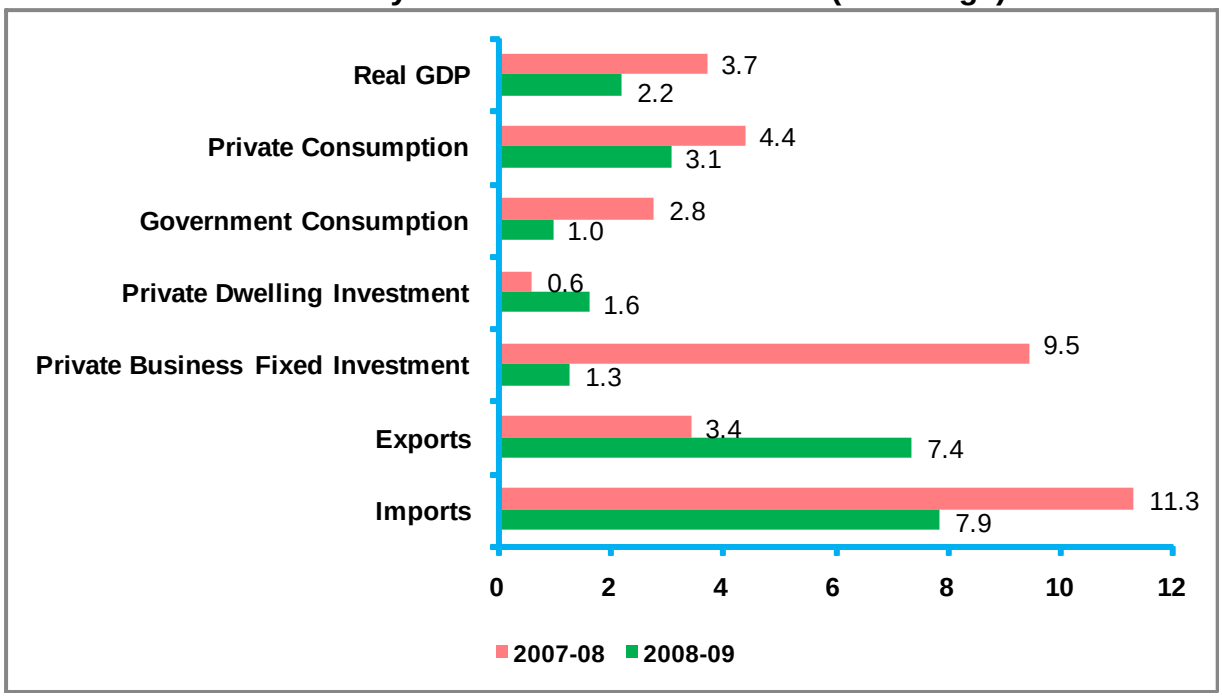
Following three solid quarters of growth in 2007/08, the Australian economy is expected to slow as weaker global growth and financial market turmoil create difficult business conditions. At the same time, higher home lending costs and rising energy and food prices are dampening consumer confidence.

Final GDP growth in 2007/08 is expected to be a healthy 3.7 per cent, but the weak current outlook has the 2008/09 GDP growth forecast moderating to just 2.2 per cent, mainly due to a moderation in business investment (Chart 3.1).

Government consumption grew by an estimated 2.8 per cent in 2007/08. The Federal Government is expecting a Budget surplus of 1.8 per cent of GDP in 2008/09 as it attempts to pull back spending in order to stem inflationary pressures.

Dwelling Investment has been surprisingly subdued. Following a moderate recovery during 2006/07, dwelling investment is estimated to have grown by just 0.6 per cent for 2007/08 (Chart 3.1). With the government increasing the skilled migrant intake, weak building approvals data of recent months implies that historically low vacancy rates and strong growth in residential rental costs are likely to persist well into 2009. The true recovery in dwelling investment is not expected to begin until 2009/10, as financial conditions improve.

Chart 3.1
Growth in Key Macroeconomic Indicators (% Change)



Source: MM2

Business investment activity has been very strong in recent years, and has been a key driver of economic activity over the past five years. Business investment is expected to grow by a strong 9.5 per cent in 2007/08 before it plateaus in 2008/09 (Chart 3.1). Recent financial market turmoil arising from the US sub-prime crisis and higher interest rates have made it more difficult and more expensive for businesses to raise equity. Coupled with a weaker outlook for domestic consumption, business investment will slow as profit outlooks moderate.

Exports growth has been more moderate than expected over the last few years, as export volumes have failed to grow in response to the explosion in commodity prices worldwide. Mining export volumes have been constrained by supply bottlenecks, whilst non-mining exports are suffering as the strong AUD is reducing their global competitiveness.

Exports are expected to grow by 3.4 per cent in 2007/08, before picking up strongly over the next few years. Exports will accelerate as the high levels of investment begin to translate into increased export volumes of non-rural commodities. Exports of Agricultural commodities are expected to grow strongly from their low levels in 2008/09 in line with higher rainfall.

Growth in imports has been driven by the strong AUD and solid consumer demand. Imports are expected to ease, after increasing by a remarkable 11.3 per cent in 2007/08, to more sustainable levels over the medium term. This is mainly due to the slowing of both consumption and investment growth in the short term and a return of the AUD to fair value over the medium term.

Reflecting this forecast of solid growth in exports and weakening growth in imports, net exports are expected to make an increasing contribution to growth in GDP. Specifically, after reducing by approximately 2 percentage points in 2007/08, net exports are forecast to have a neutral influence in 2008/09 and a positive influence beyond.

In its September meeting the Reserve Bank has lowered the official interest rate by 25 basis points to 7.0 per cent. Household spending has slowed as has credit expansion from within the household and business sectors. The rise in the terms of trade continues to work in the opposite direction, which means the outlook for inflation remains uncertain. High oil prices and rising costs of raw materials will keep upward pressure on inflation in the short term but the Reserve Bank expects these pressures to ease over time.

Population

The forecasts in this part of the report are based on Econtech's demographic model, which provides the capacity to examine the effect on economic growth of different scenarios for fertility and overseas and interstate migration. In the baseline forecasts, the fertility rate is assumed to remain at 2006/07 levels. Net migration from overseas is expected to increase in line with the expansion of the Migration Program as outlined in the 2008/09 Federal Budget.

The long era of a rising labour force participation rate is expected to end. The participation rate, currently around 65 per cent, is expected to peak in 2010, before entering a new era of steady decline. The decline in Australia's participation rate is due to two main factors. Firstly, female participation rates are beginning to approach male rates. In the past, the increases in female participation rates have meant that the labour force has risen faster than the population of working age. Secondly, the aging of the population becomes more significant. Baby boomers will begin to leave the workforce in greater numbers than new entrants to the workforce. The main effect of the aging population is a general downward trend in participation rates as more people leave the workforce than there are people entering.

One key consequence of these demographic trends is that labour force growth is expected to slow. However, labour productivity growth is expected to rebound gradually, driven by past strength in business investment.

Lower labour force growth and higher productivity growth are expected to have broadly offsetting effects on the sustainable rate of economic growth. Economic growth has been maintained above the sustainable rate of 3 per cent through falling unemployment. However, in the medium term we are forecasting that unemployment will converge to a sustainable rate of about 5.25 per cent. This means that economic growth will settle at a sustainable 3 per cent.

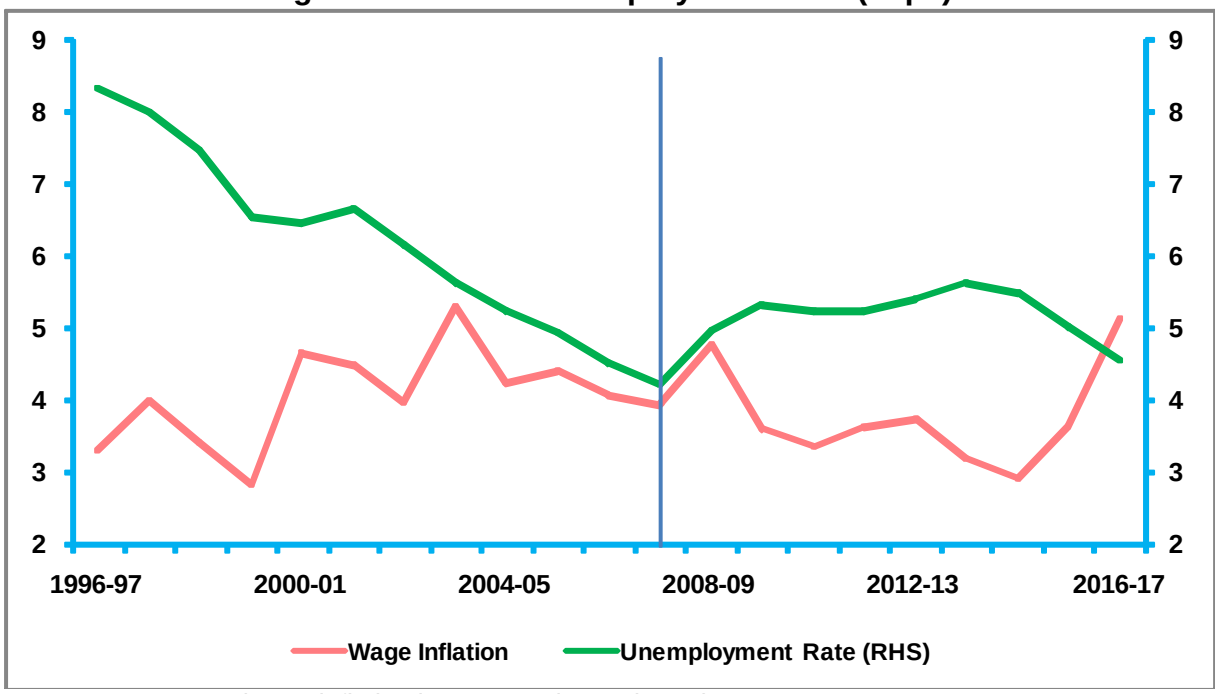
Labour Market

The labour force participation rate has been steadily increasing. Tighter labour market conditions and high wage growth are attracting entrants to the labour force. The participation rate is currently around 65 per cent. Though, as discussed above, this trend is not expected to continue.

Employment growth tends to follow growth in output with a lag. Strong economic growth has supported a healthy 2.7 per cent increase in employment during 2007/08. The slowdown in growth during 2008/09 will lead to a moderation in employment. Employment growth is forecast to be a weak 1.1 per cent in 2008/09.

The weakness in employment growth will lead to an increase in unemployment. Unemployment is expected to climb from a low point of 4.0 per cent in February 2008 to over 5 per cent in 2008/09. This upward trend can already be seen in the latest historical figures for unemployment (Chart 3.2).

Chart 3.2
Wage Inflation and Unemployment Rate (% pa)



Source: MM2, LCM (wage inflation is an annual growth rate)

The current tight labour market and skill shortage in some sectors will continue to boost wages growth. Wage growth is estimated to be a strong 3.9 per cent in 2007/08. This strength is expected to continue during 2008/09. However, rising unemployment will moderate wages growth in the medium to long term. Wages growth is forecast to be well below 4 per cent during 2009/10, extinguishing the inflation threat.

The forecasts in this report take into account the changes to industrial relations (IR) proposed by the Rudd Government. Specifically, under the new government, no new AWAs will be allowed and unfair dismissal laws for small businesses will be re-introduced. Therefore, the sustainable unemployment rate is expected to increase from 4.75 to 5.25 per cent. A more detailed workplace relations Bill will be introduced later this year. A smaller or bigger rise is possible, depending on the final details of the IR changes.

Research in an earlier Econtech report[3] shows that the direct labour market impact of reduced flexibility in the industrial relations environment would be to increase the structural unemployment rate and to reduce labour productivity.

Higher structural unemployment means that the potential labour supply is less, meaning there is greater scope for wage inflation pressure. This wages pressure will continue until labour demand is brought back into balance with the diminished potential labour supply. This higher wage inflation, together with lower productivity, flows through to higher CPI inflation. Because of higher price inflation, consumer real wages are ultimately lower than would otherwise be the case, despite the initial increase in wage inflation.

Inflation

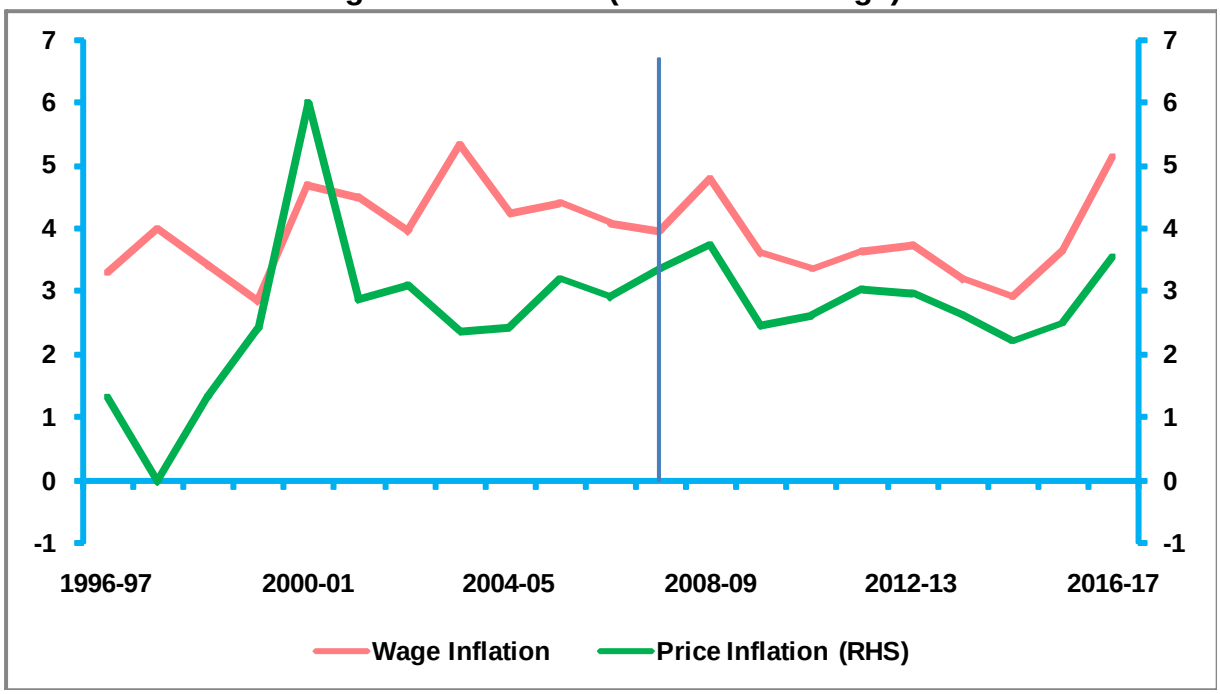
CPI inflation reached a high 4.2 per cent in the year to March 2008, driven by rapid growth in the price of food and fuel. Higher fuel and food prices, along with high wage growth are expected to continue to exert upward pressure on prices. Therefore, CPI inflation is forecast to be above 3 per cent throughout 2008.

The economic slowdown in the goods and labour markets will continue and this should ease inflation to within the RBA's target band. By the end of 2009, inflation will fall to within the RBA's target band of 2 to 3 per cent.

Chart 3.4 below shows that wage inflation is projected to grow faster than the consumer price index over the forecast period, by between 1 to 2 percentage points. Annual (financial year) CPI inflation rates as presented in Chart 3.4 are calculated as the annual growth rate of the annual CPI index. The annual CPI index is calculated as an average of the four quarterly CPI indexes in that financial year.

[3] "The Economic Effects of Industrial Relations Reforms Since 1993", Australian Chamber of Commerce and Industry, 2007

Chart 3.4
Wages and Inflation (Annual % Change)



Source: MM2, LCM

3.2 State and Territory Outlook

The AER is currently making revenue determinations for transmission and distribution companies in NSW, Tasmania and the ACT for the regulatory period 1 July 2009 to 30 June 2014. The economic outlook for these states and territory are the focus of this section.

New South Wales

The New South Wales economy grew by an estimated 2.4 per cent in 2007/08. The weak growth rate can be attributed to several factors. Firstly, unfavourable weather conditions reduced winter crop production to record lows. Secondly, higher interest rates and tight credit conditions in the second half of the financial year constrained dwelling investment. Finally, the high AUD impeded on the growth of New South Wales' Manufacturing sector.

These factors are set to continue into 2008/09. Indeed, due to New South Wales' relatively high level of household gearing and higher house prices, the state is more sensitive to difficult financial conditions. In addition, a large share of NSW output is derived from the Finance & Insurance and Property & Business industry.

Domestic demand increased by a strong 3.8 per cent in 2007/08 driven by strength in household consumption. However, household consumption has begun to slow as higher interest rates and increases in the cost of living squeeze household budgets. The moderation in consumption, coupled with subdued private investment will see domestic demand slow to 1.8 per cent in 2008/09.

Imports growth is expected to slow in line with the moderation in consumer spending, whilst exports growth in the non-resource sector continue to be hampered by the strength of the AUD. On balance, GSP growth for 2008/09 is forecast at a weak 1.2 per cent.

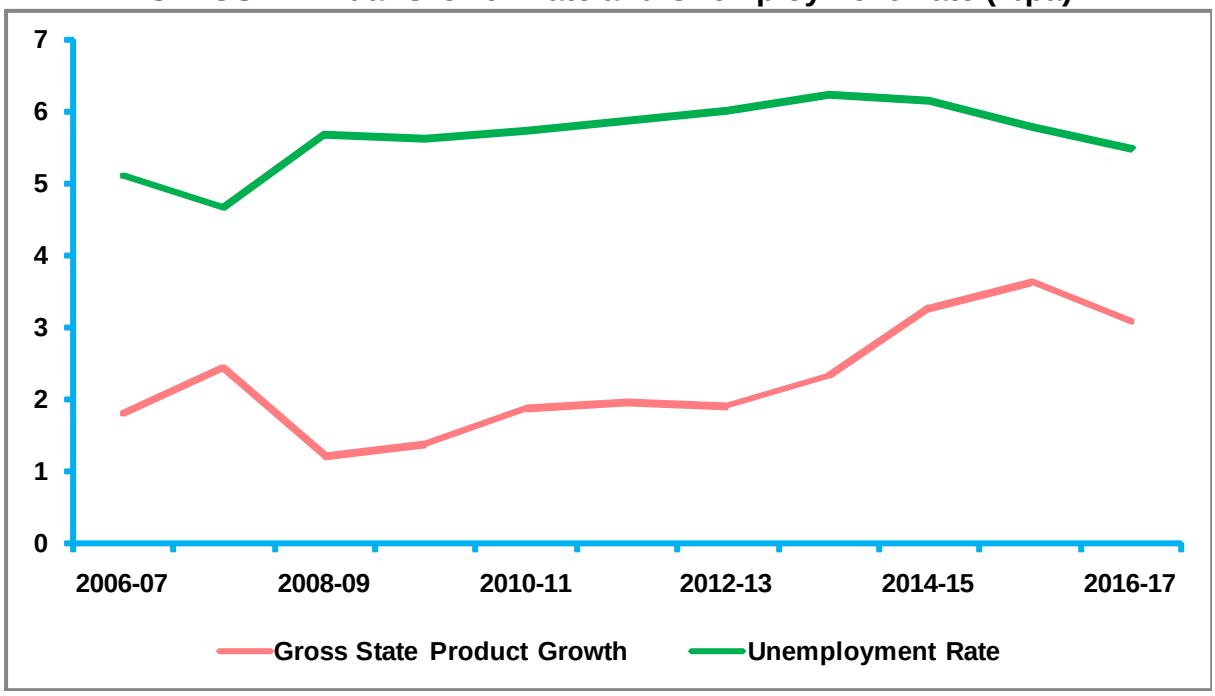
Table 3.2
Key Variables for New South Wales (% pa)

	Gross State Product	Private Consumption	Unemployment Rate	Employment	CPI Inflation	Nominal Wages
2006-07	1.8	3.8	5.1	1.6	2.7	2.5
2007-08	2.4	3.2	4.7	2.3	2.9	3.6
2008-09	1.2	2.4	5.7	0.7	3.5	5.1
2009-10	1.4	1.9	5.6	0.7	2.4	4.1
2010-11	1.9	1.2	5.7	0.9	2.6	3.7
2011-12	2.0	1.0	5.9	0.8	3.0	3.9
2012-13	1.9	0.6	6.0	0.7	2.9	3.9
2013-14	2.3	0.5	6.2	0.5	2.6	3.3
2014-15	3.3	1.7	6.2	1.0	2.2	3.0
2015-16	3.6	2.8	5.8	1.4	2.6	3.7
2016-17	3.1	2.6	5.5	1.2	3.7	5.2

Source: MM2, LCM (All figures are annual growth rates, except unemployment)

Employment is expected to increase further, albeit at a slower pace, in line with the economic slowdown. This moderation in employment growth will see the unemployment rate increase from 4.7 per cent in 2007/08 to 5.7 per cent in 2008/09.

Chart 3.5
NSW GSP Annual Growth Rate and Unemployment Rate (%pa)



Source: MM2

Longer term outlook

Growth in domestic demand in New South Wales is expected to average around 1.3 per cent over the period 2009/10 to 2012/13. Consumption growth will moderate throughout the forecast period as the current climate of high interest rates and rising living costs spur households to reconsider their level of debt.

A recovery in dwelling investment is expected in 2009/10, as supply catches up to underlying demand. The fundamentals supporting a recovery in dwelling investment are strong given the current low vacancy rates and high rental prices. In addition, high levels of overseas migration will also add to the demand for housing.

The terms-of-trade is expected to peak in 2008/09, hence a depreciation in the AUD is forecast from then on. This will see an improvement in exports and dampen imports. In addition, slower consumption growth will also dampen imports growth. Hence, over the three years to 2009/10, we forecast New South Wales GSP to grow by 1.7 per cent per annum, on average. Adjusting for population growth, the average annual growth in New South Wales GSP per capita is 0.5 per cent between 2007/08 and 2009/10.

Tasmania

The Tasmanian economy is more reliant on Agriculture and Manufacturing relative to the nation as a whole. In 2007/08, domestic demand in Tasmania increased by an impressive 7.6 per cent. This increase was driven by a sharp rise in consumption of 8.2 per cent. A portion of this increase can be attributed to an increase in household wealth as a result of strong gains in property prices. Overall, GSP growth came in at a strong 9.4 per cent in 2007/08.

Table 3.3
Key Variables for Tasmania (%)

	Gross State Product	Private Consumption	Unemployment Rate	Employment	CPI Inflation	Nominal Wages
2006-07	2.5	4.7	5.5	0.4	2.5	2.5
2007-08	9.4	8.2	4.9	2.9	2.9	4.3
2008-09	1.8	2.8	5.5	1.5	3.7	4.4
2009-10	2.2	2.5	5.5	1.3	2.5	3.1
2010-11	3.0	2.5	4.8	1.8	2.5	2.9
2011-12	2.0	1.6	4.8	0.6	2.9	3.2
2012-13	1.2	0.6	4.6	0.6	2.8	3.4
2013-14	1.6	0.3	4.5	0.5	2.5	2.9
2014-15	2.5	1.4	4.4	0.6	2.0	2.7
2015-16	2.7	2.3	3.9	1.2	2.4	3.5
2016-17	2.3	2.1	3.2	1.1	3.6	5.0

Source: MM2, LCM (All figures are annual growth rates except unemployment, which is an annual rate)

Looking ahead to 2008/09, growth in final demand in Tasmania is expected to moderate. Although household debt levels are lower in Tasmania than in the rest of Australia, household budgets remain under pressure from significant increases in the cost of living. Investment levels will remain high due to the commencement of several major projects, such

as the $180 million Musselroe Bay Eco Tourism Development (construction is set to commence in 2009) and continued investment in energy infrastructure.

High commodity prices have encouraged the development of Tasmania's mining sector. An improvement in Tasmania's export performance is expected during 2009 as several mines come on-line, including the Renison tin mine. However, imports growth is also forecast to strengthen during the year. As such, GSP is forecast to increase by 1.8 per cent in 2008/09, close to the national rate.

Employment is expected to increase by 1.5 per cent in 2008/09 (Table 3.3). This reflects the high level of construction activity occurring in Tasmania. With the participation rate forecast to increase, the unemployment rate is expected to rise to 5.5 per cent.

Chart 3.6
Tasmania GSP Growth Rate and Unemployment Rate (%pa)

Source: MM2

Longer term outlook

The data for smaller economies such as Tasmania are volatile. It is preferable to look at growth rates averaged over a number of years for a more accurate picture.

Private consumption will increase at an average of 2.6 per cent per annum over the three years to 2010/11. Although growth in private consumption is expected to slow, domestic demand will be supported by high levels of both public and private investment. Construction of several tourism and retail projects is set to commence in late 2008 and will continue into 2010/11, whilst investment in the energy market continues. In addition, dwelling investment is forecast to increase over the forecast period as supply catches up to underlying demand.

The return of the AUD closer to its historical value will assist with the international competitiveness of Tasmania's export and import-competing industries. This trend, along

with a return to average seasonal conditions, should see exports grow at a healthy rate over the medium to long term. The improvement in exports will be supported by the slowdown in import demand, reflecting the weakness in private consumption. On balance, we forecast GSP growth at an average of 2.3 per cent per annum and GSP per capita growth of 2.5 per cent per annum over the three years to 2010/11.

Solid employment growth is expected in Tasmania over the forecast period, supported by the high level of investment.

Australian Capital Territory

The ACT is the 'Government Territory'. Government consumption expenditure accounts for over 75 per cent of GSP, more than three times the national figure of 20 per cent. Since government spending tends to be relatively stable, the cycle in ACT growth tends to be less pronounced than the States. In addition, the ACT is not generally export-oriented. This means that it is less affected by international developments.

In 2008/09, domestic demand will be supported by historically high levels of investment, particularly commercial construction activity. Several large scale construction projects are anticipated over the medium term. In addition, dwelling investment will also remain at a high level. The ACT Government has accelerated the number of land releases as part of its Affordable Housing Action Plan, with Molonglo set to become the ACT's new urban development hub.

Table 3.4
Key Variables for the Australian Capital Territory (%)

	Gross State Product	Private Consumption	Unemployment Rate	Employment	CPI Inflation	Nominal Wages
2006-07	5.5	5.4	2.9	3.8	2.9	4.2
2007-08	1.7	3.0	2.5	1.0	3.7	2.6
2008-09	2.2	3.8	4.5	0.8	3.8	4.6
2009-10	2.9	2.6	4.4	1.2	2.4	3.8
2010-11	2.0	0.7	4.0	1.6	2.6	3.6
2011-12	2.8	1.4	3.5	1.5	2.9	3.9
2012-13	2.5	1.4	3.3	1.1	2.8	3.9
2013-14	2.9	1.4	3.0	1.0	2.5	3.3
2014-15	2.8	2.6	2.2	1.8	2.2	3.0
2015-16	3.2	3.7	1.6	1.6	2.5	3.7
2016-17	3.2	3.6	1.6	0.8	3.5	5.2

Source: MM2, LCM (All figures are annual growth rates except unemployment, which is an annual rate)

Demand for imports will continue to fall after posting strong growth in 2006/07. Given the small exports sector, net exports will continue to subtract from growth. Overall GSP growth is forecast at 2.2 per cent in 2008/09 before averaging around 2.6 per cent over the medium term (Table 3.4).

Employment growth is expected to slow to a modest 0.8 per cent in 2008/09, as the effects of the Federal Government's one-off 2 per cent efficiency dividend moderates labour demand. Employment growth will remain relatively steady over the forecast period, and the

unemployment rate is forecast to remain below the national average, supported by heightened construction activity.

The unemployment rates for the ACT incorporate a falling participation rate. As the population of the ACT is expected to stay fairly steady, the labour force is projected to fall. Given that there is growth expected in employment in the ACT, this means that unemployment will fall.

Chart 3.7
ACT GSP Growth Rate and Unemployment Rate (%pa)

Source: MM2

3.3 Sector Outlook

This sub-section provides Econtech's outlook for the Mining, Construction and Electricity, Gas and Water sectors.

Mining

The output of the mining sector mainly consists of the extraction of minerals, exploration for minerals and the provision of services to mining and mineral exploration. Booming demand for materials is continuing to be driven by manufacturing and construction activity in the developing world. Despite the threat of slowing export growth in countries like China and India, domestic consumption has so far cushioned these economies from the effects of the US subprime mortgage crisis. As such, the outlook for the Mining sector remains positive, with Australian miners poised to capitalise on the favourable conditions in 2008/09.

The recent period of heavy investment in mining has resulted in significant production capacity growth in the mining industry. A number of new mining operations are scheduled to begin production in 2008/09, which should result in substantial production growth over the next few years. According to ABARE, coal production is expected to increase by 55 per cent in 2008/09, whilst iron ore production will be boosted by the opening of Fortescue's Pilbara

mining operation and Rio Tinto's Hope Downs project. Other commodities that will experience noteworthy production growth include gold, zinc, liquid natural gas, nickel and copper. The net effect will be strong output growth of 8.9 per cent in 2008/09 (Table 3.5).

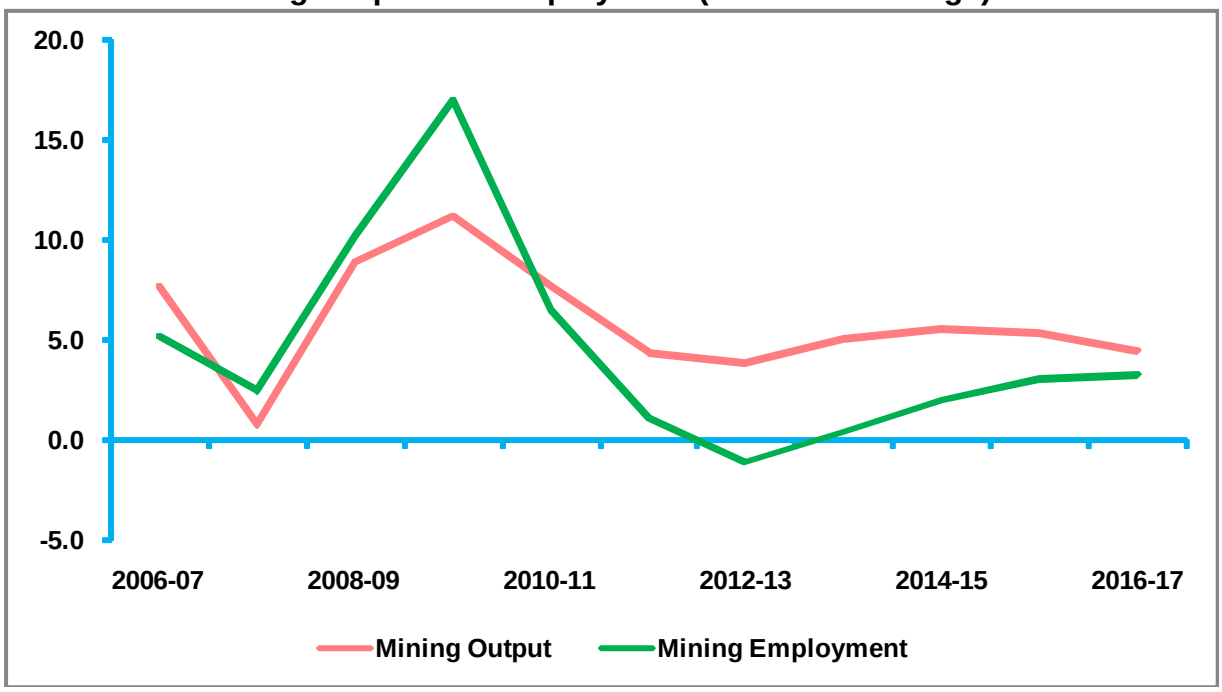
Table 3.5
Mining Output and Employment (Annual % Change)

	Mining Output	Mining Employment
2006-07	7.6	5.1
2007-08	0.8	2.4
2008-09	8.9	10.1
2009-10	11.1	16.8
2010-11	7.5	6.3
2011-12	4.2	0.9
2012-13	3.7	-1.3
2013-14	4.9	0.3
2014-15	5.6	1.9
2015-16	5.4	3.0
2016-17	4.6	3.4

Source: MM2

Table 3.5 shows forecasts of Mining output and employment growth. Over the past few years there has been an accelerating trend of employment growth within the Mining industry. While there is significant growth forecast for employment during 2008-09 and 2009-10, the mining sector accounts for a small proportion of total employment thus additions to this small base show up as significant percentage changes.

Chart 3.8
Mining Output and Employment (Annual % Change)



Source: MM2

The increase in Mining employment forecast over the medium term takes into account the sharp rise in commodity prices, and the expected increase in commodity exports over the

medium term as several major mining projects are completed and are expected to begin production in the near future. For example, in Western Australia, the North West Shelf LNG Consortium (Dec 08 production) and the Boddington Gold Mine (Oct 08 production).

Looking forward, as commodity prices ease, so will production, and hence there will also be a corresponding moderation in the growth of Mining employment. With demand and supply balanced on a knife edge in most commodity markets, supply side shocks resulted in significant price movements in 2007/08. The price of coal jumped when production was disrupted by heavy rains in north-east QLD. Chinese exports were also constricted as snow storms forced the government to divert coal towards domestic energy production. Power shortages in China, South Africa and New Zealand all acted to reduce aluminium production, whilst industrial action in Chile had a similar effect on copper. Gold prices on the other hand were driven up by the weakness of the USD, as investors sought to hedge against the currency by buying bullion. Oil prices have also skyrocketed as a result of falling spare production capacity and a sluggish supply response to growing demand. The overall effect has been an appreciation in the terms-of-trade for Australian miners, which coupled with output growth, is expected to result in strong export earnings growth of 15 per cent in 2008/09.

Construction

The output of the Construction sector consists of dwellings, other non-residential buildings such as offices and retail, engineering construction such as roads and mines, and construction trade services such as site preparation and building completion services. The Construction industry sells 90 per cent of its output to other industries as investment, and as such, is heavily influenced by investment in the wider economy.

Over the short-term, the moderation in Construction employment is due to the weakness in business and dwelling investment as a result of the high interest rates and tight credit market (Table 3.6).

Table 3.6
Construction Output and Employment (% Change)

	Construction Output	Construction Employment
2006-07	8.2	6.8
2007-08	4.1	2.8
2008-09	2.9	0.5
2009-10	3.8	0.9
2010-11	3.8	2.2
2011-12	1.8	2.1
2012-13	1.3	-0.8
2013-14	3.1	-1.5
2014-15	3.8	1.8
2015-16	2.9	4.0
2016-17	2.5	2.2

Source: MM2

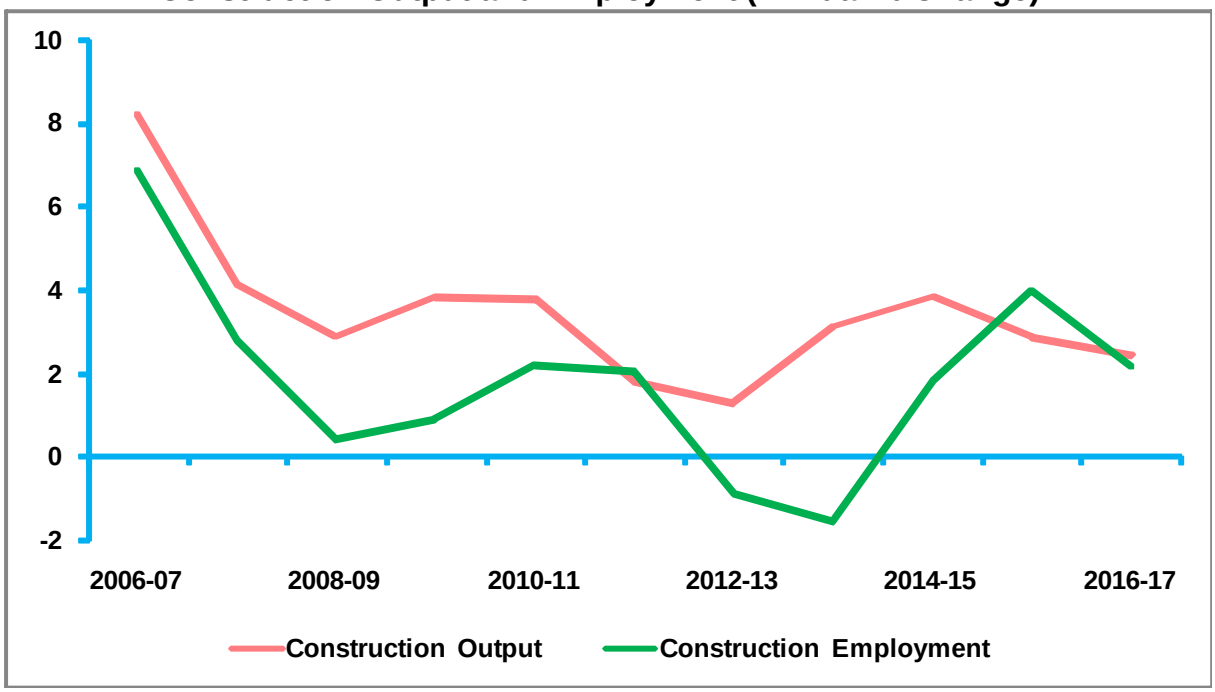
The recent strong performance of the Construction industry can be attributed to investment in the mining sector, as well as non-residential construction that was encouraged by high business confidence and favorable market conditions. Econtech has undertaken a previous

study which also shows that labour productivity has been improving in the construction industry since the turn of the century[4]. Much of this improvement in productivity can be attributed to recent industrial relations reforms and in particular the activities of the Australian Building and Construction Commissioner (ABCC) and its predecessor the Building Industry Taskforce. Looking forward, the fundamentals driving construction will shift, although growth in this sector should continue to outpace that in the wider economy.

Engineering construction has been the strong performer for the construction industry, with the commodities boom prompting miners to invest heavily in expanding production capacity. Mining construction is expected to remain high by historical standards, but the focus of engineering construction is likely to shift gradually towards infrastructure projects over the next few years. Investment in water infrastructure will be a major source of activity, as well as heavy investment under the South East Queensland Infrastructure Plan, which has tabled $80 billion of infrastructure improvements over the next twenty years.

On the other hand, non-residential construction is expected to feel the impact of deteriorating global economic conditions, as lower business investment leads to a drop off in activity. Recent levels of investment in office buildings are unlikely to be maintained as the economy slows, and growth in accommodation will continue to suffer as the high AUD restricts tourism activity. Tensions between demand and supply within the residential sector are also likely to persist over the short run. High borrowing costs have impeded the recovery in housing investment, despite the strength in underlying demand. As such, a recovery in residential construction is expected in 2009/10, roughly in line with an easing of interest rates. Overall, growth in construction is to moderate from a strong 4.1 per cent in 2007/08 to 2.9 per cent in 2008/09 (Table 3.6).

Chart 3.9
Construction Output and Employment (Annual % Change)



Source: MM2

[4] "Economic Analysis of Building and Construction Industry Productivity", Australian Building and Construction Commission, 2007.

Electricity, Gas and Water (Utility)

Prior to 1990, the Australian utilities sector had been dominated by government owned monopolies, under a heavily regulated system that segregated electricity and gas supply by State. Electricity had generally been a State or Territory provided service with limited interaction between the state grids. The natural gas industry was also partly government owned, and consisted of a small number of networks connecting basins to major cities. Inter-state trade in natural gas was often limited by statute, there were very few connections between state networks and competition was constrained by the fact that the majority of the networks were natural monopolies[5].

The early 1990's saw the beginning of a period of dramatic change in the energy sector. A number of government enquiries had identified the need for the deregulation of specific industries. The Hilmer enquiry, in particular, cited the benefits that could be gained by making the energy industry more competitive. Consequently, state governments set about making extensive structural changes to both the gas and electricity markets, with the aim of creating a competitive national electricity market between the eastern states and removing all barriers to the inter-state trade of natural gas[6].

Significant changes in the electricity industry included separating the vertically integrated electricity businesses into individual generation, transmission, distribution and retailing businesses. This allowed generators and retailers in the Eastern States to compete with each other through interconnected power grids, whilst the transmission and distribution monopolies could be regulated to prevent monopoly pricing.

In 1998 the National Electricity Market (NEM) began operating as a wholesale electricity market between QLD, New South Wales, Victoria, the ACT and South Australia (Tasmania joined in 2006)[7]. The NEM allows all of the interconnected state generators to pool their output in a national grid, so distributors and retailers can buy it on the spot market and resell it to consumers in a competitive market. In this way, generators compete with each other as they bid to supply electricity to the NEM, whilst retailers compete against each other in consumer markets.

A number of similar reforms were also made to the gas industry. These included the removal of all legislative and regulatory barriers to inter-state trade, the separation of transmission and distribution units from the state owned gas businesses, and the corporatisation of state owned gas businesses. Further legislative reforms included the creation of the National Third Party Access Code for Natural Gas and the establishment of independent state and territory regulatory bodies.

In the 1990s, the utility industry had an average growth rate that was among the lowest of all Australian industries. This was due to the impact of increased water and energy conservation on the demand side of the industry, which acted as a constraint on output. At the same time, reforms within this industry meant that substantial productivity gains were

[5] "Towards a Truly National and Efficient Energy Market", Independent Review of Energy Market Directions Council of Australian Governments, 2002.
[6] "2006-08 AER Strategic Plan", Australian Energy Regulator, 2006.
[7] "An introduction to Australia's National Electricity Market", National Electricity Market Management Company Ltd, June 2005

achieved through corporatisation, outsourcing and privatisation. As a result, labour productivity rose almost continuously from the mid-1980s to 2000.

Table 3.7
Utility Output and Employment (% Change)

	Utility Output	Utility Employment
2006-07	-1.2	-2.6
2007-08	0.6	3.9
2008-09	1.5	0.2
2009-10	4.9	0.9
2010-11	7.3	1.1
2011-12	4.8	1.5
2012-13	4.6	1.7
2013-14	4.7	1.5
2014-15	5.0	0.8
2015-16	4.7	2.9
2016-17	3.6	4.0

Source: MM2

Econtech's forecasts for output and employment in the utility industry (Table 3.7) are derived from a broad macro perspective which is in line with our general outlook for the overall economy, whilst also incorporating on-the-ground information from industry experts.

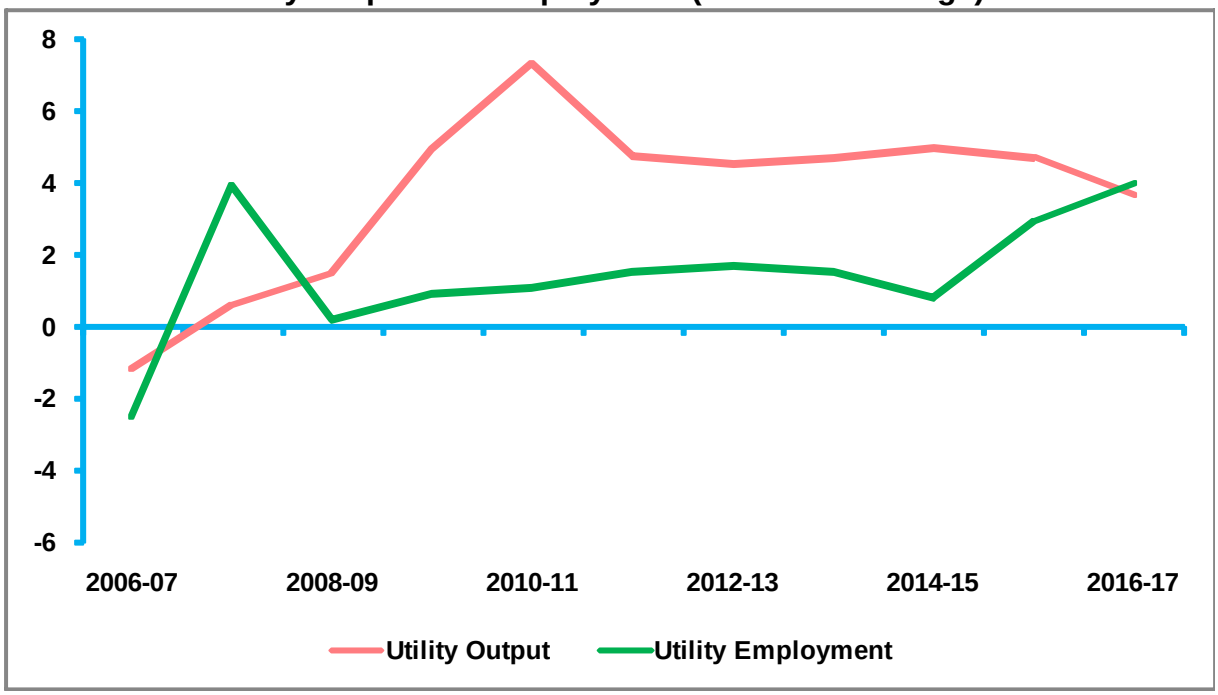
The utility sector will undergo a period of heightened activity over the next few years, as energy and water reform becomes a major priority for both State and Federal governments. The NSW Premier's Office has recently released details of an investment package for the NSW energy sector. The reforms include a Government withdrawal from the electricity retail market while retaining Government-owned power generation assets. Potential development sites for generation capacity will be sold to private operators. The expected effect of the privatisation will be to put downward pressure on retail prices and improve productivity.

Government reform aimed at sustainable resource management will drive investment in water. The Council of Australian Governments recently signed an agreement on Murray-Darling Basin reform that outlays a range of investments in water infrastructure. This will support investment in the wider industry which is otherwise being delayed due to the uncertainty created by the Emissions Trading Scheme (ETS). Nonetheless, water output will continue to be constrained by weather conditions in the short term. However, in the medium term, the gradual recovery in dam levels and a return to normal weather conditions will contribute to healthy growth in output in this sector. Over the longer term, growth in output will be supported by the 2004 National Water initiative. This initiative places an emphasis on improving efficiency and productivity within the industry, as well as restoring overstretched water systems to environmentally sustainable levels. Productivity gains arising from this initiative may lead to falling employment levels within the water sector of the Utilities industry over the longer term.

Econtech expects solid growth in output for gas and electricity over the forecast period. Strong demand for gas and electricity is expected to be driven in the short run by activity in steel production and iron ore refining. In addition, the push towards cleaner sources of fuel and an increasing focus on reducing greenhouse emissions are also encouraging growth in the consumption of gas, which is seen as a cleaner alternative to coal.

Over the long term, electricity prices are likely to be impacted upon by an ETS, although the exact effect remains uncertain. Any price movements will depend heavily on the final design of the ETS, as well as any transitional arrangements that the government agrees to put in place to protect consumers and industry. As such, the scheme could impact on output, although the current prospects for output growth are positive. Accordingly, production is forecast to grow by a strong average of 4.6 per cent over the next three years (2008/09 to 2010/11).

Chart 3.10
Utility Output and Employment (Annual % Change)



Source: MM2

The strength in output and the substantial increase in capital expenditure within the Energy sector over the medium term will lead to an increase in the demand for labour within the utilities industry. However, supply side factors, such as skills shortages in those occupations employed within the utilities industry, will act to moderate employment growth. As such, Econtech is expecting modest growth in employment within the Utilities industry over the medium term (Table 3.7).

3.4 Utility Industry in Selected States

Annual wage growth in the utility sector has historically been higher than the national average. Table 3.8 presents historical nominal growth rates for the utility industry, compared with the national all-industry growth rate. Consistent with the LCM, wages are measured using AWE. Growth rates for each specified period are compound growth rates. Compound growth rates measure the rate of change (per annum) in a value between two points in time. It differs from a simple average, by only focusing on the beginning value and the ending value.

Table 3.8
Historical Nominal Utility Industry Wage Growth (%pa)

	NSW	TAS	ACT	AUS	AUS - All Industries
1987/88 to 1997/98	5.8	5.5	5.6	5.8	4.3
1997/98 to 2007/08	5.1	4.8	5.5	4.7	4.1

Source: ABS (All figures are compound annual growth rates)

Table 3.8 indicates that the premium for wage growth in the utility industry has been experienced in NSW, Tasmania and the ACT. This is largely due to the fact that the driving forces behind this premium are present across Australia.

Generally speaking, wages growth in an industry is determined by a combination of factors that include inflationary pressures, productivity changes and the forces of supply and demand in the labour market.

These forces act in the following way to influence wage movements:

- High inflation puts upward pressure on wages as employees factor the rising costs of living in to wage demands.
- Increases in worker productivity mean that workers become more valuable to a firm, which allows them to demand higher wages. Decreases in worker productivity have the opposite effect.
- Changes in the supply and demand for labour shift the relative power of employers and employees in negotiating wages i.e. if demand is greater than supply, employers will have to pay more to attract the workers that they need.

The existence of an historical premium for utility industry wages across Australia has been due to a number of factors. Firstly, progressive deregulation of the energy sector since the early 1990's has facilitated strong productivity growth. This in turn has supported strong growth in wages. However, since the turn of the century, there has generally been negative growth in labour productivity[8], suggesting that recent wage movements must be the result of strong demand and relatively insufficient supply.

Over time, the utility sector has experienced a relatively higher increase in the proportion of highly-skilled occupations, compared to the economy as a whole. Between 1996-1997 and 2007-2008, the proportion of skilled workers[9] in the Australian utility industry increased from 37.1 per cent to 46.2 per cent – an increase of 9.1 percentage points. Over the same period, across all industries, the proportion of skilled workers increased from 35.1 per cent to 41.0 per cent – an increase of 5.9 percentage points[10]. Given that the price of skilled labour has also grown faster than labour generally, wages growth within the utility sector has been growing faster than the average for all industries. To this end, the stronger growth in utility sector wages may be partly due to composition effects which may not be associated with a true labour cost increase.

[8] "Experimental Estimates of Multifactor Productivity", ABS Information Paper, 2007
[9] Skilled workers are defined as Managers and Administrators, Professionals and Associate Professionals according to Australian and New Zealand Standard Classification of Occupations (ASCO)
[10] ABS Labour Force, Quarterly May 2008, Cat No. 6291.0.55.003, Data cube E09

Although inflation has been a concern in recent times, it is more apt to view wages growth as a driver of accelerating inflation as opposed to wages having led to higher consumption thus bidding up prices. In 2007/08, CPI inflation was only above the national average (3.3 per cent) in the ACT (3.7 per cent), while NSW and Tasmania (2.9 per cent) were below the national average. This suggests that any effect inflation is having on wages would be weaker in NSW and Tasmania and stronger in the ACT.

Many years of strong economic growth in the Australian economy has not been accompanied by an expansion in supply. This has resulted in an extremely tight labour market in recent times, putting pressure on the available supply of skilled labour and a skills shortage currently exists in most professional occupations and trades. The effect of such a tightening in the labour market has been to put upward pressure on wages in some sectors, as businesses are being forced to offer higher wages to attract skilled workers.

The utilities sector in particular has been hit hard by the skills shortage, given the constant nature of demand for its output. According to ABARE[11], in NSW (including the ACT) consumption of electricity has grown at a compound annual rate of 2.5 per cent in the six years to 2006/07. Over the same period in Tasmania, consumption of electricity grew at a compound annual rate of 3.6 per cent. Given the essential nature of utility services, their supply must be reliable and activities within the industry are less responsive to increases in input costs. In other words, maintenance and supply activities in the utility industry cannot be delayed or cancelled when input prices such as wages increase in the short run. This means that businesses in this industry have a greater imperative to attract and maintain skilled workers and are more likely to absorb wage increases in order to maintain labour supply.

The utility industry has also had difficulty in retaining skilled staff due to demand booms in related industries. The utility industry employs a large proportion of electricians, electrical and other engineers; categories that are also employed extensively by the construction industry and the mining industry. As such, the recent mining and construction boom that has been taking place over the last few years has caused competition between the industries in these particular skill areas. Consequently, wages growth, particularly in the utility and mining industries has recently been well above average as the jump in demand for skilled labour has exacerbated the effect of the underlying supply shortage.

[11] "Australian Energy Statistics - Energy Update 2008", ABARE publication, available at www.abare.gov.au

4. Detailed Labour Cost Forecasts

This section highlights the key labour costs forecasts from the LCM which are relevant to the current report.

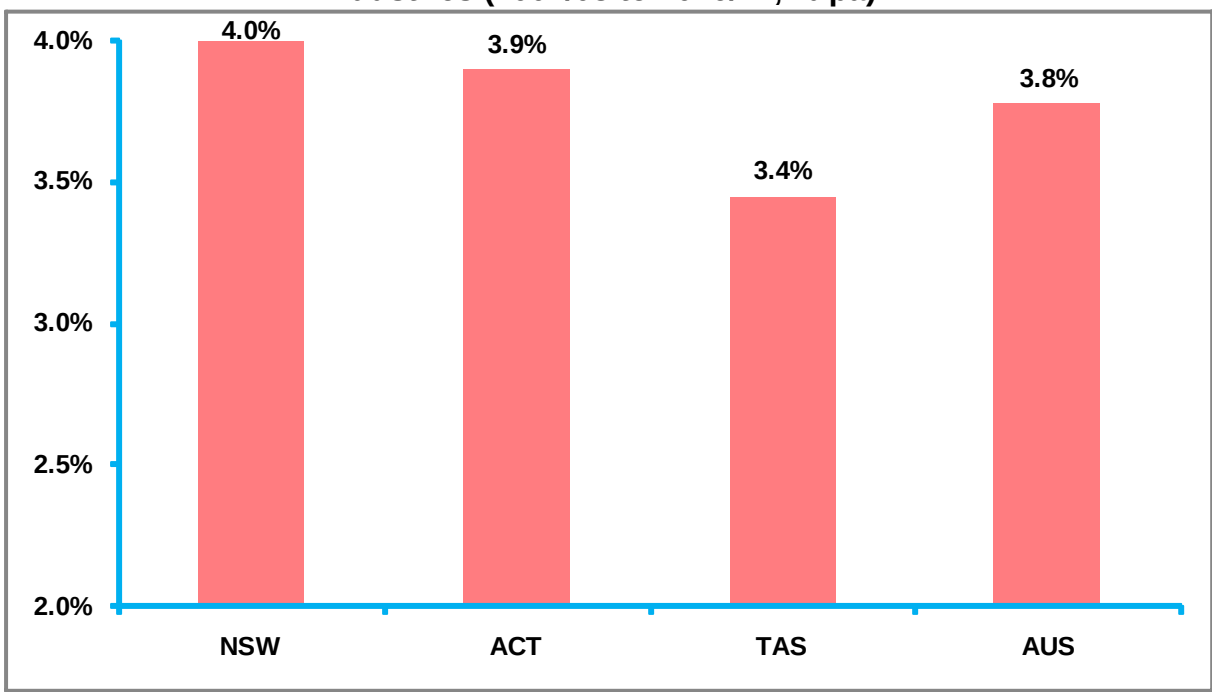
This section commences with wage growth forecasts conducted separately for a selection of states and industries. This is followed by analysis at the detailed state by industry level, for NSW, Tasmania and the ACT. This section concludes by explaining the main drivers behind the forecast labour cost growth rates in the utility industry.

4.1 Labour Cost Forecasts by State and by Industry

Chart 4.1 below shows the annual labour cost growth rates for New South Wales, ACT, Tasmania and nationally for all industries over the period 2007/08 to 2016/17. NSW and the ACT are expected to have the highest average annual growth in labour costs over the period 2007/08 to 2016/17. Annual growth in wages in Tasmania is expected to be more modest, coming in slightly under the national average.

Projections of annual labour cost growth rates for overall state and territories have moderated in the past 12 months. The Reserve Bank of Australia (RBA) raised the official cash rate by 25 basis points on four separate occasions since August 2007. The extent of the slowdown in household spending and credit expansion from within the household and business sector lead the RBA to cut interest rates by 25 basis points in September 2008. Despite this interest rate cut, the outlook for economic growth remains weak and the unemployment rate is expected to rise over the forecast period. These factors have combined to take some pressure off wages growth at the state and national level, since the last forecasts provided to the AER in 2007.

Chart 4.1
National Annual Compound Labour Cost Growth Rates by State for All Industries (2007/08 to 2016/17, % pa)



Source: LCM

Table 4.1a shows the annual nominal labour cost growth rates for the Mining, Electricity, Gas and Water, and Construction sectors over the period 2007/08 to 2016/17. Growth rates for 2007-08 are based on actual wage data for all four quarters.

Table 4.1a
Nominal Labour Cost Growth Rates, selected industries (% pa)

	Mining	Electricity, Gas & Water	Construction	All Industries
2007-2008	5.0%	2.5%	7.4%	3.9%
2008-2009	6.5%	6.0%	5.7%	4.8%
2009-2010	5.8%	5.9%	3.5%	3.6%
2010-2011	5.3%	5.8%	2.8%	3.4%
2011-2012	5.1%	5.8%	3.0%	3.6%
2012-2013	4.8%	5.6%	3.1%	3.7%
2013-2014	3.9%	4.7%	2.5%	3.2%
2014-2015	3.5%	4.1%	2.4%	2.9%
2015-2016	4.1%	4.6%	3.4%	3.6%
2016-2017	5.6%	5.9%	5.0%	5.1%

Source: LCM

Table 4.1b below shows the annual real labour cost growth rates for the selected industries. This is the nominal growth rate less the CPI inflation rate for the corresponding financial year.

Table 4.1b
Real Labour Cost Growth Rates, selected industries (% pa)

	Mining	Electricity, Gas & Water	Construction	All Industries
2007-2008	1.7%	-0.8%	3.9%	0.6%
2008-2009	2.7%	2.2%	1.9%	1.0%
2009-2010	3.2%	3.3%	1.0%	1.1%
2010-2011	2.6%	3.1%	0.2%	0.7%
2011-2012	2.1%	2.8%	0.1%	0.7%
2012-2013	1.8%	2.6%	0.2%	0.8%
2013-2014	1.4%	2.1%	0.0%	0.6%
2014-2015	1.3%	1.9%	0.3%	0.7%
2015-2016	1.6%	2.0%	0.9%	1.1%
2016-2017	1.8%	2.2%	1.3%	1.4%

Source: LCM, MM2

The utility sector across Australia experienced a negative real growth rate in 2007/08. There was, however, notable variation between the states and the national result was pulled down by negative nominal wage growth in Victoria (-1.1 per cent) and Tasmania (-0.1 per cent). In addition, the high rate of inflation contributed to the negative real growth rate. In 2007/08 inflation was 3.3 per cent, just above the RBA's target band of 2 to 3 per cent.

The outlook for the Mining sector remains positive, with strong output and employment growth expected. This industry will continue to be affected by the current skills shortage. This will support above average wage growth in the Mining sector.

The recent strong growth in Construction industry output and employment is not expected to continue over the forecast period. With a more subdued outlook and only modest employment growth expected, annual wages growth in the Construction industry is forecast to come in slightly under the national average over the forecast period.

The shortage of skilled workers in the utilities sector will continue to be an important driver of labour costs across Australia. While there are initiatives in place to increase the supply of skilled workers, most represent longer-term solutions. The Australian Government, through its Skilling Australia policy, will provide an additional 450,000 new training places. The Australian Government has also lifted permanent and temporary migration in its 2008/09 budget, however, there are remaining concerns over the ability of this additional labour to meet industry demand.

Output in the utility sector is expected to be solid over the forecast period. This will be largely due to increasing demand for gas, especially from the iron and steel industries. In addition, the push towards reducing greenhouse gas emissions will result in greater consumption of gas, which is a cleaner energy source compared to coal. The activity in steel production and iron refining will also result in a positive outlook for electricity output. Output from water supply should also pick up in the medium term with rising dam levels and easing drought conditions.

With projected annual growth of 5.4 per cent, national wages in the utility industry are expected to grow, on average, 1.6 percentage points higher than the national average.

Table 4.2 (a)
Average Nominal Wage Growth and Inflation in Australia (% pa)

	Mining	Electricity Gas and Water	Construction	All Industries	CPI Inflation
1987/88 to 1997/98	6.0	5.8	4.4	4.3	3.4
1997/98 to 2007/08	4.3	4.7	4.2	4.1	3.0
2009/10 to 2013/14	4.8	5.4	2.9	3.5	2.8
2007/08 to 2016/17	4.9	5.4	3.5	3.8	2.9

Source: LCM

Table 4.2 (b)
Average Real Wage Growth in Australia (% pa)

	Mining	Electricity Gas and Water	Construction	All Industries
1987/88 to 1997/98	2.5	2.3	1.0	0.9
1997/98 to 2007/08	1.3	1.7	1.2	1.1
2009/10 to 2013/14	1.9	2.6	0.0	0.6
2007/08 to 2016/17	2.0	2.4	0.6	0.9

Source: LCM

Tables 4.2(a) and 4.2(b) show average compound growth rates for nominal and real wages in selected industries in Australia, as well as the corresponding inflation figures. The compound growth rates represent two historical 10 year periods, the entire forecasting period and the relevant AER regulatory period, 2009/10 to 2013/14.

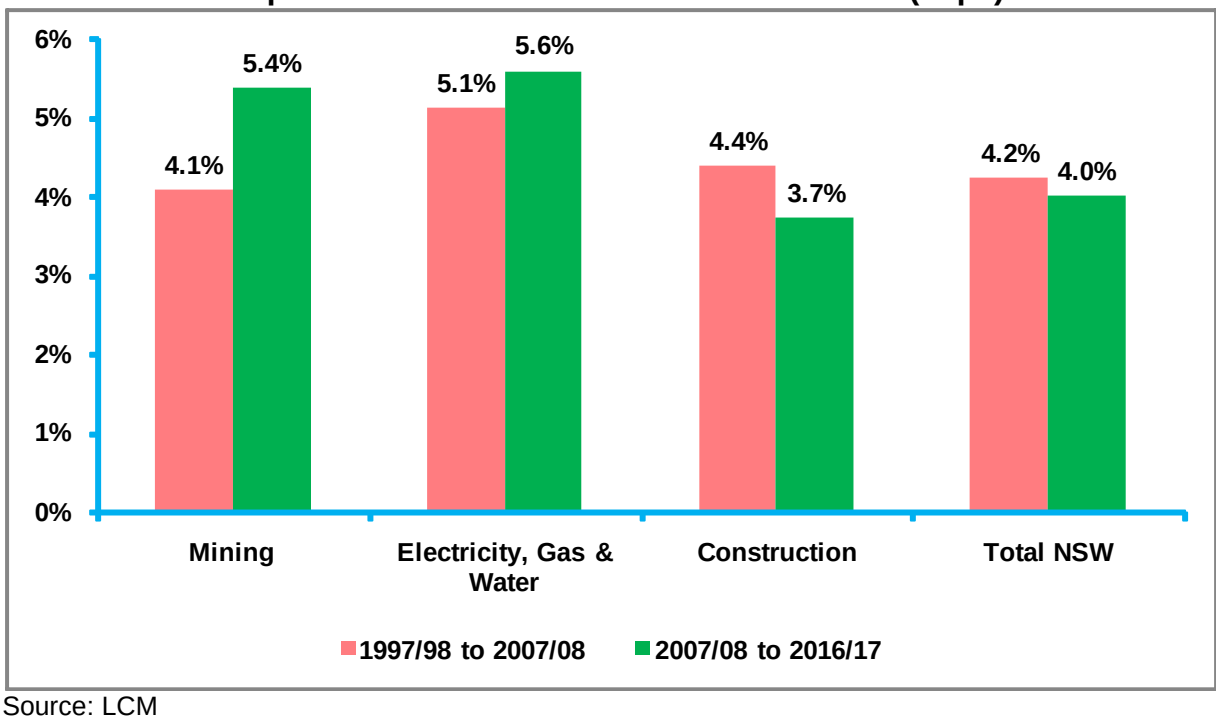
The utility industry is forecast to have the highest nominal and real wage growth of the selected industries. Historically, national utility industry wages have grown at around 1 percentage point higher than the all-industry average, however this will increase to around 1.5 percentage points during the forecast period.

4.2 Labour Cost Forecasts of Selected Industries in New South Wales

The economic factors driving growth in wages are more significant between industries than between states. This is because the labour market is generally mobile and will move between states, but labour cannot as easily move between industries where additional training and qualifications are required. For this reason, the wages growth for an industry does not tend to vary significantly between states and territories. Thus the factors that contribute to growth in utility industry wages being above average are also not significantly different between states and territories.

Chart 4.2 shows compound annual labour cost growth rates for the Mining, Electricity, Gas & Water, and Construction sectors in NSW over the historical period 1997/98 to 2007/08 and the forecast period 2007/08 to 2016/17. The average annual labour cost growth rates for these industries are presented in Table 4.3.

Chart 4.2
Compound Labour Cost Growth Rates in NSW (% pa)



Source: LCM

The forecast annual wage growth for the utility sector in NSW is expected to be higher than the all-industry average over the forecast period. This trend is similar to that at the national level. This partly reflects the fact that the wage forecasts at the detailed state level are consistent with overall national figures.

The NSW Premier's Office has recently released details of an investment package for the NSW energy sector. The reforms include a Government withdrawal from the electricity retail market while retaining Government-owned power generation assets. The expected

effect of the privatisation will be to put downward pressure on retail prices and improve productivity. Econtech predicts utility wages in NSW to grow at an annual rate 1.6 percentage points higher than the state average.

Econtech is expecting modest growth in employment within the utility industry. Hence demand for higher skilled employees within this sector should remain strong. Mining and construction activity in NSW will require engineering workers and while supply from apprenticeship programs should increase, this will not be sufficient to meet the demand for experienced workers[12]. A similar theme applies to electrical trades in NSW.

Output in the mining sector is expected to continue at historically high levels. This will support above average wage growth in NSW, with mining wages expected to grow at an average annual rate of 5.4 per cent over the forecast period, compared to the state average of 4.0 per cent.

The economic slowdown expected in the short term will also reduce business investment, which will slow growth in construction activity. Growth in construction industry wages in NSW over the forecast period is expected to be weaker than the all-industry average (Chart 4.2).

Table 4.3 below presents annual historical and forecast labour cost growth rates for selected industries and an all-industry average in NSW. The year-to-year labour cost growth rates are more volatile, which partly reflects the cyclical factors that affect the forecasts.

[12] *Overview of demand for trade skills NSW*, Labour Economics Office NSW, DEEWR January 2008

Table 4.3
Nominal Labour Cost Growth Rates in NSW (% pa)

	Mining	Electricity, Gas & Water	Construction	Total NSW
1996-1997	7.4	5.1	7.9	3.4
1997-1998	-0.1	7.6	-3.2	2.4
1998-1999	5.6	9.0	11.3	4.7
1999-2000	6.2	5.2	-0.7	4.4
2000-2001	8.3	5.9	1.4	4.4
2001-2002	5.0	10.2	6.7	4.9
2002-2003	1.0	-0.1	5.9	2.6
2003-2004	3.1	10.7	-2.7	6.0
2004-2005	4.7	0.7	3.9	3.7
2005-2006	5.0	4.5	6.1	5.5
2006-2007	2.4	1.5	1.4	2.5
2007-2008	-0.2	4.2	11.5	3.6
2008-2009	7.0	6.4	6.1	5.1
2009-2010	6.7	6.4	4.0	4.1
2010-2011	6.1	6.2	3.2	3.7
2011-2012	5.7	6.1	3.3	3.9
2012-2013	5.2	5.8	3.3	3.9
2013-2014	4.2	4.8	2.6	3.3
2014-2015	3.6	4.1	2.5	3.0
2015-2016	4.2	4.6	3.4	3.7
2016-2017	5.6	5.9	5.0	5.2

Source: LCM

The relatively low growth rates across the selected industries in 2006/07 correspond to weak output growth in the NSW economy. During 2006/07, gross state product growth in NSW was only 1.8 per cent, well below the long term trend. Given state CPI inflation of 2.7 per cent, the selected industries experienced negative real wages growth in 2006/07.

The negative growth rate in the Mining industry in 2007/08 is largely due to the weakness in Mining output during this year. Nationally, Mining output increased by only 0.8 per cent in 2007/08 as suppliers encountered production difficulties.

After accounting for historical and forecast inflation, real labour cost growth rates are presented in Attachment D (Table D1).

Tables 4.4(a) and 4.4(b) below summarise nominal and real annual wage growth in NSW. Over the period 2007/08 to 2016/17, overall nominal wages in NSW are expected to grow by 3.9 per cent per year. Accounting for an average inflation rate of 2.8 per cent per annum, overall real wages are forecast to grow by an annual average rate of 1.1 per cent.

In comparison, average nominal wages growth for the utility sector in NSW over the period 2007/08 to 2016/17 is forecast at 5.6 per cent per annum. The forecast average annual real wage growth for the utility sector is 2.7 per cent over the same period.

Table 4.4(a)
Average Nominal Wage Growth & Inflation in NSW (% pa)

	Mining	Electricity Gas and Water	Construction	All Industries	CPI Inflation
1987/88 to 1997/98	4.7	5.8	3.3	4.5	3.5
1997/98 to 2007/08	4.1	5.1	4.4	4.2	2.9
2009/10 to 2013/14	5.3	5.7	3.1	3.7	2.8
2007/08 to 2016/17	5.4	5.6	3.7	4.0	2.8

Source: LCM

Table 4.4(b)
Average Real Wage Growth in NSW (% pa)

	Mining	Electricity Gas and Water	Construction	All Industries
1987/88 to 1997/98	1.2	2.2	-0.1	1.0
1997/98 to 2007/08	1.1	2.1	1.4	1.3
2009/10 to 2013/14	2.4	2.8	0.3	0.9
2007/08 to 2016/17	2.5	2.7	0.9	1.1

Source: LCM

Over the regulatory period of 2009/10 to 2013/14, overall nominal wages in NSW are expected to grow on average by 3.7 per cent per annum. Accounting for an inflation rate of 2.8 per cent per annum, overall real wages are forecast to grow by an annual average of 0.9 per cent. Average annual nominal wages growth for the utility sector in NSW over the regulatory period is estimated at 5.7 per cent. The average annual real wage growth for the utility sector over the same period is 2.8 per cent.

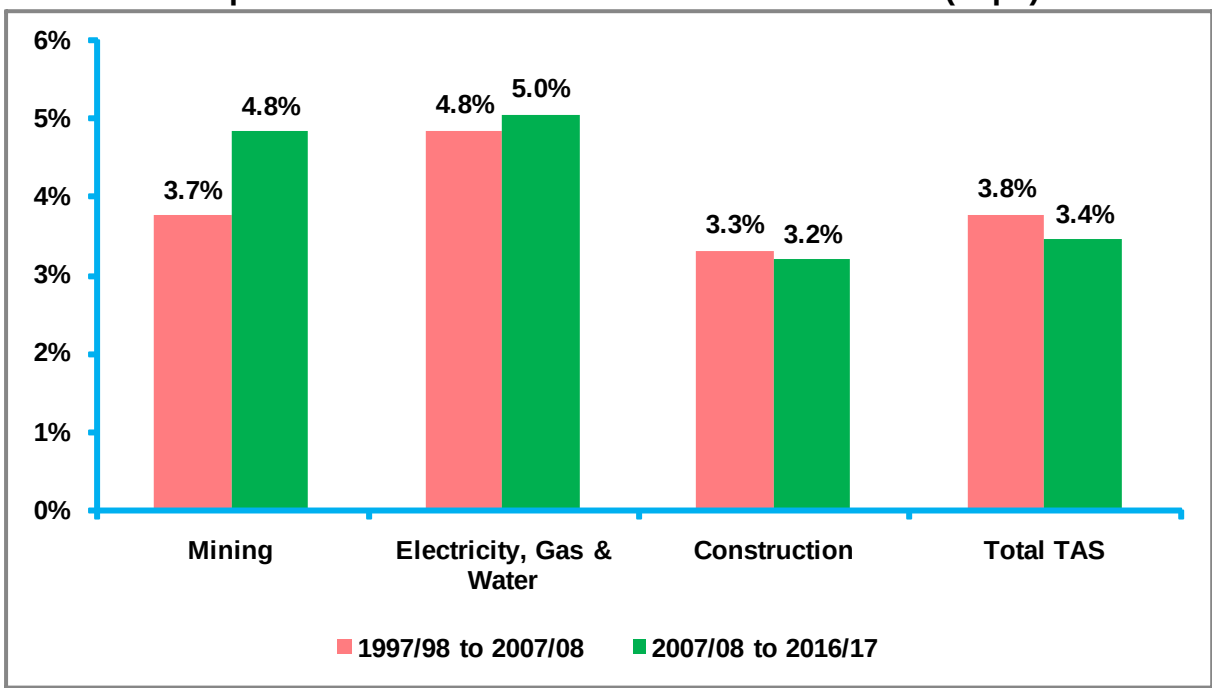
4.3 Labour Cost Forecasts of Selected Industries in Tasmania

Chart 4.3 below presents annual labour cost growth rates for the relevant industries in Tasmania.

A more modest economic outlook for Tasmania compared to NSW contributed to lower overall wages growth in Tasmania. Both the utility and mining industries are expected to achieve above average wage growth. Annual growth in construction industry wages is projected to be lower than the state average.

Major projects such as the Tamar Valley Power Station will create demand for many occupations including engineers and electrical tradespersons. Competition for these skilled workers will therefore increase in the short to medium term and push up wages, particularly in the mining and utility industries.

Chart 4.3
Compound Labour Cost Growth Rates in Tasmania (% pa)



Source: LCM

Table 4.5 below shows labour cost growth rates for selected industries in Tasmania.

The relatively weak growth in wages within the mining and utility industries in 2006/07 coincides with a general downturn in output and employment in the utilities sector and below average gross state product growth in Tasmania. Construction wages did not follow this trend, with mining based construction projects such as the Hellyer Metals Project and the Avebury Nickel mine aiding above average wages growth.

Labour cost growth rates for the utilities sector were also particularly weak in 2007/08. However, there is no specific reason for this weakness. According to the ABS, the volatility could be partly attributed to the small size of the sample as well as the effect of sample rotation. Since the AWE is a sample survey, the sample of units changes from quarter to quarter and this can impact the figures at the lower levels, particularly at the state by industry level.

Real labour cost growth rates for Tasmania are provided in Attachment D (Table D2).

Table 4.5
Nominal Labour Cost Growth Rates in Tasmania, 1996/97 to 2016/17 (%)

	Mining	Electricity, Gas & Water	Construction	Total TAS
1996-1997	1.1%	-0.7%	7.4%	3.1%
1997-1998	2.9%	13.2%	1.2%	2.3%
1998-1999	10.3%	13.7%	-3.7%	4.0%
1999-2000	5.5%	-0.6%	-15.7%	2.9%
2000-2001	5.4%	7.1%	-5.4%	2.4%
2001-2002	2.3%	6.7%	10.8%	2.5%
2002-2003	0.6%	3.4%	12.8%	6.0%
2003-2004	-0.4%	6.0%	6.0%	3.1%
2004-2005	5.0%	6.1%	5.1%	7.1%
2005-2006	4.2%	4.5%	15.9%	3.0%
2006-2007	-0.2%	2.0%	7.1%	2.5%
2007-2008	5.2%	-0.1%	4.3%	4.3%
2008-2009	6.4%	5.8%	5.5%	4.4%
2009-2010	5.7%	5.4%	3.0%	3.1%
2010-2011	5.2%	5.3%	2.4%	2.9%
2011-2012	5.0%	5.4%	2.6%	3.2%
2012-2013	4.6%	5.2%	2.7%	3.4%
2013-2014	3.8%	4.4%	2.2%	2.9%
2014-2015	3.3%	3.8%	2.2%	2.7%
2015-2016	4.0%	4.4%	3.2%	3.5%
2016-2017	5.4%	5.7%	4.8%	5.0%

Source: LCM

The forecast wage growth for the utility sector in Tasmania is expected to be higher than the all-industry average in Tasmania over the forecast period. Again, this trend is similar to that at the national level reflecting the consistency of wage forecasts at the detailed state level with overall national figures. The pick-up in growth during 2008/09 is consistent with the overall strength in labour cost growth nationally.

Tasmania is a relatively small economy, and hence there is considerable volatility in the data from year to year. This can be seen in the historical nominal labour cost growth rates across all three industries and is not confined to the utilities sector alone. According to DEEWR, in the year to May 2008, only 2,300 were employed in the utilities sector in Tasmania. This represents a mere 2.6 per cent of total industry employment. This small sample size increases sampling variability. The volatility in the nominal data flows on to the real (inflation-adjusted) series.

Table 4.6(a)
Average Nominal Wage Growth & Inflation in Tasmania (% pa)

	Mining	Electricity Gas and Water	Construction	All Industries	CPI Inflation
1987/88 to 1997/98	4.9	5.5	4.9	3.8	3.3
1997/98 to 2007/08	3.7	4.8	3.3	3.8	2.8
2009/10 to 2013/14	4.6	5.1	2.5	3.1	2.7
2007/08 to 2016/17	4.8	5.0	3.2	3.4	2.8

Source: LCM

Nominal wages for all-industries in Tasmania are projected to grow by 3.4 per cent per annum over the forecast period. Nominal wages in the mining industry will experience similar growth rates to the utility industry, with the construction industry below the all-industry average.

Table 4.6(b)
Average Real Wage Growth in Tasmania (% pa)

	Mining	Electricity Gas and Water	Construction	All Industries
1987/88 to 1997/98	1.6	2.2	1.6	0.5
1997/98 to 2007/08	0.9	2.0	0.5	0.9
2009/10 to 2013/14	1.9	2.3	-0.2	0.4
2007/08 to 2016/17	2.0	2.2	0.4	0.7

Source: LCM

Inflation in Tasmania is expected to average 2.8 per cent per annum over the forecast period. Therefore the utility industry is expected to record average annual real wage growth of a healthy 2.2 per cent, well above the all-industry average of 0.7 per cent.

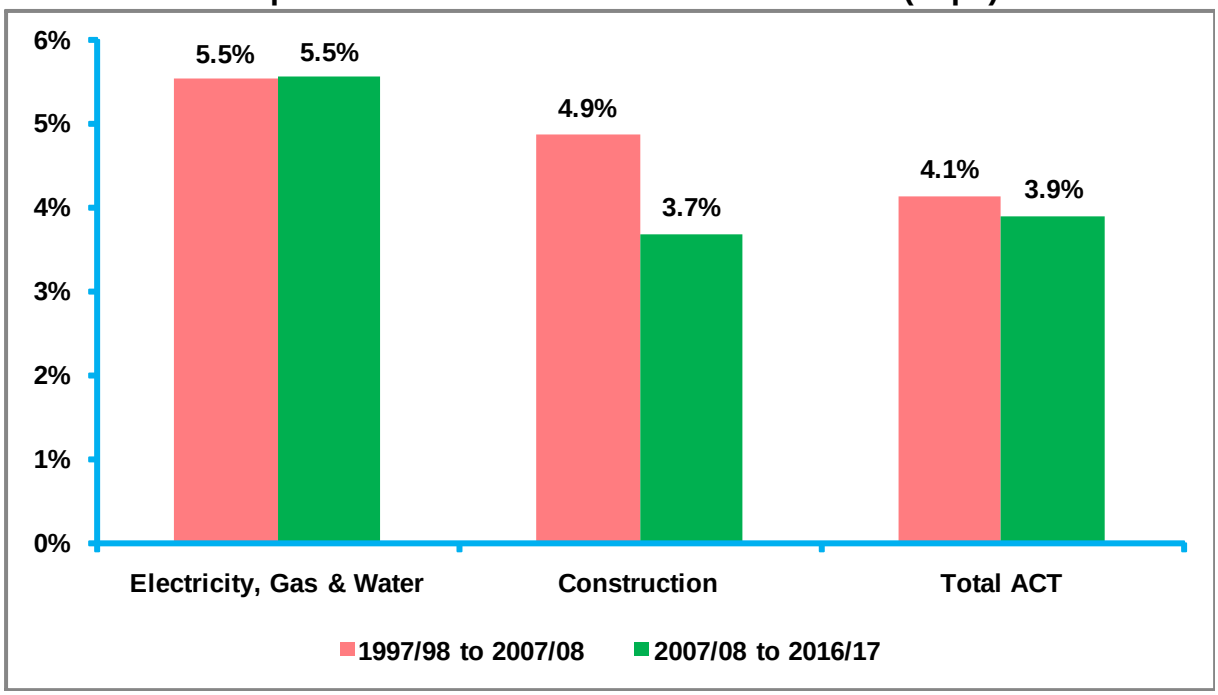
Over the regulatory period of 2009/10 to 2013/14, overall nominal wages in Tasmania are expected to grow by 3.1 per cent per year. Accounting for inflation, overall real wages are forecast to grow by an annual average of 0.4 per cent during this period. In comparison, average annual nominal wages growth for the utility sector in Tasmania over the regulatory period is estimated at 5.1 per cent. The average annual real wage growth for the utility sector over the same period is 2.3 per cent.

4.4 Labour Cost Forecasts of Selected Industries in the Australian Capital Territory

The mining industry does not have a significant presence in the ACT and there is insufficient historical data to produce reliable labour cost forecasts. The utility industry in the ACT is also relatively small, with around 1,000 employees at present, while the construction industry has a larger presence with approximately 9,000 employees. Economic data for the ACT is quite volatile. This partly reflects problems with reliability of the data. Some estimates, including those for AWE, are based on sample surveys. Since the sample size for the ACT is small, sampling error may be larger than for the States.

Chart 4.4 below shows historical and forecast annual compound growth rates for labour costs in the ACT. Growth in utility industry wages is expected to be above average, consistent with the findings in NSW and Tasmania. This is due to the fact that limited supply of skilled workers in this industry is an issue across Australia and not just confined to specific geographic regions.

Chart 4.4
Compound Labour Cost Growth Rates in ACT (% pa)



Source: LCM

Table 4.7 below contains the historical and forecast year-to-year nominal labour cost growth rates for the ACT. Real labour cost growth rates are provided at Attachment D (Table D3).

The volatility of data in the ACT is evident especially when considering historical construction industry wage growth. The 58 per cent growth in construction industry wages in 2005/06 coincides with increased construction activity, however this is unlikely to be representative of the true growth in wages. This may be partly due to composition effects, that is the characteristics of workers in the survey sample (for example full-time / part-time, male / female), but most of the variability would arise from sampling error. Caution therefore needs to be exercised when considering these historical growth rates. Notably, in 2006/07 construction wages fell 5.5 per cent, which is likely to be largely due to a correction of the 2005/06 result.

The utility industry has historically seen a more stable wage growth pattern. The exception appears in 2005/06 where nominal wages fell 3.1 per cent. While national utility output growth was modest at 1.6 per cent in 2005/06, utility employment growth was strong at 13.9 per cent. Gross state product growth was also around the long term average, which suggests this result may be due to compositional effects and/or data volatility.

Weak nominal labour cost growth across the ACT in 2007/08, driven by weakness in the overall ACT economy for that year (GSP grew by a modest 1.7 per cent), coupled with high inflation of 3.7 per cent lead to negative real labour cost growth of -1.1 per cent. In contrast labour cost growth in the utilities sector was particularly strong in 2007/08. Similar to the case in Tasmania, there is no specific reason for this strong growth and is more likely to be related to sampling issues such as the small size of the sample as well as the effect of sample rotation. Since the AWE is a sample survey, the sample of units changes from quarter to quarter and this can impact the figures at the lower levels, particularly at the state by industry level.

The Department of Education, Employment and Workplace Relations (DEEWR) notes that there are skills shortages in many occupations in the ACT including engineers and electricians[13]. These skill shortages are likely to continue to affect the construction and utility industries into the forecast period, as supply of skilled workers takes time to build up due to training and qualification requirements.

Table 4.7
Nominal Labour Cost Growth Rates in ACT, 1996/97 to 2016/17 (% pa)

	Electricity, Gas & Water	Construction	Total ACT
1996-1997	6.6%	-14.5%	3.3%
1997-1998	4.7%	3.5%	6.0%
1998-1999	8.0%	13.8%	3.3%
1999-2000	4.6%	-6.2%	2.1%
2000-2001	8.5%	2.0%	4.4%
2001-2002	6.9%	0.6%	0.2%
2002-2003	3.8%	14.8%	7.0%
2003-2004	5.4%	-12.4%	4.0%
2004-2005	3.2%	-10.6%	5.9%
2005-2006	-3.1%	58.0%	7.7%
2006-2007	5.7%	-5.5%	4.2%
2007-2008	13.2%	9.4%	2.6%
2008-2009	5.8%	5.5%	4.6%
2009-2010	6.1%	3.7%	3.8%
2010-2011	6.1%	3.2%	3.6%
2011-2012	6.1%	3.4%	3.9%
2012-2013	5.9%	3.3%	3.9%
2013-2014	4.9%	2.7%	3.3%
2014-2015	4.3%	2.6%	3.0%
2015-2016	4.7%	3.5%	3.7%
2016-2017	6.0%	5.1%	5.2%

Source: LCM

Over the next two years, solid wages growth in the construction industry is supported by new and continuing construction projects in the ACT. These include the Australian Security Intelligence Organisation (ASIO) and Department of Defence offices, Canberra International Airport and various construction projects for the Australian National University.

Tables 4.8(a) and 4.8(b) presents a summary of nominal and real wage growth in the ACT. Compound growth rates have been calculated for 10-year historical periods, a 9-year forecasting period as well as the current AER regulatory period.

[13] "Overview of demand for trade skills: Australian Capital Territory", DEEWR, December 2007, available online at www.workplace.gov.au

Table 4.8(a)
Average Nominal Wage Growth & Inflation in ACT (% pa)

	Electricity Gas and Water	Construction	All Industries	CPI Inflation
1987/88 to 1997/98	5.6	2.7	4.7	3.3
1997/98 to 2007/08	5.5	4.9	4.1	3.0
2009/10 to 2013/14	5.7	3.2	3.7	2.7
2007/08 to 2016/17	5.5	3.7	3.9	2.8

Source: LCM

Table 4.8(b)
Average Real Wage Growth in ACT (% pa)

	Electricity Gas and Water	Construction	All Industries
1987/88 to 1997/98	2.2	-0.6	1.4
1997/98 to 2007/08	2.4	1.8	1.1
2009/10 to 2013/14	3.0	0.5	1.0
2007/08 to 2016/17	2.7	0.9	1.1

Source: LCM

As discussed above, nominal wage growth is projected to be highest in the utility industry over the forecast period. At 2.8 per cent, the average annual inflation is expected to be generally on par with NSW and Tasmania over the forecast period. Real wage growth for the utility industry is expected to come in at 2.7 per cent per annum over the forecast period, and even higher at 3.0 per cent per annum during the regulatory period.

As was the case in NSW and Tasmania, average annual real wages growth for the utility industry in the ACT is forecast to be around 1.6 percentage points higher than the all-industry average over the forecast period.

4.5 Factors Driving Labour Cost Forecasts in the Utility Sector

This subsection provides a summary of the main factors driving labour cost forecasts for the utility industry.

Over the forecast period, Econtech expects solid output growth in the utility industry. Strong demand for gas and electricity is expected to be driven in the short run by activity in steel production and iron ore refining. The push towards cleaner sources of fuel and an increasing focus on reducing greenhouse emissions are also encouraging growth in the consumption of gas, which is considered a cleaner energy source compared to coal. In the medium term, the gradual recovery in dam levels and a return to normal weather conditions will contribute to healthy growth in output for the water supply industry.

The shortage of skilled workers in the utilities sector continues to be a significant driver of labour costs. The utility industry employs a large proportion of electricians and engineering professionals. These occupations are included on the DEEWR "Skills Shortage List" for NSW, Tasmania and the ACT[14]. The shortage of these workers however is currently

[14] "State and Territory Skills Shortage Lists", DEEWR, May 2008, available online at www.workplace.gov.au

affecting most of Australia. Engineers Australia estimates there is currently a shortfall of 20,000 professional engineers to meet Australia's requirements[15].

A number of initiatives have been introduced to increase the supply of workers for these occupations. The Australian Government, through its Skilling Australia policy, will provide an additional 450,000 new training places over the next four years. These training places will be available for both existing workers and jobseekers. The significance of this program is that it is demand driven and will target those occupations facing skills shortages[16]. Most of these initiatives, however, represent a longer-term solution.

The Australian Government has lifted permanent and temporary migration in its 2008/09 budget. This includes an increase of 31,000 places under the Permanent Skilled Migration program during 2008/09. Other initiatives include a $19.6 million pledge to improve the processing and compliance of the temporary skilled migration (457 visa) program. The Minister for Immigration and Citizenship has commenced a broad reform of the 457 visa program. One of the aims of the reform is to make the program more responsive to labour market needs. Such initiatives have the potential to relieve skills shortages in the short-term, however a number of pre-existing issues need to be resolved such as recognition of overseas qualifications and a lack of worker familiarity with Australian regulations and standards[17]. Econtech accounts for permanent and temporary migration (such as 457 visas) within the demographic model in MM2 at the national level.

An aging workforce in the utility industry may also put further strain on the supply of skilled labour. According to research by SkillsInfo[18], the utility industry has an older than average workforce relative to all industries. In 2007, 40.8 per cent of the utility industry were aged 45 years and over, compared to 37.2 per cent for all industries. As only 1.1 per cent of the utility industry workforce were aged over 65, the aging workforce issue is more likely to be a concern in the medium to long term. The effect of smaller labour force will be to put upward pressure on utility industry wages.

The combination of supply and demand factors described above will contribute to above average wage growth in the utility sector over both the forecast and AER regulatory periods.

[15] "Fixing Australia's engineering skills shortage is an urgent and shared responsibility", Engineers Australia, Media Release, 29 January 2008.
[16] "Skilling Australia for the Future", Discussion Paper 2008.
[17] "Engineering Skilled Migration", Engineers Australia, March 2006.
[18] "Employment Outlook for Electricity, Gas and Water Supply", SkillsInfo Research Paper, July 2008 http://www.skillsinfo.gov.au/

5. Review of Labour Cost Forecasting Submissions

In this section, Econtech will review the methodology used to forecast labour costs proposed by the electricity network businesses in NSW and Tasmania. Specifically, Econtech will review the following reports:

- Competition Economists Group (CEG), Escalation factors affecting expenditure forecasts – A report for Transend, April 2008; and
- Competition Economists Group (CEG), Escalation factors affecting expenditure forecasts – A report for NSW Electricity Businesses, April 2008.

5.1 Wage Measures

Both CEG reports rely on wage forecasts provided by specialist economic forecasters. In particular, detailed wage forecasts for the utilities industry are based on a report by Macromonitor[19] and a report by Econtech[20].

The Econtech wage forecasts for the utilities sector used by CEG are from a report provided by Econtech to the AER for the SPAusnet and VENCorp reviews. These wage forecasts for the national utilities industry are based on the AWE and were developed using an earlier version of the LCM. CEG used Econtech's forecasts of CPI inflation, sourced from Econtech's December 2007 ANSIO publication to convert Econtech's nominal wage forecasts into real wage forecasts.

To measure wage growth in the utility sector, Macromonitor use Average Weekly Full Time, Ordinary Time Earnings (AWOTE). Compared to the AWE data used in the LCM, AWOTE includes only full time workers and excludes non-standard wages such as paid overtime. As noted by Macromonitor, AWOTE is not affected by compositional changes between full time and part time workers, or changes in average paid overtime.

AWOTE will account for changes in the proportion of high and low paid workers. Macromonitor state that this is important in a tight labour market as often workers will be offered a promotion to retain their services, which would increase average wages.

The CEG reports also refer to a general wage forecast provided by Econtech in its December 2007 ANSIO Report. These forecasts are based on a wage measure known as "Compensation of Employees" (CPE), as described in Attachment C. CPE is calculated based on total compensation of employees from the National Accounts, divided by the number of employees from the Labour Force Survey. As discussed in Section 2, Econtech found that on balance, AWE was generally less volatile than CPE across industries and states and therefore AWE is considered the most appropriate wage measure for the AER. The CPE is used in ANSIO to ensure consistency with the National Accounts, which the remainder of the forecasts within ANSIO are based.

[19] "Forecasts of Cost Indicators for the Electricity Transmission Sector – New South Wales and Tasmania", Macromonitor, February 2008

[20] "Labour Costs Growth Forecasts", Econtech, August 2007

5.2 Forecasting Methodology

The Macromonitor report provides forecasts of growth in AWOTE for the utility sector in NSW, Tasmania and Australia.

The report does not contain any description of the methodology used to forecast wages growth. It is therefore difficult to assess or evaluate the forecast results provided. For instance, it is unclear as to the extent with which the Macromonitor forecasts for wages in the utility industry are consistent with the outlook for broad macro-economic factors nationally, and across industries and states. This is in contrast to Econtech's methodology where the labour cost forecasts are derived from MM2, an economy-wide forecasting model. What is made clear by Macromonitor is that they do not use any econometric techniques to derive their forecasts[21].

Table 5.1 compares the nominal annual growth forecasts from Macromonitor and the LCM for the utility sector in NSW, Tasmania and Australia. The forecasts for 2008-09 are quite similar from both sources, however during the middle of the forecast period the LCM generally predicts higher growth rates due mainly to labour skills shortages. Growth rates then ease towards the end of the forecast period. In contrast, Macromonitor predicts annual growth rates to be lower during the middle period as they expect demand from the mining, construction and utility industries to ease.

Table 5.1
Comparative Forecasts - Nominal Labour Cost Growth Rates (% pa)

	NSW		TAS		AUS	
	Macromonitor	LCM	Macromonitor	LCM	Macromonitor	LCM
2007-2008	6.5	4.2	4.5	-0.1	6.0	2.5
2008-2009	6.5	6.4	5.5	5.8	6.0	6.0
2009-2010	4.0	6.4	4.0	5.4	4.0	5.9
2010-2011	0.5	6.2	2.0	5.3	2.0	5.8
2011-2012	3.5	6.1	4.0	5.4	4.0	5.8
2012-2013	5.5	5.8	6.0	5.2	5.0	5.6
2013-2014	6.0	4.8	6.5	4.4	5.5	4.7
2014-2015	6.0	4.1	6.0	3.8	5.5	4.1
2015-2016	-	4.6	-	4.4	-	4.6
2016-2017	-	5.9	-	5.7	-	5.9

Source: Macromonitor, LCM

Productivity Adjusted Wages

Macromonitor also calculate productivity adjusted wage costs, or unit labour costs (ULC). They argue that this is a more meaningful measure of changes in an organisation's labour costs. Labour productivity is measured in terms of value added per hour worked.

While reasons are put forward to explain forecasts of productivity, there is again no clear methodology provided that outlines how productivity is forecast. It is stated that "...forecasts

[21] "Forecasts of Cost Indicators for the Electricity Transmission Sector – Forecasting Methodology", September 2008, page 3.

are based on historical data measuring gross value added per hour worked..."[22]. State based estimates of labour productivity are calculated using total factor income data.

Macromonitor are expecting negative annual productivity growth in the utility sector over the next few years, which becomes positive from 2011-12. The same general trend is expected in NSW and Tasmania. The negative annual productivity growth is generally attributed to a continuing upturn in the economy coupled with a further tightening of the labour market and difficulties attracting and retaining skilled staff.

Between 2007-08 and 2013-14, Macromonitor forecast an average annual productivity reduction of 0.7 per cent in the NSW utility sector and a 0.9 per cent annual reduction in the Tasmanian utility sector.

The forecasts of annual productivity adjusted wages growth, or ULC, is calculated according to the following formula:

$$ULC = X - Y\ ((1 + X) / (1 + Y)),$$

Where:

X = Annual growth in wages
Y = Annual growth in productivity

The Macromonitor report has been used by CEG to present forecasts of real unit labour costs (RULC) for NSW and Tasmania. RULC use real annual growth in wages as opposed to nominal growth. CEG provide best estimates of inflation by taking the average inflation forecasts of a selection of expert macro-economic forecasters. These are national inflation figures, and separate inflation forecasts for NSW and Tasmania are not considered.

Another difference in the RULC measure used by CEG is the annual productivity growth, which is averaged over the forecast period. This was considered a more conservative approach as it reduced the overall impact of escalation on total labour costs over the five years to 2013-14, for both NSW and Tasmania.

The approximate relationship between RULC, real wages growth and productivity growth can be expressed as follows:

$$\text{RULC growth (\%)} \approx \text{Real wages growth (\%)} - \text{Productivity growth (\%)}$$

Given the above relationship, the effect of forecasting negative productivity growth is clear. This will increase growth in labour costs above the growth in real wages. This relationship can be seen in Table 6 within the CEG reports for NSW and Tasmania.

CEG compare forecasts of annual growth in RULC in NSW and Tasmania with forecasts derived from Econtech, as discussed in the preceding section. These comparisons are provided in Table 5.2.

[22] "Forecasts of Cost Indicators for the Electricity Transmission Sector – New South Wales and Tasmania", Macromonitor, February 2008, page 12.

Table 5.2
Comparative Real Labour Cost Growth Rates (%, pa)

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Econtech (Aus-wide)	2.0%	2.8%	5.6%	5.0%	3.9%	3.4%	3.1%
Macromonitor (NSW)*	4.2%	4.4%	2.3%	-1.2%	1.7%	3.7%	4.2%
Macromonitor (Tas)*	2.4%	3.6%	2.4%	0.5%	2.3%	4.3%	4.9%

Source: CEG
* Productivity adjusted

In making the above comparisons, CEG assumed that Econtech forecasts incorporate trends in productivity.

The RULC figures in CEG's reports for NSW and Tasmania are not directly comparable with the derived Econtech forecasts as outlined in Table 5.2. The Econtech forecasts of wages growth does not take out productivity growth. Hence, Econtech's forecast of wage growth represents the general increase in labour costs over and above CPI inflation as well as the specific compensation to labour for increases in productivity[23]. This is why Econtech's cost escalation factors were found, on average, to result in higher labour costs from 2009-10 to 2013-14. Since Econtech's forecasts incorporate compensation for increases in productivity, they are not equivalent to real unit labour costs. In addition, the derived Econtech forecasts are based on the national economy, and not specifically for NSW and Tasmania.

The labour cost escalation factors recommended by CEG for NSW and Tasmania are an average of the derived Econtech and RULC / Macromonitor escalation factors. Given that the derived Econtech forecasts are not equivalent to real unit labour costs, this approach is misguided.

The CEG recommendations of escalation factors for labour costs in NSW and Tasmania are based on Macromonitor forecasts of wages and productivity growth. There has been no clear methodology presented that enables Econtech to assess the quality of these forecasts. The CEG recommendations for labour cost escalation factors in NSW and Tasmania are based on an average of Econtech and Macromonitor escalation factors. However, the derived Econtech forecasts are not RULC, therefore the escalation factors are not directly comparable.

[23]The LCM incorporates labour productivity via the employment forecasts used in MM2. MM2 incorporates labour productivity assumptions through its own labour productivity index, PSkill. PSkill is an input into the model and not an output. It is calculated as the average of Mean Weekly Earnings (MWE) across the 9 1-digit Australian Standard Classification of Occupations (ASCO) classification relative to the MWE of a Manager/Administrator (the highest skill level). This methodology uses MWE as a proxy for productivity, that is, the more productive you are, the higher your earnings. So Pskill should always be below 100 because Managers/Administrators have the highest level of earnings and, under these assumptions, the highest level of productivity.

Along with this productivity index, MM2 also incorporates assumptions regarding the growth in labour efficiency for each industry. Labour efficiency in each industry is then used to augment PSkill.

In summary, Econtech believes that for the purpose of this report detailed AWE data broken down by state and by industry is the best indicator of wage movements. Further, Econtech forecasts incorporate increases in wages as a result of increased productivity. That is Econtech's forecasts of wages growth does not take out productivity growth and are not equivalent to the Macromonitor forecasts. The approach used by CEG in deriving its forecast of labour cost escalation is not sound given that Econtech's forecast and Macromonitor's forecast are not directly comparable. Such a methodology is likely to provide inaccurate forecasts of labour cost escalation.

Attachment A – The Labour Cost Model (LCM)

Section 2 provides an overall perspective on the LCM model. This attachment to the report describes in more detail the modelling principles behind the LCM and the data sources used in the modelling.

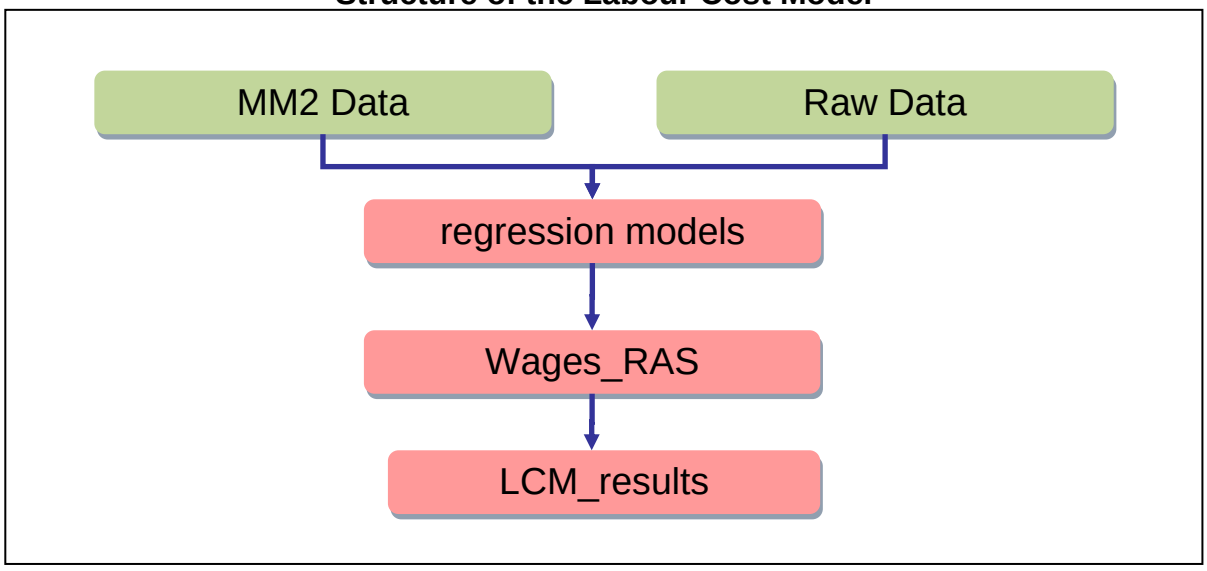
There are four main steps in constructing a model such as the LCM. These steps are outlined below and then discussed in more detail in the following sections.

- The first step is to collect historical data on labour costs in the Australian economy.
- The second step is to forecast employees at both the state and industry level.
- The third step is to forecast wages at both the state and industry level.
- The fourth, and final step, is use the forecasts of employees and wages by state and by industry to produce detailed forecasts by state by industry.

LCM model

The Labour Costs Model (LCM) is made up of three excel workbooks: *regression models.xls*, *Wages_RAS.xls* and *LCM_results.xls* (as shown in Figure A.1).

Figure A.1
Structure of the Labour Cost Model



The role of each workbook is as follows:

- *regression models.xls* – read in raw ABS data and MM2 data; separately forecasts at the state and industry level, wages and employees.
- *Wages_RAS.xls* – converts the wages forecasts by state and by industry into detailed state by industry forecasts in the RAS.
- *LCM_results.xls* – uses the detailed wage forecasts to produce detailed forecasts of labour costs and growth rates by state by industry.

Data Sources

The first step involves collecting the appropriate data sources to forecast labour costs. The following data is used in the LCM.

- Average Weekly Earnings by State by Industry - Australian Bureau of Statistics, unpublished data from the *Average Weekly Earnings, Australia* publication (Catalogue no. 6302), May 2008.
- Employees by State by Industry - Australian Bureau of Statistics, *Labour Force, Australia, Detailed, Quarterly* (Catalogue no. 6291.0.55.003), May 2008, Data Cubes E06_nov84 and E06_aug94.
- Employed Persons by State by Industry - Australian Bureau of Statistics, *Labour Force, Australia, Detailed, Quarterly* (Catalogue no. 6291.0.55.003), May 2008.
- Forecasts of Employment by State and by Industry - Econtech, *Australian National, State and Industry Outlook*, March 2008.
- Forecasts of Wages - Econtech, *Australian National, State and Industry Outlook*, March 2008.

Data Conversion

First, average weekly earnings and employee figures are combined to obtain wages for employees. Second, the employment forecasts from the MM2 are converted to employee figures. This conversion is a technical issue because labour cost relates to employees, which would exclude the self-employed.

The conversion from employment to employee figures is done by forecasting the share of employees in total employment. A logistic equation is used to estimate the share of employees in employment for each industry (or state). The logistic equation ensures that the forecast of shares of employees are between 0 per cent and 100 per cent. The logistic equation takes the form of

$$\ln\left(\frac{e_i}{1-e_i}\right)_t = \alpha_0 + \alpha_1 \ln\left(\frac{e_i}{1-e_i}\right)_{t-1} + \alpha_3 timetrend + \varepsilon \qquad (1)$$

where e_i = the ratio of employee to total employment for industry i (or State i)

Subsequently, the number of employees is derived by multiplying the estimated shares above with the total employment forecasts from the MM2.

Forecasts Labour Cost by State and by Industry Separately

There are a few technical issues in directly modelling labour costs at the very detailed by state by industry level.

- First, the wage data by state by industry exhibits large volatility (most likely due to small sample sizes). In comparison, labour cost figures by state and by industry separately appear to be more stable.

- Second, modelling labour costs by state by industry would involve estimating 136 series in total, that is, 17 industries in eight states/territories. This is a time consuming process.
- Third, and most importantly, separately estimating 136 labour cost series would potentially lead to inconsistencies in the estimates. As mentioned previously, it is important to ensure the total state and industry figures separately sum to the national figures.

To overcome these technical issues, Econtech has forecast labour costs by state and by industry separately. This is done by using historical state and industry wage data in combination with Econtech's existing MM2 forecast of the national wage. These two data sources are used to forecast consistent wage relativities for each state and territory, and for each of the 17 ANZIC broad industries, separately, using robust econometric analysis. The key driver of these forecasts is the tightness of the labour market in each state and in each industry.

The tightness in the labour market is indicated by the developments in labour demand and labour supply in each industry and in each state. These developments stem from Econtech's outlook for each state and industry. Notably, the labour demand by industry, and labour demand and labour supply by state are published in Econtech's *Australian, State and Industry Outlook (ANSIO)* publication.

Specifically, Econtech forecast the wage relativities between each industry and state. Wage relativity for industry *i* (or state *i*) is calculated as the product of industry *i* (or state *i*) average share of total employees and the industry *i* (or state *i*) wage ratio to the national wage.

$$Wage\_relativity_i = \left(\frac{wage_i}{national\_wage} \right) \times average \left(\frac{employee_i}{total\_employee} \right) \quad (2)$$

The wage relativities measure how wages in each industry (or state) compared with the national wages. For instance, a wage relativity that is higher than the average share of employees in that particular industry (or state), means that wages in that industry (or state) are higher than the national wage, and vice versa. The feature of wages relativities is that the sum of the wage relativity of all industry (or state) will be one.

Next, regression equations are used to forecast industry and state wage relativities.

$$Wagerelativity_{i,t} = \beta_0 + \beta_1 timetrend + \alpha_1 Wagerelativity_{i,t-1} + \alpha_2 e_{i,t} + \alpha_3 e_{i,t-1} + \varepsilon \quad (3)$$

where e_i = industry *i* (or state *i*) share of total employees

Equation (3) contains two key elements of the LCM. First, wage relativities between industries are affected by industry employment demand as measured by an industry's share of national employment. An increase in the demand for labour in industry *i* would lead to an increase this industry share of employees. Consequently, wages relativity for this industry would increase as well.

Second, both industry and state wage relativities are modelled in a flexible dynamic framework that also allows for trend-related effects. Wage relativities in this period are expected to depend on the wage relativity in the previous period. At the same time, the wage relativities equation contains a time trend variable.

It is important to note that the wage relativity equations are the key equations in the LCM model.

After deriving the forecast of industry and state wage relativities, the next step is to forecast wages for each industry and state. This is done by first calculating the forecast of industry *i* (or state *i*) wage ratio to the national wage, which is the wage relativity of industry *i* (or state *i*) divided by its average share of total employees.

Essentially, rearranging Equation (2), we have the following equation

$$\left(\frac{wage_i}{national\_wage}\right) = Wage\_relativity_i \,/\, average\left(\frac{employee_i}{total\_employee}\right) \qquad (2a)$$

Therefore, wages for each industry (or state) is obtained by multiplying the national wage by the wage relativity of industry *i* (or state *i*) divided by its average share of total employees.

$$Wage_i = National\_wage * Wage\_relativity_i \,/\, average\left(\frac{employee_i}{total\_employee}\right) \qquad (2b)$$

Forecasting Labour Cost by State by Industry

The final step is to convert the forecasts of state wage relativities and industry wage relativities to forecasts of wage relativities by state by industry. A procedure known as the Residual Allocation System (RAS) is used.

The RAS procedure is applied to forecasts of wages to obtain the forecast by state by industry. The forecasts of wages are found in *Wages_RAS.xls*.

Wages and growth rates are then calculated in *LCM_results.xls*. Overall, this approach has the advantage that the final forecasts of wages by state by industry are fully consistent with the national wage forecasts supplied from MM2 in the first step.

Enhancements to the LCM

The LCM has been enhanced since Econtech last reported to the AER in August 2007. The same data sources are used in the new model, and while a different definition for wage relativities is used, the form of the regression equations used to forecast wage relativities remains unchanged. Therefore, the same factors will be driving wage relativities in the new model.

In the previous model, wage relativities were calculated as the difference between an industry's (or state's) share of total compensation and its share of total employees. In the new model, wage relativities are calculated as the product of the ratio of an industry's (or state's) average wage to the national wage, and its average share of total employees.

This revised form for wage relativities ensures that labour cost growth rates are more responsive to large increases in employment shares for an industry or state. This is a realistic, as for example, if an industry wants to significantly increase its share of workers, it will need to raise its wages higher than average to attract additional labour.

Attachment B – Murphy Model 2 (MM2)

Econtech's forecasting tool, Murphy Model 2 (MM2), is Australia's leading national, industry and state forecasting model. It has a highly respected forecasting track record and is used by Federal and State Governments, industry associations, financial institutions and major companies. Subscriptions to forecasting reports and Windows-based forecasting software are available.

Development

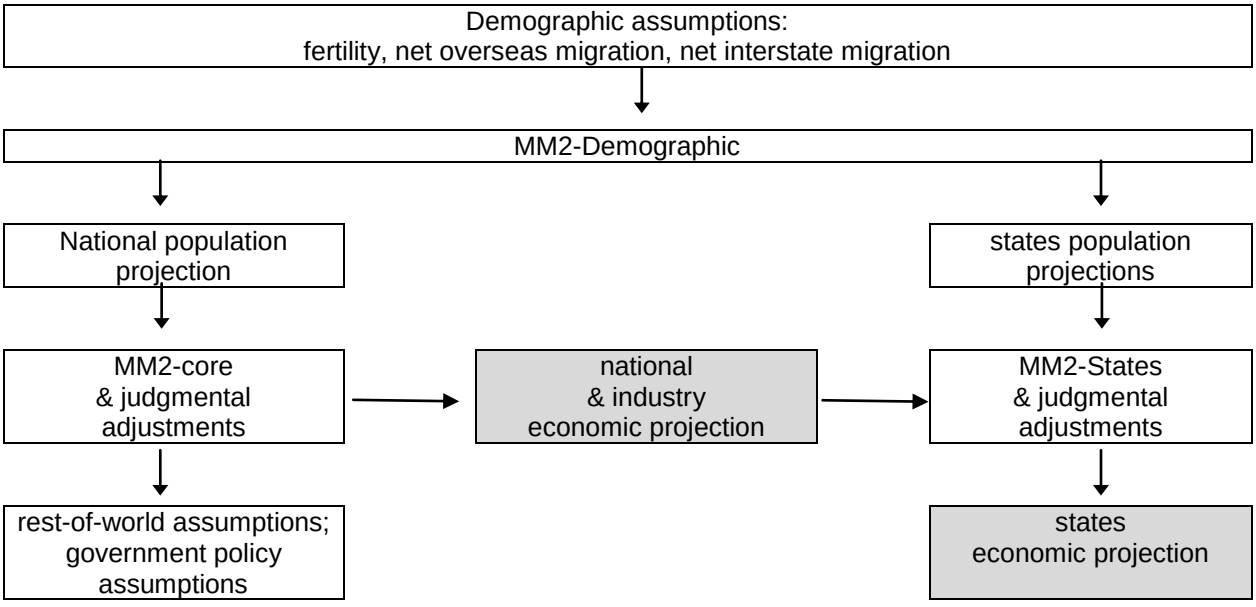
The original Murphy Model was developed by Chris Murphy, after ten years of experience in macroeconometric modelling at the Australian Treasury, Economic Planning Advisory Council, and the Australian National University. In 1988, Chris published the first version of the Murphy Model in Australian Economic Papers, and it was soon recognised as Australia's leading national or macro model.

In 1994, the first major redevelopment of the model was undertaken to distinguish 12 industry sectors. This marked the introduction of the Murphy Model 2 (MM2), a fully integrated macro and industry model.

In 1995, under contract to two state treasuries, the MM2-States was developed as an extension to MM2. The MM2-States allocates a number of MM2's key outputs across the eight Australian States and Territories.

In the same year, the current version of MM2-Demographic was developed under contract to the Australian Bureau of Immigration Research. Using assumptions for fertility, mortality, overseas and interstate migration, it generates consistent state and national population scenarios.

In 1996, the MM2 was further developed to expand the sectoral detail from 12 sectors to the 18 sectors corresponding to the Australian and New Zealand Standard Industrial Classification (ANZSIC) industry divisions. The linkages between the three models are illustrated below.



Features

MM2 is a state-of-the-art, fully-integrated macro-industry model with the following features:

- produces quarter-by-quarter nine-year-ahead forecasts;
- forward-looking financial sector for realism;
- Keynesian short-run for forecasting; and
- neoclassical long-run for policy analysis.

Documentation

Powell, A.A. and Murphy, C.W. (1997), *Inside a Modern Macroeconometric Model - A Guide to the Murphy Model, Springer*, Berlin, 2nd ed., 455pp.

MM2 Forecasting Services

The MM2 suite of models is used every quarter to produce comprehensive and up-to-date economic forecasts at the national, industry and state levels.

The national, industry and state forecasts are available in a group of forecasting reports. By also subscribing to the MM2 forecasting software service, clients can easily vary any of Econtech's assumptions to produce their own forecasts and alternative scenarios.

Consulting

As well as forecasting services, MM2 has also been used in several consulting projects as follows.

- "Economic Effects of the Recent Tourism-Related Events on the Tourism Sector and the Economy", prepared for the Department of Industry, Tourism and Resources (2001)
- "The Economic Impact of 2000/01 Migration Program Changes", prepared for the Department of Immigration and Multicultural Affairs (2001).
- "Economic Modelling of The Cost of Presenteeism In Australia", prepared for Medibank Private (2007).
- "Victorian Water Industry Construction Price Indexes", prepared for City West Water, South East Water, Yarra Valley Water and Melbourne Water for submission to the Essential Services Commission (2007).

Attachment C – Wage Measures

Average Weekly Earnings (AWE)

In constructing the AWE, the data is collected through a sample survey of approximately 5,500 employer units that have been selected from the Australian Bureau of Statistics (ABS) Business Register. The AWE survey measures the average weekly earnings of all employed wage and salary earners, with the following exceptions.

- Members of the Australian permanent defence forces;
- employees of enterprises primarily engaged in agriculture, forestry and fishing;
- employees of private households;
- employees of overseas embassies, consulates, etc.;
- employees based outside Australia; and
- employees on workers' compensation who are not paid through the payroll.

Also excluded are the following persons who are not regarded as employees for the purposes of this survey:

- casual employees or employees on leave without pay, on strike or stood down, who did not receive pay during the reference period;
- directors who are not paid a salary;
- proprietors/partners of unincorporated businesses;
- self-employed persons such as subcontractors, owner/drivers, consultants; or
- persons paid solely by commission without a retainer.

The AWE survey data is used to estimate the average weekly earnings of employees across Australia. Estimates of average weekly earnings are calculated by dividing estimates of weekly total earnings by estimates of the number of employees. Estimates are classified by sector, state or territory, industry and sex in three levels:

- Full-time[24] Adult[25] Ordinary Time Earnings[26];
- Full-time Adult Total Earnings[27]; or
- Total Earnings All Employees.

In this report, AWE is based on total earnings for all employees.

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[24] Full-time employees are permanent, temporary and casual employees who work the normal hours for a full-time employee in their occupation. If agreed or award hours do not apply, employees are regarded as full-time if they ordinarily work 35 hours or more per week.

[25] Adult employees are those employees 21 years of age or over and those employees who, although under 21 years of age, are paid at the full adult rate for their occupation.

[26] Weekly ordinary time earnings refers to one week's earnings of employees (for the reference period) attributable to award, standard or agreed hours of work. It includes bonuses and other incentive payments. It excludes overtime payments and payments not related to the reference period.

[27] Weekly total earnings of employees is equal to weekly ordinary time earnings plus weekly overtime earnings.

Wage Price Index

The WPI represents the wage and salaries component of a broader Labour Price Index (LPI). The LPI includes wages and salaries, overtime, bonuses (only in the labour price including bonuses index), annual and public holiday leave, superannuation, payroll tax and workers' compensation. In constructing the WPI, information is first collected from a representative sample of employee jobs within a sample of approximately 4,800 employers selected from the ABS Business Register. The WPI is not impacted by increases in hours worked or changes in the composition of the employee workforce. This data is only available from 1997-98, limiting the depth of econometric analysis that can be performed using it. This is relevant when forecasting labour costs.

Mean Weekly Earnings

The data for MWE is collected from the Employee Earnings, Benefits and Trade Union Membership Survey conducted throughout Australia as a supplement to the ABS monthly Labour Force Survey (LFS). The survey provides data on weekly earnings of employees, their entitlement to paid leave, superannuation coverage and trade union membership. To calculate MWE, the total earnings of a group is divided by the number of employees in that group. The MWE measure differs from the other three measures in that it is based on data collected from a household (employee) interview survey. The other three measures are based in whole or part on an employer written survey and so may be more reliable. Also, the MWE is only available on an annual basis, and refers to August of each year, while the other measures are all available on a quarterly basis.

Compensation of Employees

The data for average compensation of employees is reported in the ABS National Accounts. Specifically, total compensation of employees from the National Accounts is divided by the number of employees from the LFS. This use of two different sources of information may contribute to volatility in this measure. Compensation of employees includes both wages and salaries and employers' social contributions such as employer superannuation. Compensation of employees has the advantage of being the only indicator of labour costs that is publicly available by state by industry. However, the other three measures are available at the same level from the ABS special request service.

Attachment D – Real Labour Cost Growth Rates

Table D1
Real Labour Cost Growth Rates in NSW (% pa)

	Mining	Electricity, Gas & Water	Construction	Total NSW
1996-1997	5.9	3.6	6.4	1.9
1997-1998	-0.2	7.5	-3.3	2.2
1998-1999	3.9	7.2	9.5	3.0
1999-2000	3.7	2.7	-3.0	2.0
2000-2001	1.9	-0.3	-4.6	-1.8
2001-2002	1.9	7.0	3.6	1.9
2002-2003	-1.8	-2.9	3.0	-0.2
2003-2004	1.0	8.4	-4.8	3.7
2004-2005	2.2	-1.7	1.4	1.2
2005-2006	1.9	1.4	3.1	2.4
2006-2007	-0.3	-1.2	-1.2	-0.2
2007-2008	-3.0	1.2	8.4	0.7
2008-2009	3.4	2.8	2.5	1.6
2009-2010	4.2	3.9	1.6	1.7
2010-2011	3.4	3.4	0.6	1.1
2011-2012	2.6	3.0	0.3	0.9
2012-2013	2.2	2.8	0.3	1.0
2013-2014	1.5	2.1	0.0	0.7
2014-2015	1.4	1.9	0.3	0.8
2015-2016	1.6	2.0	0.8	1.1
2016-2017	1.8	2.1	1.2	1.4

Source: LCM, MM2

Table D2
Real Labour Cost Growth Rates in Tasmania (% pa)

	Mining	Electricity, Gas & Water	Construction	Total TAS
1996-1997	-0.5%	-2.3%	5.9%	1.5%
1997-1998	2.9%	13.3%	1.3%	2.4%
1998-1999	9.3%	12.7%	-4.7%	3.0%
1999-2000	3.7%	-2.4%	-17.6%	1.1%
2000-2001	-0.4%	1.3%	-11.1%	-3.4%
2001-2002	0.3%	4.6%	8.7%	0.4%
2002-2003	-2.6%	0.2%	9.6%	2.7%
2003-2004	-2.9%	3.5%	3.4%	0.6%
2004-2005	1.8%	2.9%	1.9%	4.0%
2005-2006	1.0%	1.3%	12.7%	-0.2%
2006-2007	-2.7%	-0.5%	4.6%	0.0%
2007-2008	2.3%	-3.0%	1.4%	1.4%
2008-2009	2.7%	2.0%	1.7%	0.7%
2009-2010	3.2%	2.9%	0.5%	0.6%
2010-2011	2.7%	2.8%	-0.1%	0.4%
2011-2012	2.1%	2.5%	-0.3%	0.3%
2012-2013	1.8%	2.4%	-0.1%	0.6%
2013-2014	1.3%	1.9%	-0.2%	0.5%
2014-2015	1.3%	1.8%	0.2%	0.7%
2015-2016	1.6%	2.0%	0.8%	1.1%
2016-2017	1.8%	2.1%	1.2%	1.3%

Source: LCM, MM2

Table D3
Real Labour Cost Growth Rates in the ACT (% pa)

	Electricity, Gas & Water	Construction	Total ACT
1996-1997	5.9%	-15.2%	2.7%
1997-1998	5.3%	4.1%	6.6%
1998-1999	7.1%	12.9%	2.4%
1999-2000	2.3%	-8.5%	-0.1%
2000-2001	2.4%	-4.2%	-1.8%
2001-2002	4.3%	-1.9%	-2.3%
2002-2003	0.5%	11.5%	3.7%
2003-2004	2.7%	-15.1%	1.4%
2004-2005	0.9%	-12.9%	3.6%
2005-2006	-6.7%	54.4%	4.1%
2006-2007	2.8%	-8.4%	1.2%
2007-2008	9.4%	5.7%	-1.1%
2008-2009	2.0%	1.7%	0.8%
2009-2010	3.7%	1.3%	1.4%
2010-2011	3.6%	0.6%	1.1%
2011-2012	3.3%	0.5%	1.0%
2012-2013	3.1%	0.6%	1.2%
2013-2014	2.4%	0.2%	0.8%
2014-2015	2.1%	0.5%	0.9%
2015-2016	2.2%	1.0%	1.2%
2016-2017	2.5%	1.6%	1.7%

Source: LCM, MM2

Attachment E – Terms of Reference

Econtech is required to provide the ACCC with up-to-date forecasts for labour costs by state and industry for the period 2007-08 to 2016-17 using Econtech's labour cost model. This will take into account labour productivity changes, skill shortages, infrastructure issues and other risks (both positive and negative) over the period. The ANZSIC industries of particular relevance are: Mining, Electricity, Gas and Water Supply and Construction.

Econtech is required to evaluate the labour market conditions for Australia, NSW, ACT and Tasmania for utility service providers. This will include:

- a comparative analysis of the forecast labour costs across the specified regions (including comparison between the regions and the national average)
- an analysis for the utility sector and other industries
- an explanation on how the market conditions have affected the results of forecast labour growth.