Electrical energy and customer number projections for Essential Energy in New South Wales to 2021-22

A report for
ESSENTIAL ENERGY

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1. Introduction

Essential Energy invited the National Institute of Economic and Industry Research (NIEIR) to prepare electricity forecasts for the Essential Energy distribution region in New South Wales to 2021-22.

The scope of works as outlined in the study brief was to:

- prepare electrical energy forecasts by class and network tariff for Essential Energy for a base or most likely scenario, separating hot water load; and
- fully document the methodological approach, assumptions in a report incorporating graphics, text and tables.

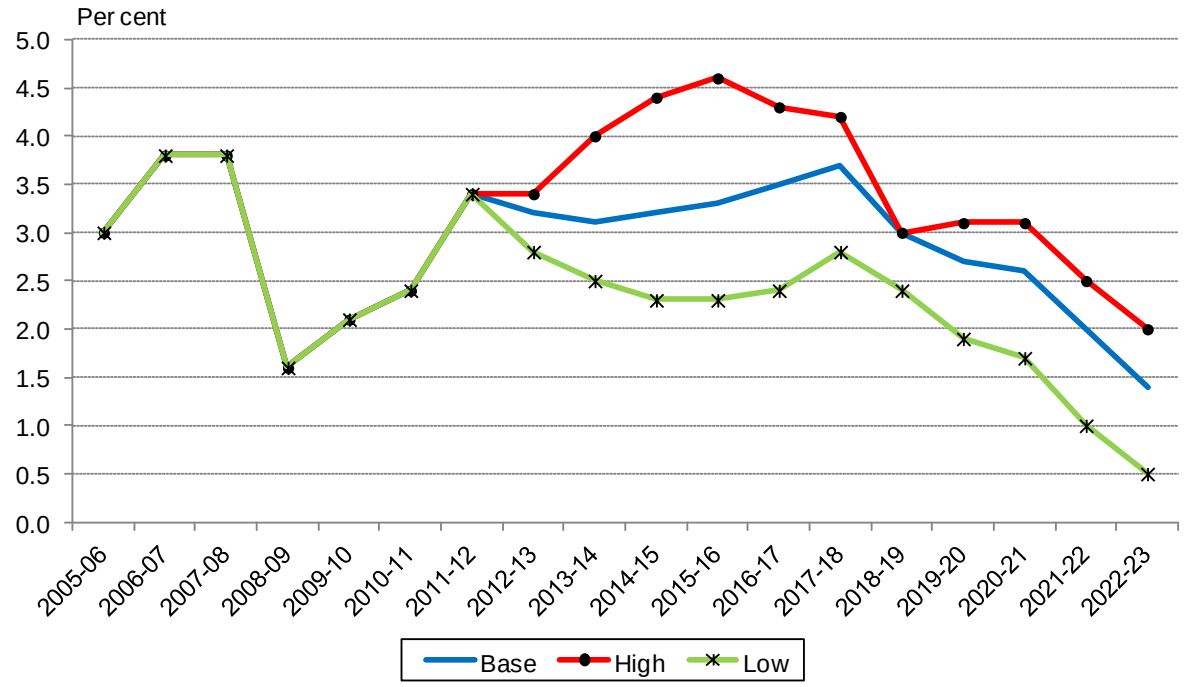
This work for Essential Energy updates previous work undertaken by NIEIR for Essential Energy (previously known as Country Energy) since 2003.

2. The economic outlook for Australia to 2022-23

2.1 Introduction

This section provides an outline of the economic outlook for Australia to 2022-23. Figure 2.1 shows the outlook for Australian gross domestic product to 2022-23 by scenario. Table 2.1 shows the projected annual Australian GDP growth rates to 2022-23 for each of the scenarios. These economic forecasts were prepared in April 2013.

Figure 2.1: Australian GDP growth by scenario (annual per cent change)



Note: Financial years ending June.

Table 2.1(a) gives span growth rates across each scenario for Australian GDP growth. Table 2.1(b) gives the year by year growth rates for each of the three scenarios, while Figure 2.1 shows the graphical profile for the key high, low and medium scenarios. The cyclical profiles in Figure 2.1 reflect the cycle in the world economy.

Table 2.1(a) Australian GDP growth by sub-period and each scenario (per cent)			
Financial year	**Base**	**High**	**Low**
2012-13 to 2017-18	3.4	4.3	2.5
2017-18 to 2022-23	2.3	2.7	1.5
2012-13 to 2022-23	2.9	3.5	2.0

Table 2.1(b) Australian GDP growth under each scenario (per cent)			
Financial year	**Base**	**High**	**Low**
2005-06	3.0	3.0	3.0
2006-07	3.8	3.8	3.8
2007-08	3.8	3.8	3.8
2008-09	1.6	1.6	1.6
2009-10	2.1	2.1	2.1
2010-11	2.4	2.4	2.4
2011-12	3.4	3.4	3.4
2012-13	3.2	3.4	2.8
2013-14	3.1	4.0	2.5
2014-15	3.2	4.4	2.3
2015-16	3.3	4.6	2.3
2016-17	3.5	4.3	2.4
2017-18	3.7	4.2	2.8
2018-19	3.0	3.0	2.4
2019-20	2.7	3.1	1.9
2020-21	2.6	3.1	1.7
2021-22	2.0	2.5	1.0
2022-23	1.4	2.0	0.5
Compound average annual change			
2012-13 to 2017-18	3.4	4.3	2.5
2012-13 to 2022-23	2.9	3.5	2.0

2.2 The world and national outlook

2.2.1 Introduction

Four years after the Global Financial Crisis (GFC), both the short-term and medium-term outlooks are subdued. There will not be acceleration in growth rates for the world and Australian economies until 2016 or 2017. This means that growth will be constrained to the 3 to 4 per cent range. Growth is likely to accelerate from current levels by 2014 and beyond because of:

(i) the ending of the current negative contribution to economic growth, both for the world and Australian economies, of up to 1 per cent per annum from fiscal consolidation. That is, the withdrawal of the fiscal stimulus introduced in 2009-2010 to stabilise the world economy from the impact of the GFC;

(ii) the current low interest rate regime and high levels of liquidity which will have some positive impact on growth, if only as a fraction of what would have been the case over the 1995 to 2007 period. The reason for this is that expansionary monetary policies can only impact on growth if households and businesses are willing to take on additional debt and for many countries, including Australia, debt levels remain near saturation levels particularly for the household sector; and

(iii) the developing and emerging economies will continue to expand at satisfactory growth rates, although the net benefit of this growth to high income countries will be weaker than what would have been the case in the past. More and more of the economic spill-over impacts from the growth of developing and emerging economies are being contained within this bloc.

The outlook becomes less optimistic after 2016 due to the loss of capacity since the GFC caused by the increase in long-term unemployment and the loss of investment. Even modest growth for high income countries is likely to mean these countries, as a whole, will reach capacity constraints by 2016 or 2017, forcing monetary policies to move to neutral or even contractionary settings.

This will not be the only reason to expect a slowdown in the growth of the world economy post 2016 or 2017. Fiscal reform in the United States cannot be delayed any further without the risk, and most likely temporary experience, of a major financial crisis, which will have a negative impact on growth for at least a year or two. The same will be true of the required political response from the Euro countries.

For Australia the mining investment boom will peak over the next year or so and then trend downwards, although the major positive impact on mining production from the current high levels of mining will last to 2017. The downturn in mining investment will be constrained by the large expansion of the mining sector replacement investment requirements.

This may well be a positive for the southern states. NIEIR's estimate suggests that the net impact of the mining expansion since 2005 on the Australian economy, after taking into account the effects of the Dutch Disease (largely, though not exclusively, the result of the high exchange rate), has had little net impact on the southern Australian states. The net impact for Victoria was negative.

The downward trend in mining investment will not necessarily be a net negative for the economy as a whole given:

(i) the current high import content of mining investment; and

(ii) the high outflow overseas of income from LNG production,

providing the exchange rate falls back towards its purchasing power parity (PPP) rate of 0.70 cents to the $US.

The Australian dollar is likely to fall sharply and quickly, with the greatest risk being from 2014 or 2015 onwards.

The Australian cities of Sydney, Melbourne, Brisbane and Perth are all going to require major investments in transport infrastructure. If the politicians are forced, via the ballet box, to undertake the necessary expenditures, the prospects for high local content engineering expenditures from 2015-2016 onwards will be positive.

2.2.2 The world economy

Over 2012 and 2013 the world economy is projected to grow by 3.3 per cent per annum, of which 40 per cent of growth comes from China. This stands in contrast to the 5.4 per cent growth in 2010 and near 4 per cent growth in 2011. The growth profile over 2012 and 2013 reflects the withdrawal of fiscal stimulus from most economies over 2010 and 2012 with the level of fiscal stimulus equal to 1.5 to 2.0 per cent per annum of world GDP and up to 3 per cent if multiplier effects are included. The withdrawal will have reduced growth in many European countries by between 2 and 3 per cent of GDP. It is no wonder many of these economies have negative or negligible growth rates over 2012 and 2013. Given the scale of the fiscal withdrawal, the world economy over 2012 and 2013 is doing as well as could be expected when realistic multipliers are used.

Modest growth will return to most economies from 2014. This will be due to a number of drivers becoming more supportive of growth. They include:

(i) the ending of aggressive debt consolidation policies in recognition of the fact that for most countries they will not reduce the debt to GDP ratio. However, most countries' fiscal policy will, at best, move from a negative impact on growth to having a neutral impact. This will be especially true for those countries with high debt to GDP ratios;

(ii) the recovery of house prices which will increase the net wealth-to-income ratio, thereby encouraging higher consumption and dwelling investment expenditures;

(iii) the repair of household and corporate balance sheets from higher savings ratios and low investment ratios compared to pre-2008 levels. This will increase the capacity to invest and spend once a degree of confidence returns;

(iv) the simultaneous recovery of most economies which will create strong trade induced multiplier effects across most economies reaching a forecast peak in 2016; and

(v) historically low interest rates in many countries, which are steadily reducing the debt service ratios of households and corporations, thereby increasing their debt carrying capacity when confidence returns.

For high income countries there is no "overshoot" in the medium term profile. That is, there is no sustained period of above trend growth that would enable a downward trend in unemployment rates and thereby correct for the increased unemployment rate over the 2007 to 2009 period. The overshoot phenomenon characterised the recoveries from the 1982, 1991 and 2001 world recessions.

There will be no overshoot due to:

(i) the severity and length of the GFC has meant that capacity installed relative to working age population has steadily declined and will continue to do so because of the decline in investment. This means that full capacity output circa 2016-2018 will be significantly less than what it would need to be in order to restore pre-2008 unemployment rates. This is why the growth surge in the medium scenario around 2016 diminishes over the 2017 to 2020 period. This important point was acknowledged in a speech given by Ben Bemanke, the Federal Reserve Chairman in November 2012. He acknowledged, for the first time, that growth rate of

US potential GDP had fallen significantly over recent years. This means that monetary policy will become more restrictive with only mild acceleration in actual growth. One conclusion from the speech, given the fall in the rate of growth of potential capacity, is that the actual percentage growth between 2012 and 2016 would have to be restricted to about 2 per cent per annum by contractionary monetary policy. This is perhaps being a little too pessimistic;

(ii) increased controls over bank lending and lending criteria will mean that the finance supply to allow expectations necessary for a sustained period of above trend growth to be realised will not be provided;

(iii) the constraints of current high public sector debt-to-GDP ratios;

(iv) private sector, and especially household debt-to-income ratios. Although currently easing, they are still at very high levels compared to the 1980s and 1990s;

(v) equity capital will remain expensive. It is likely to become more expensive because of perceived high risks of the future compared to the 1980s, 1990s and the 2000-2007 period. These perceived increased risks are the result of:

  (a) the GFC experience;

  (b) ICT technologies and the threat to established business models;

  (c) the destructive effect of the rise of emerging economies on high income countries' supply chains; and

  (d) the impact of climate change and the possible wealth destruction from the current "fossil fuel bubble".

This logic also suggests that the under-estimation of short-term growth in immediate past projections will not force a higher medium-term growth rate to compensate. Under-estimation of short-term growth will, in the current environment, simply lead to lower effective capacity installed in the medium-term. This issue is returned to below in the "Changes to the projections" section.

The six headwinds of growth for the United States

The structural difficulties of achieving even modest growth under current trends can be seen from the obstacles to United States growth.

The per capita GDP growth rate for the projection is around 1.4 per cent for the 2020s. For the recovery over the period from 2010 to 2020, the growth rate is 1.6 per cent. For the low scenario the growth rate is 0.9 per cent per annum over 2010-2035 and 2.4 per cent per annum for the high scenario.

In a paper issued in September 2012[1], Robert J. Gordon nominates six factors which, unless corrected, will reduce US per capita GDP growth to negligible levels. They are:

1. the decline in the share of working age population (-0.2);
2. the plateau in education attainment (-0.2);
3. the level of income inequality (-0.5);
4. the exhaustion of productivity gains for the ICT revolution and other factors (-0.2);
5. the rising cost of energy (-0.2); and
6. the government and household deficits (-0.3).

[1] Robert J Gordon, CEPR, "*Is US economic growth over? Faltering innovation confronts six headwinds*", Policy Insight No. 63.

In brackets are the long-run annual subtractions from growth that each of the headwinds will exert if allowed to continue at current trends. Given the 1980 to 2008 outcome of 1.8 per cent per annum in US GDP per capita growth, the subtraction would imply a long-run expectation of 0.2 per cent per annum, not the 1.3 to 1.5 per cent of the projection.

This analysis clearly indicates that the most important driver of world and Australian economic growth prospects is, undoubtedly, what happens to the United States political economy and its direct correlation with political economy developments in the Western Pacific.

The good news is that most of these headwinds can be reduced or eliminated by fiscal and tax reforms in the United States. The bad news is that even with the 2012 election outcome indicating a degree of tax increases on the top 1 per cent of households will be possible, the tax increases will be far less than the income redistribution effort required to substantially reduce the impact of the headwinds.

At this stage the projection assumes that radical US reform happens in the next five to ten years. This may prove unrealistic.

The longer term growth projections

The first half of the 2020s is a period of relatively low economic growth and the second half of the decade relatively high economic growth.

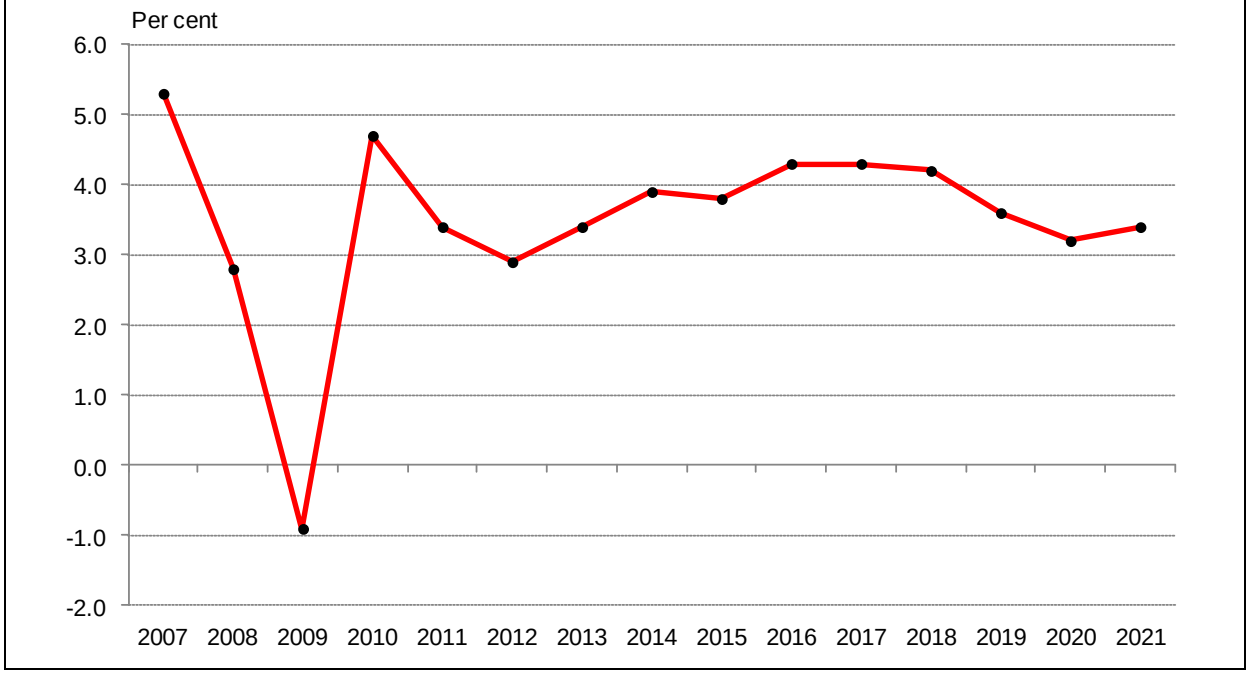
The causes of the weakness over the first half of the 2020s are:

(i) countries reaching normal levels of capacity utilisation by 2020 with developing inflationary pressures; and

(ii) because it is likely that 2020 will mark the year of the coordinated introduction of major CO_2 reduction emissions which will disrupt short-term economic activity.

Events of the past year have increased the possibility that the Western Pacific region may break up into trading and military blocs resembling Europe over the 1948 to 1990 period. This possibility will depend on how China will use its growing economic and military power. The events over 2012 suggest that if current trends continue, the use of this power by China will be threatening to its neighbours. The election of a new Japanese Government in December 2012 brought to power a leadership group which believes that China must be constrained by a Pacific trade/military bloc which simultaneously weakens China's growth potential and allocates large resources to match China's military capability. This also appears to be the United States' view of how the rise of China may have to be responded to. If this occurs the exchange rate will be considerably lower than what is being forecast here and activity in Australia's manufacturing sector considerably higher even if overall GDP levels are lower.

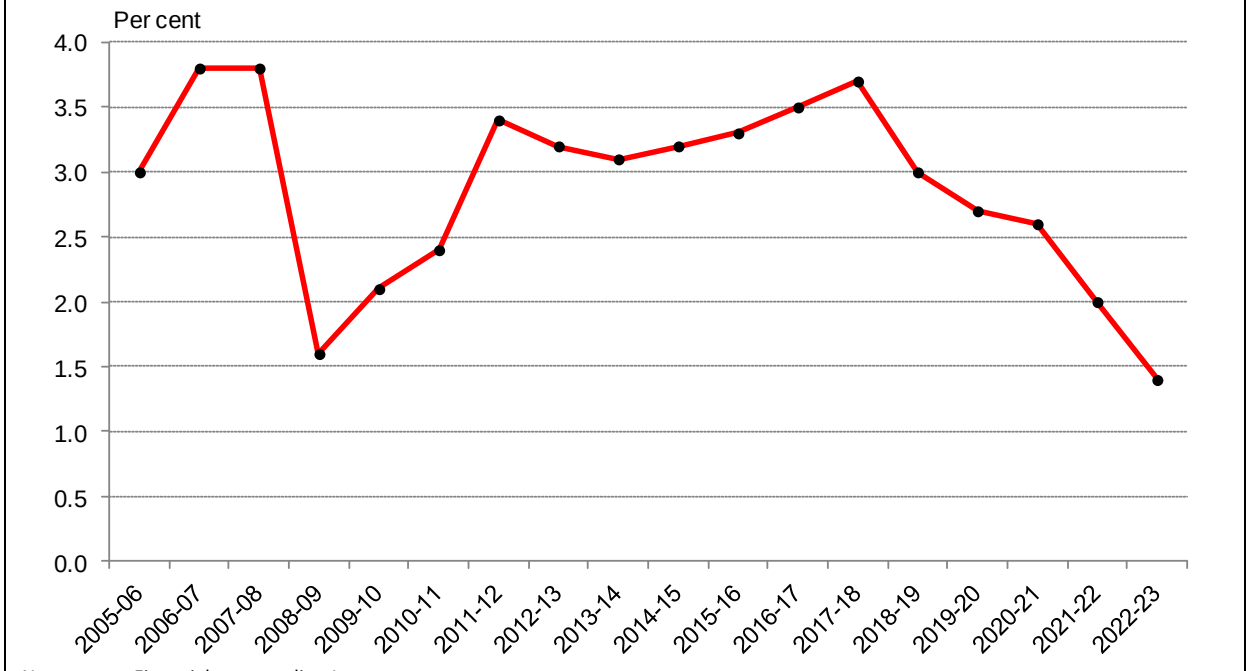
Figure 2.2: World GDP growth (per cent)



2.2.3 The economic outlook for Australia

This section provides an outline of the economic outlook for Australia to 2022-23 for the base projection. Figure 2.3 shows the outlook for Australian gross domestic product to 2022-23. These economic forecasts were prepared in April 2013.

Figure 2.3: Australian GDP growth – base scenario (annual % change)



Note: Financial years ending June.

The GDP profile

The proximate drivers of the medium-term GDP profile can be seen from Tables 2.2 and 2.3, which show the demand and supply (industry) drivers of GDP formation.

Over the 2011 and 2012 fiscal years, the mining expansion in Australia accelerated. This was reflected in the expansion of both mining and construction activity. Adding the contribution of these two sectors together implies that the continuation of the mining boom explained 30 per cent of Australia's GDP growth of 1.9 per cent in the 2011 fiscal year and 20 per cent of the GDP growth of 3.4 per cent in 2012. Flow-on multiplier effects would increase the contribution to near 50 per cent for 2011 and 30 per cent for 2012. However, this assumes that mining investment contribution is fully reflected in the total construction activity growth. This is not the case as the increase in mining investment in 2010-11 was $12 billion, (2009-10 prices), $31 billion in 2011-12 and $12 billion in 2012-13. This gives a percentage point contribution to growth of 0.8, 2.0 and 0.8 percentage points respectively which, given the GDP growth profile, translates into a percentage contribution to growth of 42 per cent in 2010-11, 60 per cent in 2011-12 and 30 per cent in 2012-13. Adding in the mining activity contribution to growth gives a total resource boom contribution of near 50 per cent for 2010-11, 40 per cent in 2011-12 and one-third for 2012-13. With flow-on multiplier effects this implies that the mining expansion is explaining the majority, or the near majority, of growth.

The question that arises from this is, why isn't the overall Australian growth rate for the immediate past and the immediate future much higher? The answers the high import content of construction (for LNG plants) and equipment, and the Dutch disease.

The Dutch disease is offsetting the gross benefits of the mining expansion by between one half and two thirds. The figure may be as low as zero on a per capita basis once the additional 400,000 net immigration that have been taken in since 2005 to support the mining expansion is taken into account.

From Table 2.2, the crowding out effect is reflected in the high negative contribution to growth from imports. In 2010-11 the negative contribution to growth from imports represented a subtraction from growth of 75 per cent, or 42 per cent from the 3.3 per cent growth that would have occurred in 2010-11 if imports had exerted a neutral impact on growth. In 2011-12 GDP growth would have been 5.4 per cent if imports had been neutral.

In 2012-13, mining investment is likely to peak, and with the completion of the current LNG projects under construction over 2015 to 2017, mining investment will have a significant negative gross contribution to growth. In 2016-17 mining investment is projected to be $60 billion or $30 billion less than the 2012-13 peak, implying that mining investment in gross terms will subtract 4 percentage points from growth. It must then be explained why GDP growth is over 3 per cent for the three years to 2016-17. The explanation is that the net impact of the decline in the mining market is, to a large extent, offset by a decline in imports. This is why the negative contribution from imports, from Table 2.2, is modest compared to the historical record.

The second reason for the return to 3 per cent growth over the 2015 to 2019 period is that the production impact of the current high levels of investment is a steady stimulus to the economy, explaining between 5 and 10 per cent of the overall growth rate.

The third reason why the economy grows at a rate greater than 3 per cent over the 2018-2019 period is that, like the rest of the world, Australia is undergoing its own fiscal withdrawal with controls on public demand growth. This impact starts to weaken after 2014 with public demand making its traditional contribution to growth from 2015 onwards.

The fourth reason for experiencing growth greater than 3 per cent over the 2015 to 2019 period is that the world recovers from its current, near recessionary, growth rate.

The fifth, and perhaps most important, reason is that the exchange rate over 2014 to 2017 returns to levels near the PPP exchange rate of 70 US cents to the Australian dollar, signalling cost competitiveness from the perspective of international cost comparisons.

This is the major change from the previous projection, with an earlier devaluation of the Australian dollar which will blunt the Dutch disease impact and produce higher growth rates for the southern states than what would have been the case.

Even so, there is no return to 4 to 5 per cent growth rates and the unemployment rate is projected to steadily increase over the medium-term. There are a number of reasons to explain this, including:

- debt saturation;
- the availability of finance;
- sustained inflationary pressures; and
- consumer confidence in consumption expenditure.

2.2.4 Constraints on Australian growth

Savings adjustment

Provided the Australian National Account statistics are reliable, Australian households have now regained saving ratios which are sustainable. The financial stability of the Australian household has improved. This is due to the increase in the net savings ratio from negligible levels before the GFC to the current 8 to 11 per cent range in net terms and approximately 17 per cent in gross terms.

The financial stability of the Australian household has been improved by the net savings ratio increasing from negligible levels before the GFC to the current 8 to 11 per cent range in net terms and approximately 17 per cent in gross terms.

The reason for this debt stabilisation condition is that currently the headline savings rate is approximately equal to the household savings through superannuation funds. That is household discretionary savings is zero with on average households not borrowing to finance consumption expenditure. Household debt is continuing to increase but this is driven by household capital expenditures.

Australian households have reached debt saturation levels. This is one of the reasons why Australian economic growth will be constrained to the relatively low levels that are being projected in the medium scenario over the next few years. Currently the household debt-to-net household disposable income ratio is 190 per cent, significantly above levels prevailing in European countries and even the United States. These countries can still increase growth through households reducing savings and borrowing to finance consumption expenditure. This option is not available in Australia except for limited periods as would arise in recessions.

The savings ratio will wax and wane with the economic cycle. For the medium scenario, slow growth periods, like the first half of the 2020s, will result in the gross savings ratio falling to, in some quarters, 15 per cent. However, the build-up in debt and the need to pay down debt will force the gross savings ratio back up to 20 per cent once higher growth is achieved, as in the mid 2020s. It can be seen from the medium scenario that this will restrain the response of private consumption expenditure during high growth periods. High wealth-debt driver consumption growth that occurred at various times over the 1994 to 2008 period will not be repeated on a sustainable basis.

The availability and cost of finance

There is unlikely to be a return to the easy access to credit regimes that existed before the GFC. The reliance of Australian banks on wholesale markets and, in particular, foreign wholesale markets, renders Australia sensitive to changes in the world economic climate. This is currently happening with the Euro crisis undermining confidence in banks with high European public sector debt exposure which, in turn, is placing upward pressure on the cost of finance on wholesale credit markets. This is both increasing the cost and reducing the availability of credit in Australia which, at the very least, is adversely impacting on the small business sector and non-residential commercial developments.

In addition, the high-rise apartment construction sector in Australia is currently being adversely impacted by the tightening of credit in China. This is because of the apparent importance of Chinese investors to this sector. Although this will ameliorate as inflationary pressures ease, it is unlikely that Chinese finance availability will reach the levels of the past two years as China can be expected to implement lower targets for credit growth over the longer term to reduce the probability of housing price bubbles in China.

The tightening of banking capital adequacy ratios under Basel III over the next decade will also place downward pressure on the availability of credit compared to what otherwise would have been the case.

In this environment emerging market investors, particularly Chinese, are likely to become important sources of Australian financing. Whether or not the terms and conditions of this finance will be acceptable to be used to improve the quality of Australian growth is another question.

Inflationary pressures

There are a number of structural inflationary pressures emerging, such as:

(i) housing costs – rents;

(ii) energy costs (of which the carbon tax is only one of a number of drivers);

(iii) insurance and finance costs;

(iv) food costs; plus

(v) the general inflationary pressures from low labour productivity growth.

Over the next three years inflationary pressures will be a strong constraint on growth as relatively high interest rates will have to be maintained to ensure that structural inflation is not again embedded in the economic structure, as was the case in the 1970s. To offset these inflationary pressures relatively high rates of unutilised labour and capital resources will have to be maintained to ensure real wages growth and profit margins are constrained within reasonable limits.

Consumption expenditure

In the next eight quarters, the household savings rate is projected to average 11.6 per cent, an increase of 1.4 percentage points over the 2011-12 fiscal year average. The reality is that equity withdrawal is still occurring. Equity withdrawal is borrowing to finance consumption expenditure. Over the last four quarters, it has averaged $12 billion per quarter, or $50 billion per year. The headline savings ratio would have to be around 12 to 13 per cent before equity withdrawal fell to zero.

An important question is how much a reduction in interest rates would stimulate domestic demand. It is true that interest cost reductions for highly indebted households will largely flow into additional consumption. However, household financial assets are two and a half times household financial liabilities. A large part of household financial assets are in superannuation funds which cannot be directly accessed for current consumption. The part of financial assets, where the returns can be applied to consumption, is similar to the level of liabilities. This means that the direct expenditure stimulus from an interest rate reduction, due to a reduction in debt costs, is more or less neutralised by the reduction in interest income from financial assets.

Interest rate reductions will have a powerful impact on the economy, but only when the environment is right. The right conditions for interest rates to have a powerful stimulus on the economy are when two or more of the following prevail:

(i) the economy is recovering from a downturn/recession;

(ii) debt to household income ratios are low;

(iii) longer-run expectations are positive in regard to growth; and

(iv) the expectation of strong capital gains in housing.

This is not to say that recent interest rate reductions will not have some stimulatory impact on the economy. The stimulus effect is likely to be significantly more subdued than what has been the case in the past.

There will be a decline in the household debt-to-income ratio over the next three years. By the beginning of 2016 the household debt-to-disposable income ratio is down from 1.84 at the end of 2011. This is a period of relatively high headline growth because of the mining production surge from the mining investment over 2011 to 2014. Expenditures of the future become more positive and the household savings ratio falls. As a result, over the 2015 to 2018 period the contribution of private consumption to GDP growth increases to an average of 2.1 percentage points, with GDP growth averaging 3.6 per cent over the 2016 to 2018 period.

Unfortunately, debt-to-income ratios will return to the current high levels by 2019 and consumption expenditure growth is curtailed. In the early 2020s the contribution of private consumption expenditure-to-GDP growth falls to a historical low of 1.3 percentage points.

Long-term consumption growth, because of household debt saturation, is constrained to household disposable income growth.

The balance of payments

The Australian current account deficit will fall below 5 per cent of GDP due to major mining production expansion arising from projects to be completed in 2017. This expansion will be driven by the firming of real commodity prices due to accelerated world economic growth.

However, a subdued outlook in relation to the continuation of the mining boom post 2017, for reasons mentioned elsewhere above, results in an upward trend towards high current account deficits late projection period.

The medium-term current account deficit deteriorates significantly compared to the previous projection. In 2016 the deficit as a percentage of GDP is 2 percentage points higher than for the previous projection and 4 percentage points higher by 2020. This is due to the lower terms of trade, lower commodity prices and lower exchange rate. The lower terms of trade (and commodity prices) will increase the nominal balance of trade, while the lower exchange rate will increase debt service costs.

The improvement in the real net trade that is associated with the lower exchange rate eventually forces the current account deficit back down to more sustainable levels.

The exchange rate

The exchange rate over the next two years follows the outlook for real commodity prices with the downward trend reflecting the current weakness in the world economy in general. Over the medium term real commodity prices are projected to recover as world economic growth accelerates. The impact of this on the exchange rate is projected to be subdued. Firstly this is expected to be in response to the likelihood of the return of high current account deficits as a percentage of GDP over the next 2 to 3 years. Although low current account deficits return as the production effects of the current and projected mining investment are realised this is expected to be offset by the realisation of the extent of the damage that the Dutch disease has imposed on the structure of the Australian economy. Later in the projection period the issues of Australian energy and mineral access to Chinese markets and trading relationships in the Western Pacific, as well as issues associated with climate change, are generally expected to further dampen long-run expectations of Australian economic growth, and hence sentiment towards the Australian currency.

The biggest change in the projection profile compared to the previous projection is the downward adjustment in the exchange rate compared to the previous projection. This is 20 to 25 per cent down by 2016 and reflects the downward adjustment in commodity prices in $US, which is also profiled in the figure.

Despite the recovery in commodity prices towards the level predicted in the previous projection, the exchange rate does not go above the previously projected level in the 2020s. Currently, Australia's annual foreign borrowing required (short-term debt of less than a year's maturity plus the current account deficit less foreign reserves) is around 40 per cent of GDP. This is predicted to increase to 70 per cent by the mid-2020s. This is very high. In the past, foreign borrowing requirements of between 25 to 35 per cent of GDP have triggered exchange rate and banking crises. The high annual borrowing requirement, at the very least, will exert severe downward pressure on the exchange rate. At worst it will trigger an economic crisis which will shift the economy to a low growth profile circa the early 2020s.

Population

There has been a short-term downward adjustment of total population compared to the previous projection. This represents downward revision to the population by the ABS following the 2011 Census. However, post 2020 the population level accelerates compared to the previous projection. This is due to the erratic profile for net immigration. For this report a floor is placed on the minimum immigration intake for a year for the medium scenario of around 110,000, while the peaks, which are not as high, resemble, at most, the outcomes for the 2008 to 2010 period.

Interest rates

The immediate short-term outlook for interest rates is for a 90 day bill rate between 3 and 3.5 per cent. As the economy regains momentum through the second half of 2013, interest rates increase (though not necessarily the cash rate). The return of high current account deficits will place upward pressure on interest rates. The continuation of high current account deficits and inflationary pressures force interest rates beyond 6 per cent by 2018, which is maintained to 2020. A softening

world economy in 2021 allows interest rates to fall. The recovery over 2023 to 2025 forces interest rates to return to between 6 and 6.5 per cent by 2026.

Employment and unemployment

The headline unemployment rate is of little value in judging the underlying strength of the economy as currently it is almost fully controlled by governments. This is done by shifting the unemployed in and out of working age social security support in order to stabilise the measured unemployment rate. As can be seen from the economic indicators in the spreadsheets attached to this report the unemployment rate is expected to increase steadily over the next few years reaching a peak of 6 per cent by 2016. However the headline unemployment rate by 2016 would be at least one percentage point higher if not the workforce participation rate is projected to fall by one percentage point compared to current levels.

This mechanism is probably now well understood by the general public which explains why falls in the unemployment rate these days do little to improve confidence.

The constraints in the Australian economy from high current account deficits and minimum levels of net immigration result in a strong upward pressure on the unemployment rate, reaching 7 per cent over the longer term.

Table 2.2 Annual per cent growth in major expenditure aggregates for Australia – financial years (per cent)

	2009-10 to 2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Compound average annual change 2012-13 to 2017-18
National Accounts									
Household consumption expenditure	3.6	3.3	2.4	3.1	3.0	3.0	3.5	3.5	3.2
Private dwelling investment	2.3	-3.7	-0.1	4.0	-0.8	0.6	4.0	5.9	2.7
Total business investment	8.6	22.0	5.9	-2.3	-3.0	-4.2	-1.0	5.7	-1.0
Government consumption	3.1	3.4	1.4	2.3	3.4	3.7	3.3	3.1	3.2
Public investment (excluding asset sales)	-2.5	-2.2	3.5	4.7	2.5	2.6	0.8	1.4	2.4
State final demand	3.6	5.3	2.8	2.1	1.8	1.8	2.6	3.7	2.4
Overseas exports of goods and services	-0.4	3.8	6.6	4.9	3.6	7.6	8.4	6.9	6.3
Overseas imports of goods and services	6.9	9.3	2.0	0.2	-1.1	2.6	5.8	7.0	2.9
Gross state product at market prices	2.4	3.4	3.2	3.1	3.2	3.3	3.5	3.7	3.4
Labour market and demographics									
Population	1.2	1.4	1.5	1.5	1.6	1.6	1.5	1.5	1.5
Total employment	2.9	0.6	1.0	1.4	1.1	1.3	1.7	2.1	1.5
Prices and wages									
CPI	3.1	2.3	2.5	2.2	2.5	3.1	3.5	3.6	3.0
Average earnings	4.3	4.6	4.2	4.2	3.9	4.1	4.3	3.1	3.9

Table 2.3 Other economic indicators for Australia – financial years

	Unit	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Average 2013-14 to 2017-18
Labour market											
Participation rate	Per cent	65.4	65.8	65.5	65.2	65.0	64.7	64.5	64.5	64.7	64.7
Unemployment rate	Per cent	5.5	5.1	5.2	5.4	5.4	5.6	5.6	5.7	5.6	5.6
Interest rates											
90 day bill	Rate	4.0	4.9	4.4	5.0	5.1	5.0	5.0	5.0	5.7	5.1
10 year bond	Rate	5.5	5.3	4.0	5.2	5.5	5.3	5.3	5.5	5.4	5.4
Variable mortgage rate	Rate	6.5	7.7	7.3	7.8	7.5	7.4	7.4	7.4	8.1	7.5
Exchange rate											
US dollar	Rate	0.9	1.0	1.0	1.0	0.9	0.8	0.8	0.8	0.8	0.8
Euro	Rate	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
Trade weighted exchange rate	Index	68.9	74.0	75.8	75.0	66.0	58.9	56.4	55.2	51.8	57.7
Trade											
Terms of trade	Index	99.8	120.5	122.7	115.5	107.3	104.2	104.7	105.4	103.2	104.9
Balance on current account	% of GDP	-4.4	-2.4	-2.8	-4.4	-7.1	-7.1	-5.7	-4.4	-5.2	-5.9

Figure 2.4: $A/$US and $A/Euro exchange rates and weighted average exchange rate

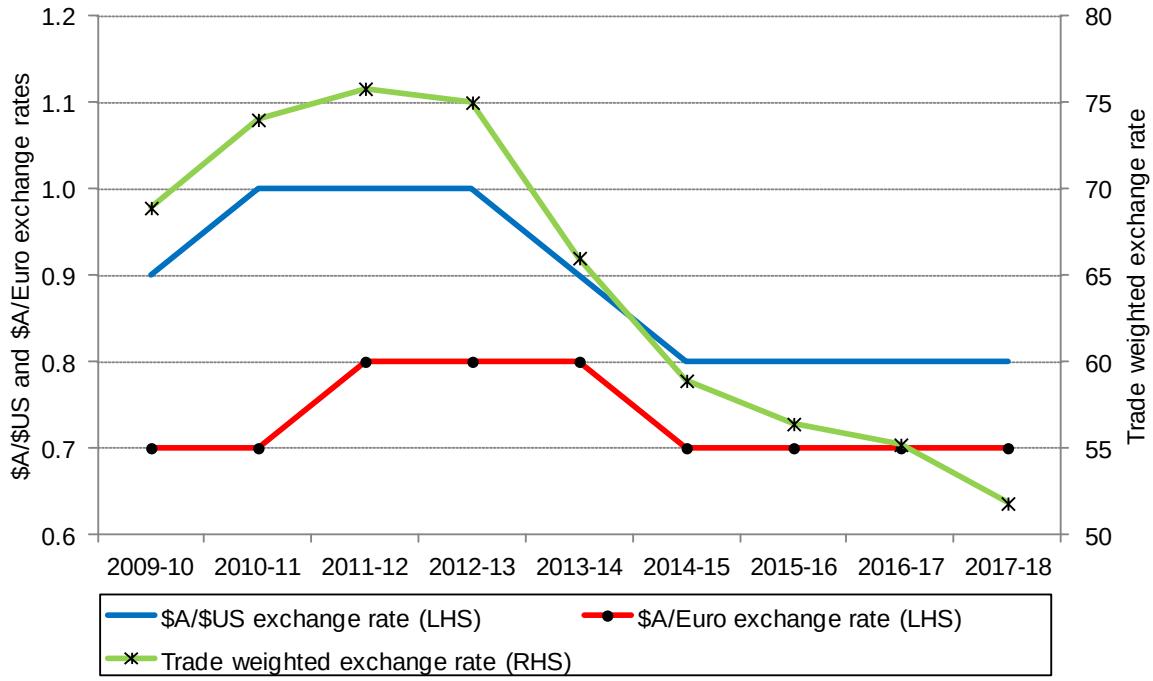


Figure 2.5: Australian population increase

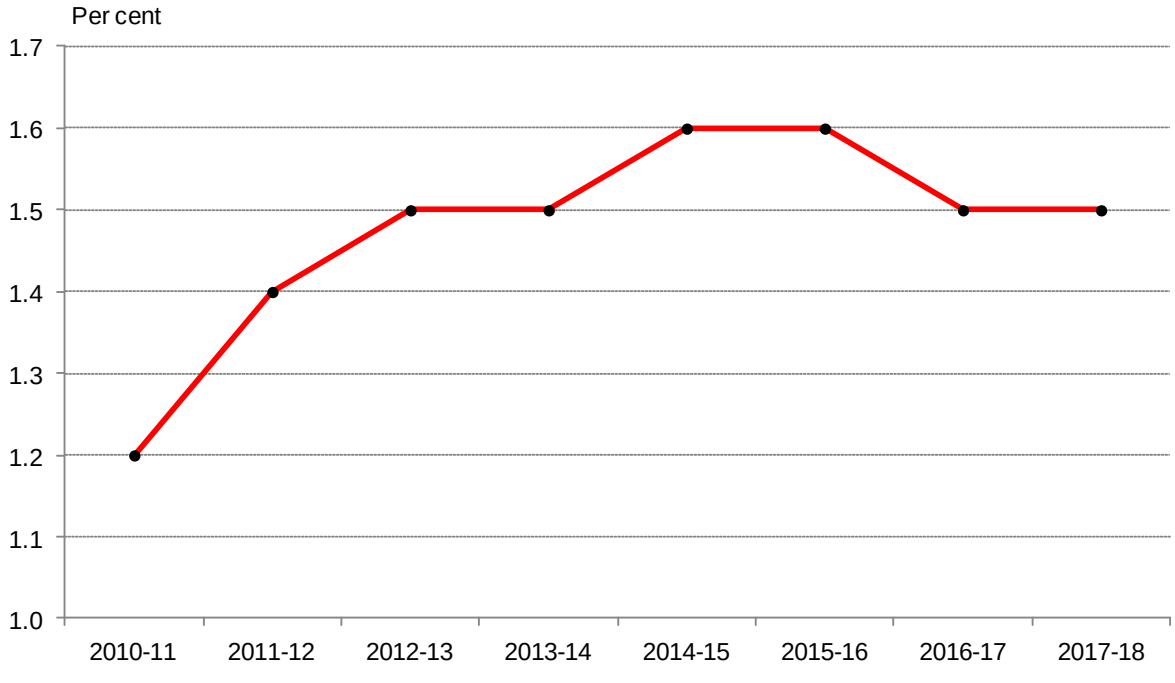


Figure 2.6: Labour market

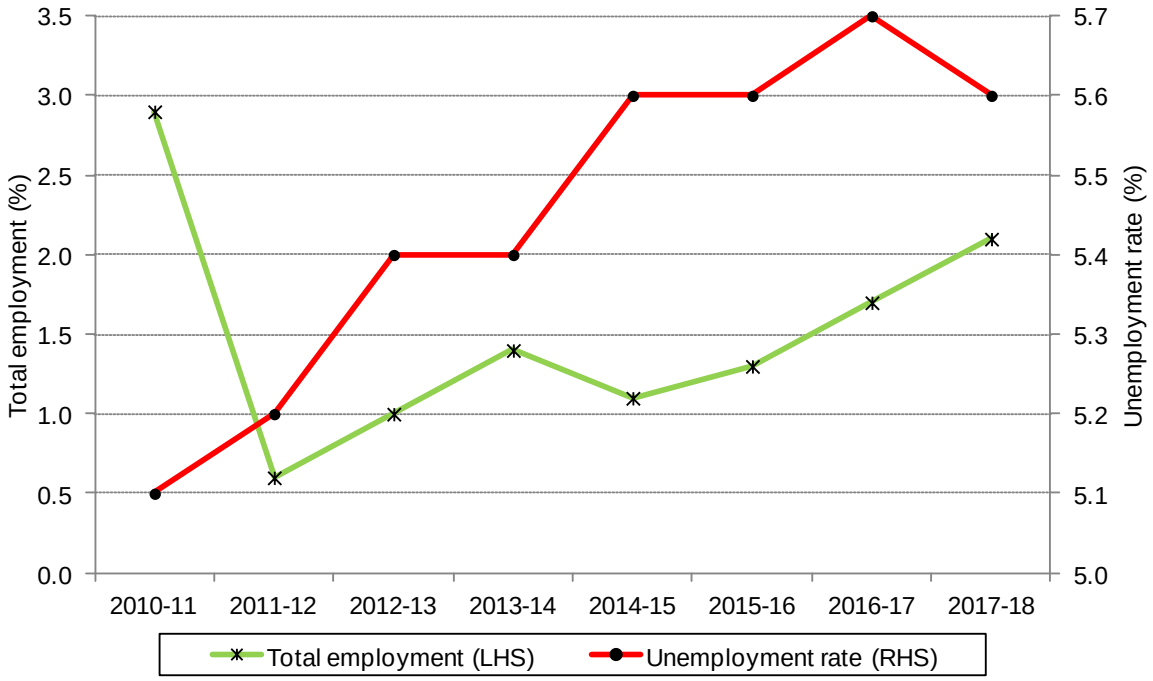


Figure 2.7: Interest rates

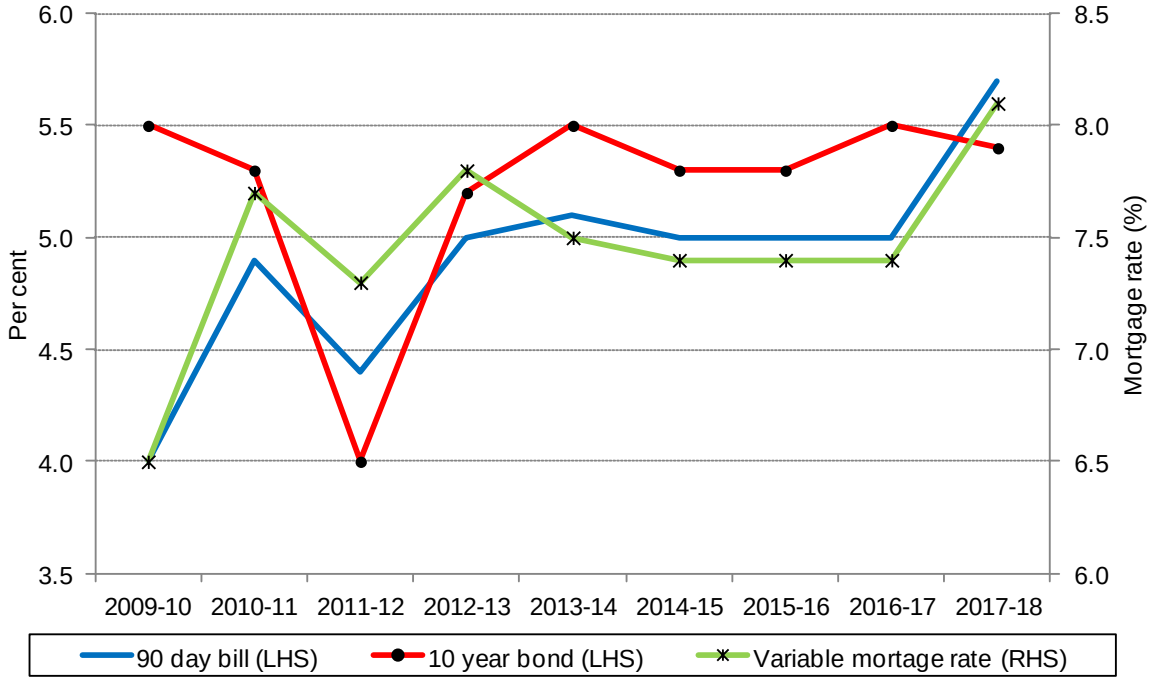


Figure 2.8: Current account balance (% of GDP)

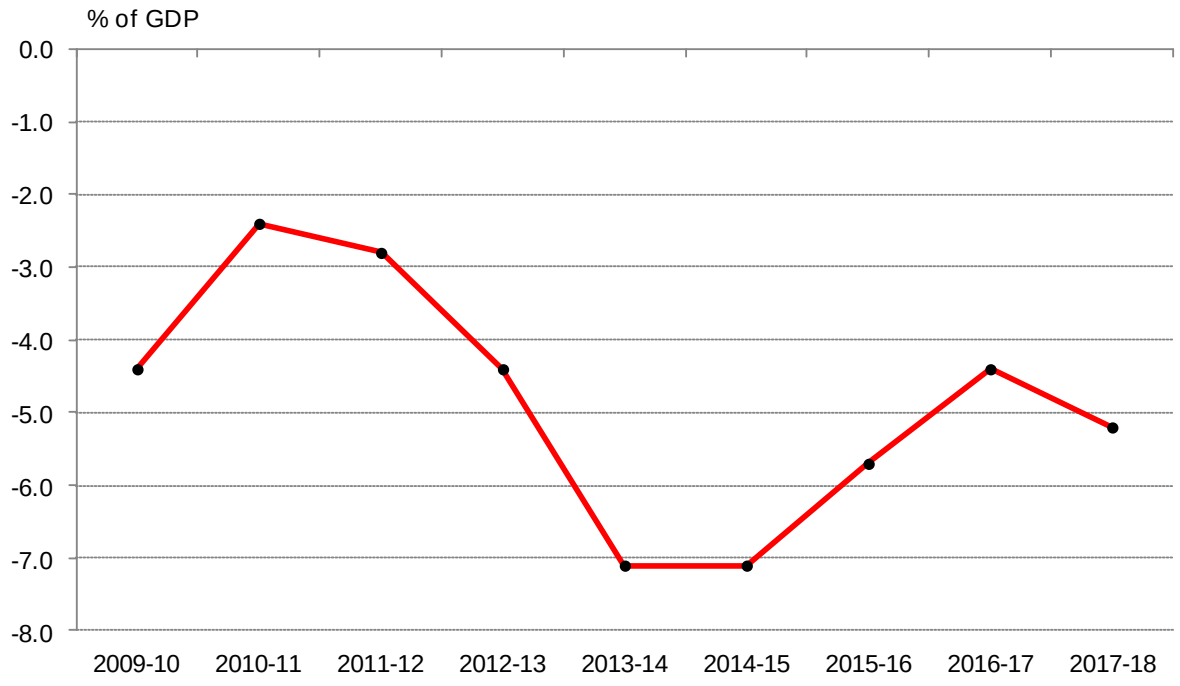


Figure 2.9: Prices and wages

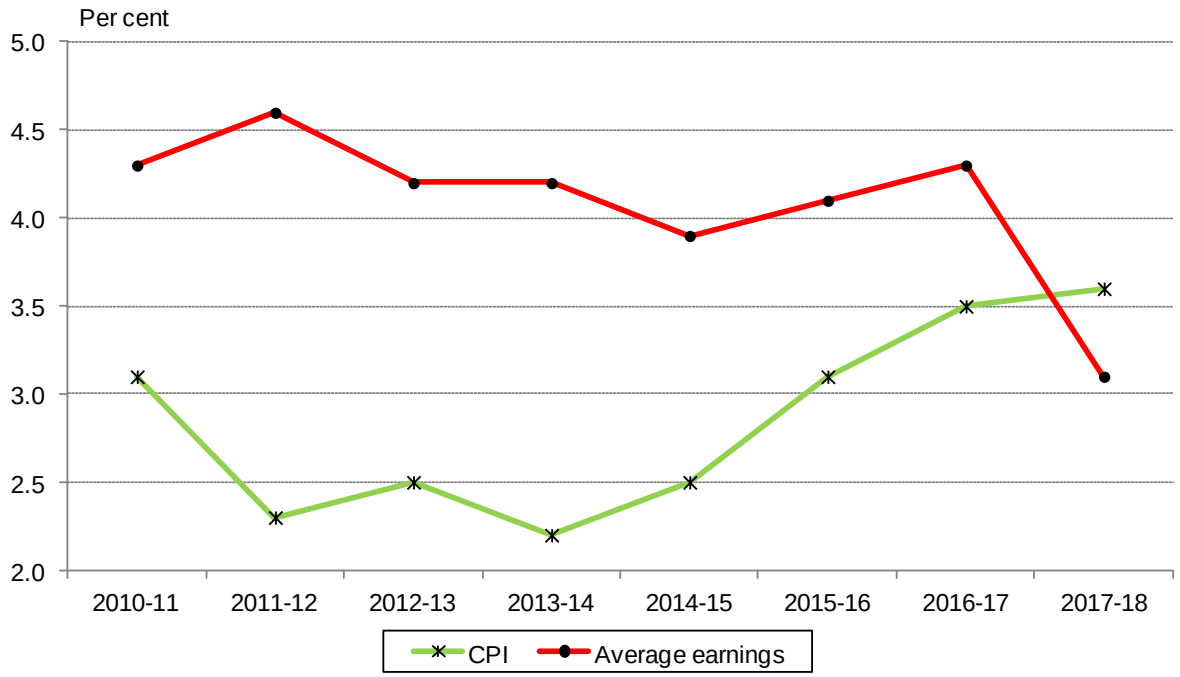


Figure 2.10: Overseas exports and imports of goods and services

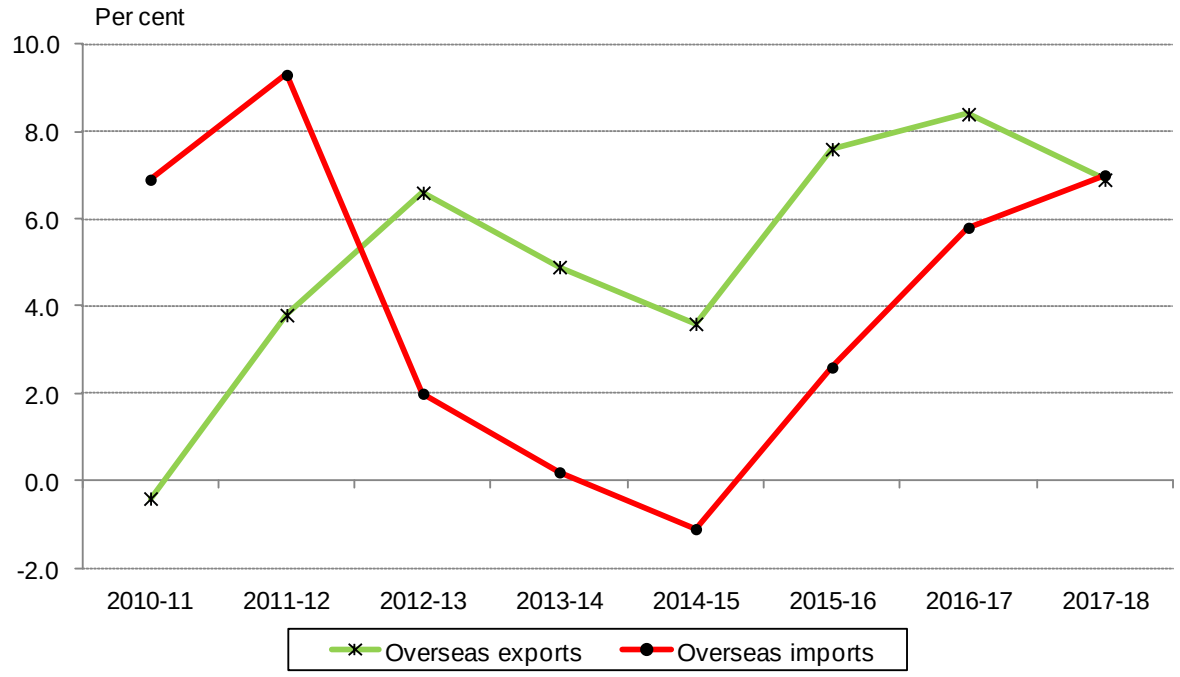


Figure 2.11: GDP and employment

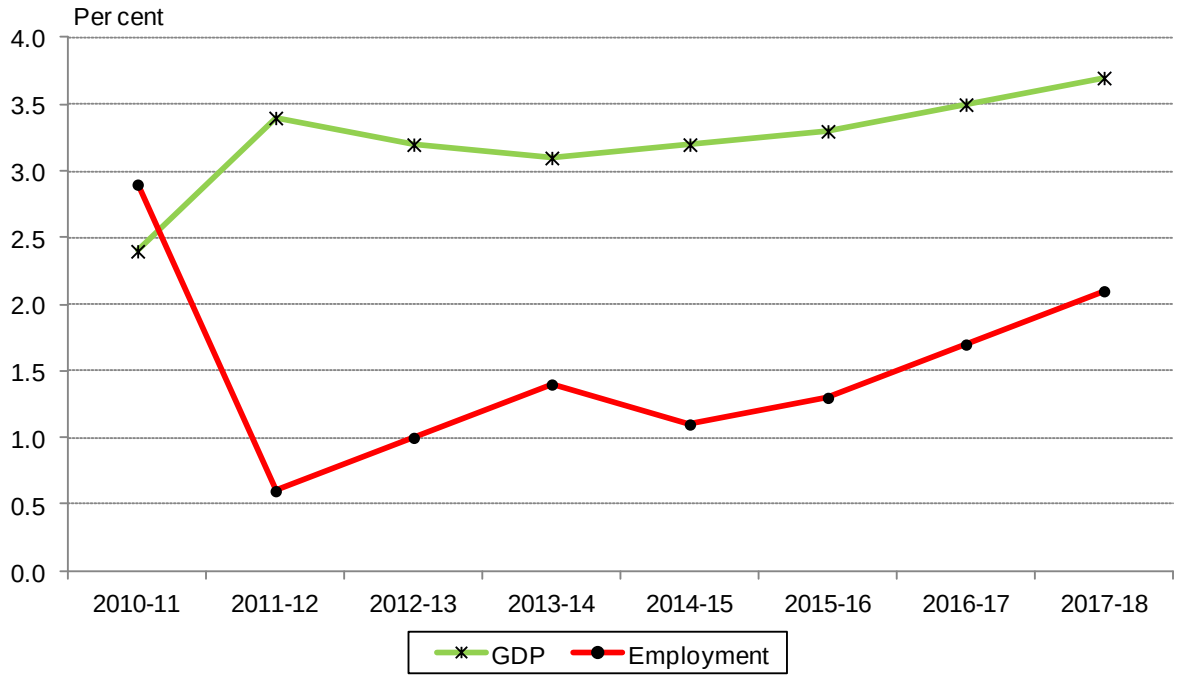
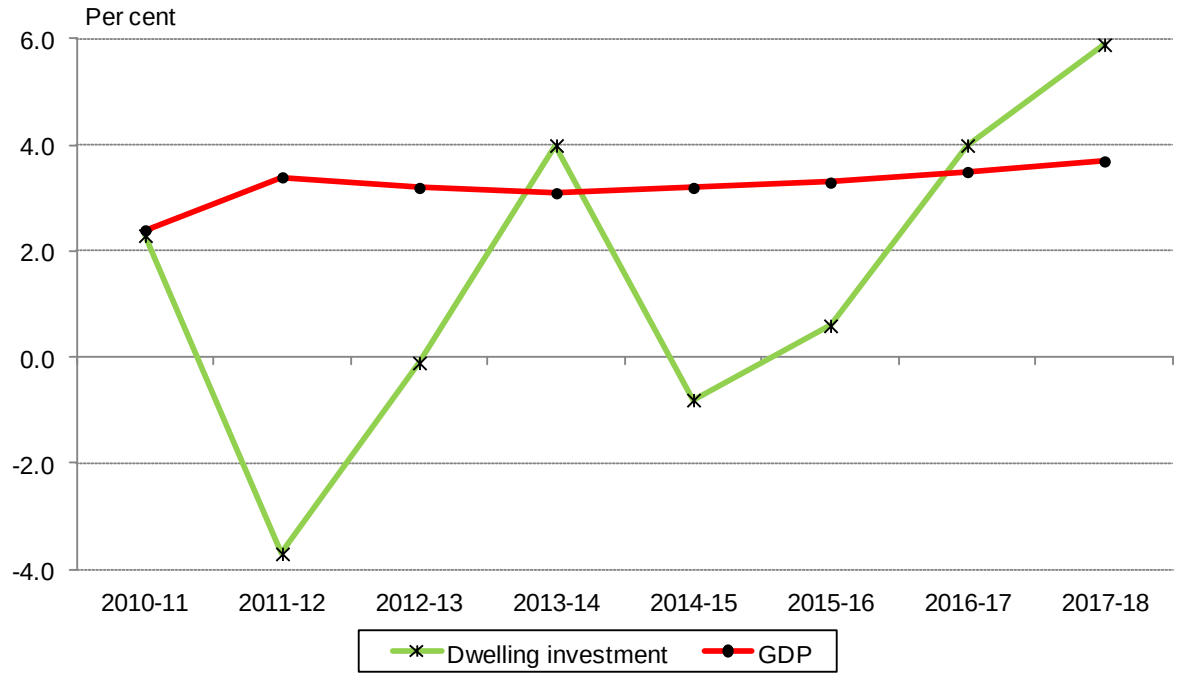


Figure 2.12: Housing sector



3. The outlook for New South Wales to 2022-23

3.1 Introduction

This section outlines the economic outlook to 2022-23, focussing on the short-term to 2017-18.

3.2 Summary of scenarios

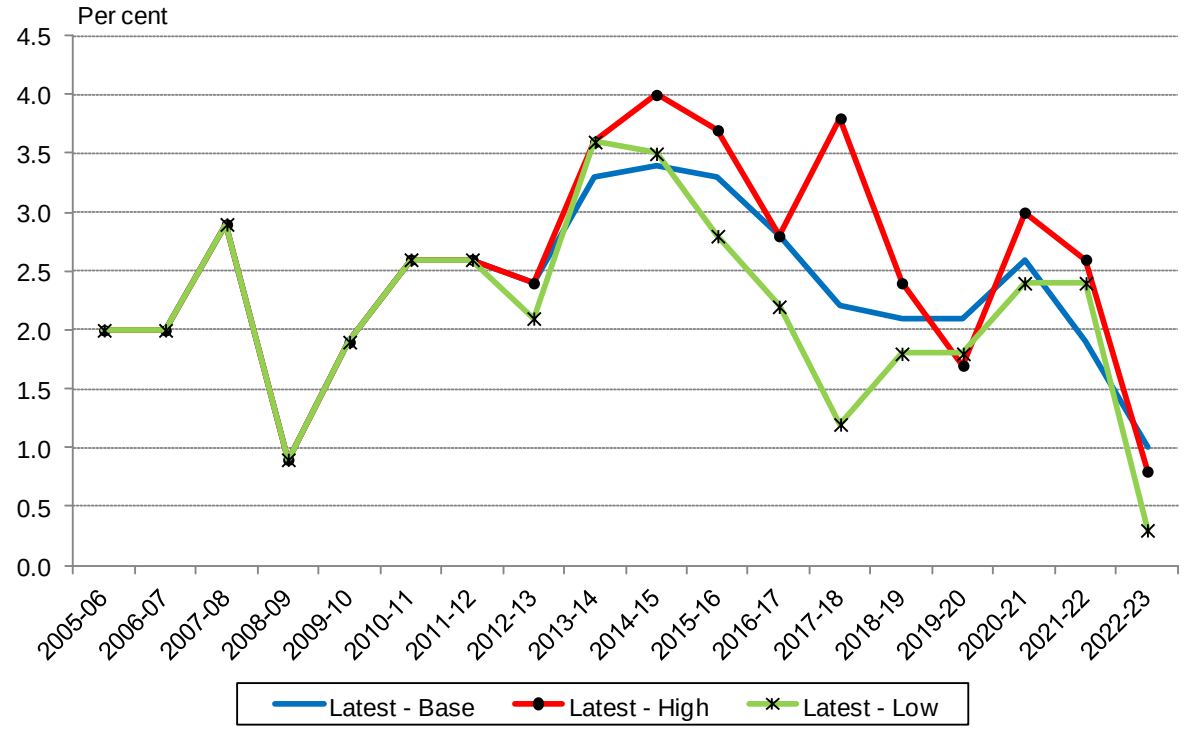
Figure 3.1 shows the outlook for growth in Gross State Product over the period to 2022-23 under alternative three scenarios (Base, High and Low cases). Between 2012-13 and 2022-23 GSP growth is projected to average:

- 2.5 per cent per annum under the Base scenario;
- 2.8 per cent under the High scenario; and
- 2.2 per cent under the Low scenario.

The risk to the base growth profile over this period is equally weighted between high and low scenario; average annual growth under the low scenario expected to be 0.3 per cent per annum lower than the base growth profile while growth under the high scenario is expected to be 0.3 per cent per annum higher than base growth profile.

Table 3.1 compares the projected annual economic growth rates projected for Australia and New South Wales by scenario for the period 2005-06 to 2022-23.

Figure 3.1: New South Wales GSP growth by scenario 2005-06 to 2022-23



Source: NIEIR and ABS.

Table 3.1	Projected Australian and New South Wales economic growth rate by scenario – 2005-06 to 2022-23					
	Australia			New South Wales		
	Base	High	Low	Base	High	Low
Per cent change						
2005-06	3.0	3.0	3.0	2.0	2.0	2.0
2006-07	3.8	3.8	3.8	2.0	2.0	2.0
2007-08	3.8	3.8	3.8	2.9	2.9	2.9
2008-09	1.6	1.6	1.6	0.9	0.9	0.9
2009-10	2.1	2.1	2.1	1.9	1.9	1.9
2010-11	2.4	2.4	2.4	2.6	2.6	2.6
2011-12	3.4	3.4	3.4	2.6	2.6	2.6
2012-13	3.2	3.4	2.8	2.4	2.4	2.1
2013-14	3.1	4.0	2.5	3.3	3.6	3.6
2014-15	3.2	4.4	2.3	3.4	4.0	3.5
2015-16	3.3	4.6	2.3	3.3	3.7	2.8
2016-17	3.5	4.3	2.4	2.8	2.8	2.2
2017-18	3.7	4.2	2.8	2.2	3.8	1.2
2018-19	3.0	3.0	2.4	2.1	2.4	1.8
2019-20	2.7	3.1	1.9	2.1	1.7	1.8
2020-21	2.6	3.1	1.7	2.6	3.0	2.4
2021-22	2.0	2.5	1.0	1.9	2.6	2.4
2022-23	1.4	2.0	0.5	1.0	0.8	0.3
Average annual growth rate (per cent)						
2012-13 to 2017-18	3.4	4.3	2.5	3.0	3.6	2.7
2012-13 to 2022-23	2.9	3.5	2.0	2.5	2.8	2.2

Source: NIEIR and ABS.

3.3 The Base scenario outlook for New South Wales to 2017-18

Table 3.2 presents selected economic aggregates for New South Wales to 2017-18 for the Base scenario.

Table 3.2 Macroeconomic aggregates and selected indicators – New South Wales (per cent change)

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Compound average annual change 2012-13 to 2017-18
Private consumption	3.3	2.6	2.0	2.5	3.2	3.1	3.2	3.1	3.0
Private dwelling investment	9.6	-8.0	5.3	11.4	-3.8	-4.1	2.1	11.3	3.4
Total business investment	5.7	9.0	4.4	3.5	1.3	1.9	4.2	1.2	2.4
Government consumption	2.9	3.4	2.9	2.3	3.2	3.4	3.2	3.0	3.0
Government investment	-4.1	-3.9	-6.8	-1.4	1.0	4.7	5.5	0.0	1.9
State final demand	3.1	2.2	2.5	2.8	2.5	2.7	3.4	3.0	2.9
Gross State Product	2.6	2.6	2.4	3.3	3.4	3.3	2.8	2.2	3.0
Population	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.0
Total employment	3.1	0.3	0.8	1.1	0.9	1.1	1.4	1.8	1.3

Source: NIEIR and ABS.

Gross State Product

The latest Australian Bureau of Statistics (ABS) State Accounts estimates show that Gross State Product (GSP) in New South Wales had grown by 2.6 per cent in 2011-12, following 2.6 per cent growth in 2010-11. In the eight years leading up to the Global Financial Crisis in 2008-09, economic growth is estimated to have averaged by just 2.1 per cent per annum; the highest annual percentage increase over this period was just 2.9 per cent. In this context, growth performance over the past two years looks relatively solid.

Growth in household spending moderate somewhat in 2011-12 following robust growth in 2010-12; private consumption is estimate to have grown by 2.6 per cent in 2011-12, on the back 3.3 per cent growth in 2011-12. The more subdued growth can, in part, be attributed to more cautious behaviour of consumers in light of financial market turbulence in Europe and the United States and the changed labour market conditions. Total employment is estimated to have increased by just 0.3 per cent in 2011-12 following a large increase (up 3.1 per cent) in 2010-11.

The more subdued sentiment amongst households in 2011-12 was strongly reflected in the housing market. Private dwelling investment is estimated to have fallen by 8.0 per cent in 2011-12, partly reversing the notably 9.6 per cent pickup in 2010-11 following an extended period declined. The housing market in 2011-12 was back around its Global Financial Crisis' low and remained significantly below its early 2000s peak. Private dwelling investment in 2011-12 was only 2 per cent above its 2008-09 level and a massive 26 per cent below its 2003-04 level.

Despite the subdued sentiment in the household sector, business capital expenditure continued to gather pace in 2011-12. Private business investment is estimated to have increased by 9.0 per cent in 2011-12, following growth of 5.7 per cent in 2011-12. Business spending partly offset the declines in other parts of the economy. Business investment alone contributed around 1.0 percentage points to the 2.6 per cent growth in Gross State Product in 2011-12.

The government sector spending had a mixed impact on the state's accounts. Government consumption is estimated to have grown b 3.4 per cent in 2011-12, while Government investment is estimated to have contracted by 3.9 per cent. In net terms, the government sector added around 0.4 percentage points to the 2.6 per cent growth in Gross State Product.

In the current financial year (2012-13), economy growth in New South Wales is expected to remain solid (albeit far from robust). Gross State Product is expected to grow by 2.4 per cent in 2012-13. Household spending is expected to remain fairly subdued as a result of the continued uncertainty about the international economy and local labour market conditions; Private consumption expenditure is forecast to grow by 2.0 per cent in 2012-13. The housing market is expected to bounce back somewhat in response to the lower domestic interest rates and private dwelling investment is forecast to grow by 5.3 per cent in 2012-13.

Growth in business spending is expected to moderate although remain fairly robust. Business investment is forecast to grow by 4.4 per cent to be now over 20 per cent above its level in 2008-09 when the Global Financial Crisis hit. Changes in government capital expenditure are expected to continue to be negative on growth in Gross State Product. Government investment is forecast to fall by 6.8 per cent in 2012-13. Government consumption is expected again to make a possible contribution to growth.

Looking ahead, the New South Wales economy is expected to experience a period of relatively robust growth over the short-to-medium terms. Gross State Product is forecast to grow in excess of 3.0 per cent per annum until 2015-16, before moderating back down to less than 3.0 per cent. The relatively rosy growth in part reflects a pickup in household consumption after a fairly extended period of cautious spending by New South Wales consumers and continued solid growth in business capital spending. A strong recovery in the housing market will also provided support for growth at least in 2013-14.

Private household consumption is forecast to grow by 2.5 per cent in 2013-14 and by over 3.0 per cent per annum thereafter. Private dwelling investment is projected to jump by 11.4 per cent in 2013-14, before contracting in response to higher domestic interest rates. Business investment is forecast to continue to increase throughout the medium-term period, growing on average by around 2.4 per cent per annum.

Population and labour market

New South Wales population is estimated by the Australian Bureau of Statistics to have increased by 1.0 per cent to 7.3 million in 2011-12. Net immigration into the state in 2011-12 is estimated to have been 40,000 persons, up slightly from 37,000 persons in 2010-11.

Since the release of preliminary rebased population estimates on 20 June 2012, the ABS has not revised the population components of births, deaths or net overseas migration and will not do so until final rebasing is completed in June 2013. Because of this, it is difficult to attribute movements in population to its components. Historical data and forecasts of net immigration into the state (i.e., net flows into the state from interstate and overseas migrations) are based on the unrevised data and are subject to revisions.

Total employment is estimated by the Australian Bureau of Statistics to have increased by just 0.3 per cent in 2011-12, the lowest annual rate of increase since the early 1990s recession. While the weak results can be in part attributed to the subdued conditions in the economy in 2011-12, it may also simply reflect a correction to somewhat of an overshoot in employment growth in the previous year. Total employment was up by a very robust 3.1 per cent in 2010-11.

In the current financial year (2012-13), population is projected to grow by 1.0 per cent (or 76,000 persons). Net immigration into the state is projected to fall slightly to 32,000 persons. Total employment is projected to grow by 1.6 per cent in 2012-13.

Looking ahead, population is projected to grow, on average, by 1.0 per cent per annum between 2012-13 and 2017-18, while net immigration into the state is projected to be on average 35,000 persons per annum. Over the same period, total employment is projected to grow by 1.3 per cent per annum.

TABLE 3.3 GRP Essential Energy regions

	Far North Coast	Mid North Coast	Northern Region	North West Region	Far West Region	Central Western Region	Southern Region	South Eastern	Total EE
UNIT	**********	**********	number	**********	**********	**********	**********	**********	**********
2007	8517.30	8448.90	6417.20	4982.30	1615.90	6876.80	6728.90	6690.00	50277.30
2008	8454.40	8485.90	6444.70	4947.40	1523.60	6901.20	6663.70	6594.90	50015.80
2009	8515.70	8571.10	6692.00	5189.50	1503.60	7217.20	6785.10	6724.00	51198.20
2010	8573.10	8677.10	6839.00	5386.30	1472.90	7418.80	6763.50	6803.50	51934.20
2011	8592.60	8792.00	7161.50	5632.10	1504.70	7716.00	6878.00	7111.30	53388.20
2012	8503.60	8755.00	7195.60	5774.80	1529.10	7919.70	6799.50	7257.20	53734.50
2013	8395.90	8731.00	7274.30	5758.30	1593.20	8028.60	6869.20	7439.70	54090.20
2014	8419.70	8811.40	7216.10	5679.60	1620.70	8068.20	6822.70	7594.80	54233.20
2015	8545.50	8947.30	7271.60	5715.80	1645.90	8192.70	6903.70	7799.50	55022.00
2016	8800.90	9195.30	7367.20	5834.20	1689.40	8341.30	7041.10	8047.50	56316.91
2017	9061.90	9524.60	7471.20	5929.20	1726.60	8514.60	7160.60	8326.00	57714.71
2018	9351.80	9846.80	7535.90	5963.00	1731.30	8622.10	7257.10	8569.70	58877.70
2019	9615.40	10142.50	7575.50	6004.30	1735.30	8725.90	7352.70	8772.90	59924.51
2020	9783.30	10372.30	7558.10	6061.30	1744.50	8821.10	7409.40	8889.30	60639.30
2021	9955.40	10580.90	7540.70	6074.00	1733.00	8851.20	7470.50	9036.80	61242.51
2022	10017.70	10722.70	7489.20	6064.80	1695.60	8858.20	7461.60	9103.60	61413.40
PERCENTAGE CHANGES									
2008	-0.74	0.44	0.43	-0.70	-5.71	0.35	-0.97	-1.42	-0.52
2009	0.73	1.00	3.84	4.89	-1.31	4.58	1.82	1.96	2.36
2010	0.67	1.24	2.20	3.79	-2.04	2.79	-0.32	1.18	1.44
2011	0.23	1.32	4.72	4.56	2.16	4.01	1.69	4.52	2.80
2012	-1.04	-0.42	0.48	2.53	1.62	2.64	-1.14	2.05	0.65
2013	-1.27	-0.27	1.09	-0.29	4.19	1.38	1.03	2.51	0.66
2014	0.28	0.92	-0.80	-1.37	1.73	0.49	-0.68	2.08	0.26
2015	1.49	1.54	0.77	0.64	1.55	1.54	1.19	2.70	1.45
2016	2.99	2.77	1.31	2.07	2.64	1.81	1.99	3.18	2.35
2017	2.97	3.58	1.41	1.63	2.20	2.08	1.70	3.46	2.48
2018	3.20	3.38	0.87	0.57	0.27	1.26	1.35	2.93	2.02
2019	2.82	3.00	0.53	0.69	0.23	1.20	1.32	2.37	1.78
2020	1.75	2.27	-0.23	0.95	0.53	1.09	0.77	1.33	1.19
2021	1.76	2.01	-0.23	0.21	-0.66	0.34	0.82	1.66	0.99
2022	0.63	1.34	-0.68	-0.15	-2.16	0.08	-0.12	0.74	0.28
COMPOUND GROWTH RATE (PER CENT) -									
2005-2013	0.65	0.88	0.91	1.59	-0.37	1.81	-0.65	1.67	0.91
2013-2018	2.18	2.43	0.71	0.70	1.68	1.44	1.10	2.87	1.71
2013-2022	1.98	2.31	0.32	0.58	0.69	1.10	0.92	2.27	1.42

All data are for the financial year ending in June of the year specified.

TABLE 3.4 Population Essential Energy regions

	Far North Coast	Mid North Coast	Northern Region	North West Region	Far West Region	Central Western Region	Southern Region	South Eastern	Total EE
UNIT	**********	**********	number	**********	**********	**********	**********	**********	**********
2007	281212.00	295208.00	180139.00	119474.00	32744.00	172883.00	179251.00	214247.00	1475158.00
2008	283311.00	297756.00	180497.00	119566.00	32580.00	173309.00	178903.00	215728.00	1481650.00
2009	285658.00	300267.00	181502.00	120292.00	32286.00	174571.00	179007.00	217640.00	1491223.00
2010	287074.00	302146.00	182298.00	120718.00	31922.00	175675.00	178695.00	219358.00	1497886.00
2011	287616.00	303696.00	182767.00	120610.00	31528.00	176509.00	177817.00	220305.00	1500848.00
2012	287850.00	304938.00	182999.00	120555.00	31180.00	177288.00	176842.00	221356.00	1503008.00
2013	288054.00	305903.00	183168.00	120631.00	31003.00	178086.00	176417.00	222725.00	1505987.00
2014	288860.00	307190.00	183172.00	120634.00	30824.00	178684.00	176315.00	224068.00	1509747.00
2015	290833.00	309569.00	182930.00	120603.00	30667.00	178898.00	176451.00	225873.00	1515824.00
2016	293020.00	312164.00	182820.00	120626.00	30539.00	179243.00	176693.00	227775.00	1522880.00
2017	295236.00	314757.00	182873.00	120726.00	30440.00	179765.00	177056.00	229621.00	1530474.00
2018	297472.00	317363.00	182867.00	120753.00	30326.00	180254.00	177355.00	231452.00	1537842.00
2019	299794.00	320071.00	182746.00	120679.00	30181.00	180659.00	177572.00	233315.00	1545017.00
2020	302261.00	322946.00	182678.00	120624.00	30045.00	181124.00	177862.00	235248.00	1552788.00
2021	304668.00	325764.00	182603.00	120541.00	29900.00	181570.00	178138.00	237097.00	1560281.00
2022	306977.00	328479.00	182519.00	120449.00	29760.00	181968.00	178395.00	238870.00	1567417.00
PERCENTAGE CHANGES									
2008	0.75	0.86	0.20	0.08	-0.50	0.25	-0.19	0.69	0.44
2009	0.83	0.84	0.56	0.61	-0.90	0.73	0.06	0.89	0.65
2010	0.50	0.63	0.44	0.35	-1.13	0.63	-0.17	0.79	0.45
2011	0.19	0.51	0.26	-0.09	-1.23	0.47	-0.49	0.43	0.20
2012	0.08	0.41	0.13	-0.05	-1.10	0.44	-0.55	0.48	0.14
2013	0.07	0.32	0.09	0.06	-0.57	0.45	-0.24	0.62	0.20
2014	0.28	0.42	0.00	0.00	-0.58	0.34	-0.06	0.60	0.25
2015	0.68	0.77	-0.13	-0.03	-0.51	0.12	0.08	0.81	0.40
2016	0.75	0.84	-0.06	0.02	-0.42	0.19	0.14	0.84	0.47
2017	0.76	0.83	0.03	0.08	-0.32	0.29	0.21	0.81	0.50
2018	0.76	0.83	0.00	0.02	-0.37	0.27	0.17	0.80	0.48
2019	0.78	0.85	-0.07	-0.06	-0.48	0.22	0.12	0.80	0.47
2020	0.82	0.90	-0.04	-0.05	-0.45	0.26	0.16	0.83	0.50
2021	0.80	0.87	-0.04	-0.07	-0.48	0.25	0.16	0.79	0.48
2022	0.76	0.83	-0.05	-0.08	-0.47	0.22	0.14	0.75	0.46
COMPOUND GROWTH RATE (PER CENT) -									
2005-2013	0.56	0.67	0.30	0.07	-0.81	0.47	-0.11	0.76	0.42
2013-2018	0.65	0.74	-0.03	0.02	-0.44	0.24	0.11	0.77	0.42
2013-2022	0.71	0.79	-0.04	-0.02	-0.45	0.24	0.12	0.78	0.45

All data are for the financial year ending in June of the year specified.

4. Electricity forecasting methodologies and modelling assumptions

This section summarises the methodologies employed and the key modelling assumptions used in developing Essential Energy's electricity sales forecasts by class.

The centrepiece of the modelling methodology was the application of NIEIR's state and energy industry based economic energy projection models.

NIEIR's projections of energy consumption are derived from growth equations. This is a common approach to modelling non-stationary variables. By taking the first difference (percentage change) of the variable, a non-stationary series can be converted to a stationary one. Standard modelling techniques and hypothesis testing (t-distribution test) can be applied to these.

One disadvantage of this approach is that potentially useful information about the long-run relationship between the non-stationary variables is discarded. However, this potential shortcoming, in our opinion, is likely to be small in this modelling exercise, particularly given the difficulties in establishing a long-run relationship between energy and it determinants. The power (reliability) of existing tests for establishing a long run or 'co-integrating' relationship is poor. Further, non-stationary models have poor small sample properties (i.e. samples less than 40 observations). This is particularly important given the limited consistent historical data on the key determinants of energy consumption (notably prices).

4.1 Methodology – electricity sales forecasts

Historical electricity sales data for the Essential Energy distribution region was supplied by Essential Energy:

- network tariff energy from 2006-07 to 2012-13;
- network tariff customer numbers from 2006-07 to 2012-13;
- energy was provided for total, peak, anytime, off-peak, shoulder;
- demand was provided for anytime, peak, off-peak, shoulder and capacity; and
- exports by small scale PV customers and other embedded generators.

NIEIR aggregated the Essential Energy network tariff categories into a more manageable group(s) of network tariffs for the purposes of forecasting. Table 4.1 shows these network categories or groups for Essential Energy used by NIEIR in its modelling.

Table 4.1 Network tariff categories		
Tariff type	**Tariff**	**Primary network price description**
Residential	BLNN2AU	LV Residential Continuous
	BLNT3AU	LV TOU RES
	BLNE2AU	NSW Solar Bonus Scheme
	BLNE4AU	NSW Solar Bonus Scheme Gross
	BLNE14AU	NSW Solar Bonus Reduced Gross
	BLNE12AU	NSW Solar Bonus Reduced Net
	BLNE21AU	Res Export - Gross @ $0
	BLNE23AU	Res Export - Net @ $0
Controlled Load	BLNC1AU	Controlled Load 1
	BLNC2AU	Controlled Load 2
Business	BLND1CO & BLND1SR & BLND1SU & BLNN1AU	LV 1 Rate
	BLNT1SU & BLNT1AO	LV TOU over 100MWh
	BLNS1AO	LV TOU average daily demand
	BLNT2AU	LV TOU <100MWh
	BLND3TO & BLND3AO & BLND4NO & TLD	LV TOU 3 Rate
	BHND1CO & BHND1SO	HV 1 Rate
	BHND3AO & TLD	HV TOU
	BHNS1AO	HV TOU average daily demand
	BLNE1AU	NSW Solar Bonus Scheme
	BLNE3AU	NSW Solar Bonus Scheme Gross
	BLNE11AU	NSW Solar Bonus Reduced Net
	BLNE13AU	NSW Solar Bonus Reduced Gross
	BLNE22AU	Bus Export - Net @ $0
Customer specific	Various	

Small scale photovoltaic schemes

The New South Wales Solar Bonus Scheme provides feed-in-tariffs for eligible customers with small solar or wind generators that are connected to the distribution network. The Scheme commenced on 1 January 2010 and operates until 31 December 2016. The New South Wales Government closed the Scheme in May 2011, effectively closing the Scheme to new applicants from 28 April 2011.

Initially, the New South Wales Solar Bonus Scheme offered a 60 cent FIT, however, this was reduced to 20 cents in October 2010 and a Scheme capacity limit of 300 MW was introduced.

The New South Wales Solar Bonus Scheme offered both a "gross" and "net" tariff:

- a "gross" tariff means that customers are paid for all electricity produced and exported to the grid by their eligible generator; and
- a "net" tariff means that customers may choose to export only excess electricity produced to the grid.

Most customers covered by the Solar Bonus Scheme have gross metering, so all generation is exported and customers are metered separately and pay the applicable retail price for all their consumption.

Under net metering, it is only excess generation that is exported to the grid (net exports). Where a net customer cannot meet their demand from their own generation, the extra electricity is supplied by the grid at the applicable retail price. Most customers in New South Wales that are not eligible for the Solar Bonus Scheme have net metering.

All new PV customers in New South Wales will adopt net metering, reflecting the higher ongoing financial benefits. Customers under net metering are only billed for their net electricity consumption.

Energy retailers in New South Wales have been able to set their own feed-in-tariffs (for customers not eligible for the Solar Bonus Scheme). IPART, in June 2012, released its view on a fair and reasonable FIT for New South Wales for 2012-13 is in the range of 7.7 to 12.9 cents per kilowatt hour.

The small scale PV data for Essential Energy was provided for residential and business customers.

Table 4.2 shows the categories forecast for small scale PV for Essential Energy.

Table 4.2 Solar PV tariffs				
Tariff	**Network tariff**	**Sectoral class**	**Gross/Net**	**60 cents/ 20 cents**
BLNE1AU	BLNE1AU – General export net	Business	Net	60
BLNE2AU	BLNE2AU – General export net	Residential	Net	60
BLNE3AU	BLNE3AU – General export gross	Business	Gross	60
BLNE4AU	BLNE4AU – General export gross	Residential	Gross	60
BLNE11AU	BLNE11AU – General export net	Business	Net	20
BLNE12AU	BLNE12AU – General export net	Residential	Net	20
BLNE13AU	BLNE13AU – General export gross	Business	Gross	20
BLNE14AU	BLNE14AU – General export gross	Residential	Gross	20
BLNE21AU	Residential export – Gross @ $0	Residential	Gross	0
BLNE22AU	Business export – Net @ $0	Business	Net	0
BLNE23AU	Residential export – Net @ $0	Residential	Net	0

Essential energy also supplied individual PV customer billings data.

Monthly data for PV customers was estimated by customer type covering:

- actual connections;
- new connections; and
- tariff switching and disconnections.

This allowed us to assess the net change (or churn) between the different PV network tariffs in the Essential Energy distribution region.

Energy and capacity data were also available by network tariff on a customer by customer basis. NIEIR used these data (after filtering out blank/inconsistent reads) to calculate capacity factors for Essential Energy PV customers by network tariff for 2011 and 2012.

Business sales

NIEIR's existing New South Wales electricity forecasting model was used to drive the electrical energy projections. This model is an industry based model which uses the ABARE energy demand data and NIEIR's projections of gross state product and output by industry along with other variables.

Table 4.3 shows the Australian Standard Industrial Classification (ASIC) categories included in NIEIR's New South Wales electricity forecasting model. Table 4.3 also shows the concordance between customer class categories and ASIC industry categories. Electricity consumption forecasts are based on econometric models which link New South Wales electricity sales by industry to real output growth by industry, electricity prices and weather conditions.

Essential Energy provided NIEIR with business sales data on a customer by customer basis for the 2010-11 financial year. Using the business name and cross checking against business registrars and other listings, NIEIR industry coded all large business customers in Essential Energy. There were some 5,000 business customers in the Essential Energy distribution area. This represented nearly 65 per cent of total business energy sales in the Essential Energy distribution region.

The key reason for adopting this approach for business sales is that it is a much more rigorous and accurate forecasting model. It effectively captures the implications for electricity sales in industries that are declining, such as motor vehicle production and textiles, clothing and footwear, and industries that are growing, such as commerce and recreation and entertainment.

In effect the NIEIR modelling approach for business sales takes into account, not only economic growth in the Essential Energy region, but also the structure of economic growth in the Essential Energy region on an industry basis. This approach is much more meaningful than relying simply on aggregate GDP measures to project business electricity sales growth.

Table 4.3 Reconciliation of customer class categories with ASIC industries

Customer class category	ASIC
Residential	
Commercial	Water and sewerage Construction Wholesale and retail trade Transport and storage Communication Finance, property, business services Public administration and defence Community services Recreation, personal and other services
Industrial	Agriculture, forestry, fishing, hunting Mining Food, beverages, tobacco manufacturing Textiles, clothing and footwear manufacturing Wood, wood products manufacturing Chemicals, petroleum, coal manufacturing Paper, paper products manufacturing Non-metallic minerals manufacturing Basic metal products manufacturing Fabricated metal products manufacturing Transport equipment manufacturing Other machinery and equipment manufacturing Miscellaneous manufacturing

Notes: ASIC refers to Australian Standard Industrial Classification.
1. The farm class which excludes residential farm is included in the industrial sector.

Residential sales

Residential sales were split between general sales and hot water sales.

Hot water electricity sales

Two controlled load tariffs were modelled for Essential Energy. Customers and energy are expected to continue to decline for these network tariffs.

A full hot water model was not developed for the Essential Energy region, partly because of the diversity across the region. Piped natural gas is available in some areas of the Essential Energy region, although in many areas bottled gas would be prevalent. It would be difficult to accurately model hot water loads without these types of detailed data.

General residential electricity sales

NIEIR's econometric models of residential sales link sales growth with real income per capita, real and relative prices and weather conditions. Whilst these general econometric regression models are useful, they do not allow the practitioner to take account of Federal and State Government policies that will directly affect energy use by New South Wales households. In addition, statistical problems associated with these models and data inconsistencies can also generate implausible coefficients.

A sensible approach to assessing the impact of energy policies is to separate residential customers into existing customers and new customers, since this is generally the way energy policies are structured.

For the initial energy projection work prepared for Essential Energy by NIEIR in September 2012, residential electricity use was not split between old and new customers.

However, the impact of existing photovoltaic schemes on residential electricity sales was explicitly modelled, including:

- the in-house electricity use from customers on net FIT schemes; and
- the impact of gross PV schemes finishing in 2016, and energy previously exported to the grid being used in-house by residential customers on gross PV schemes.

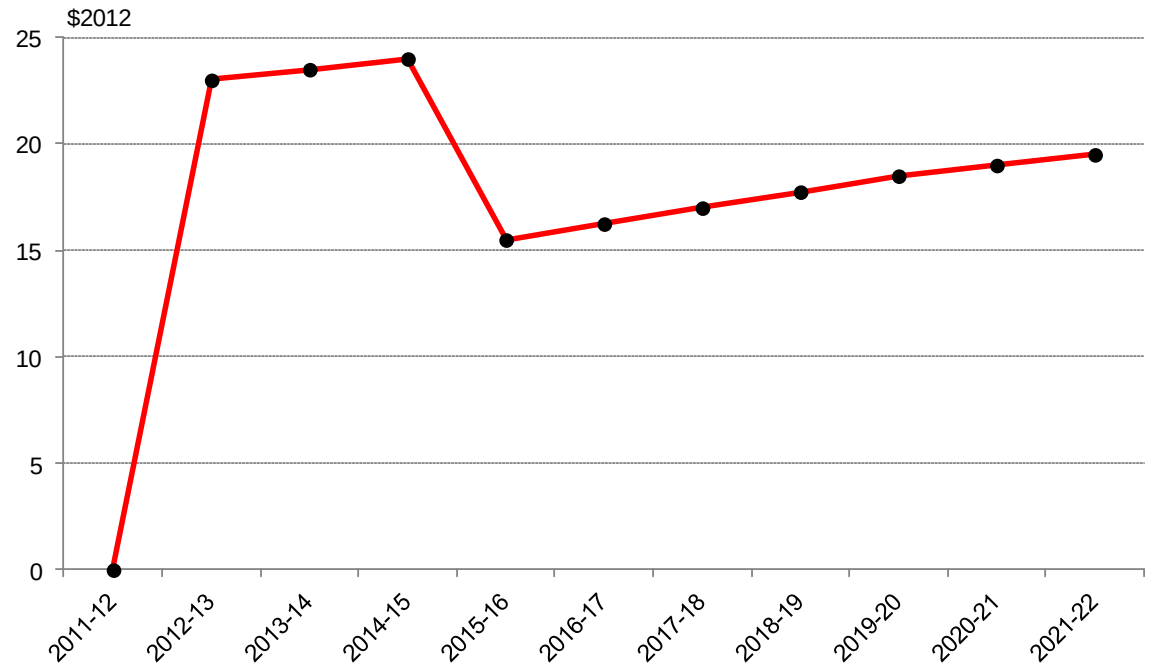
4.2 Electricity price assumptions by State

NIEIR estimates future retail electricity prices based on an analysis of the factors influencing prices over the forecast period. These factors are underlying ($0/t CO_2e) fuel prices, network costs, fees, impacts of CO_2e pricing, green initiatives (RET, etc.) FITS, VEET, etc., retail margins. We expect that carbon pricing and complementary initiatives (Federal, State) will accelerate EEI and with changes in end-user behaviour towards lower grid purchases, will reduce energy demand growth in the sector. These projections were prepared in July 2013.

Carbon (CO_2e) pricing impacts

Carbon pricing will increase the prices of electricity and gas according to the CO_2e price and the CO_2e content of fuels used to produce electricity. The carbon content of gas used to provide end-use energy services results in increased end-use gas prices. In end-use markets energy users will respond to increased energy prices by reducing energy demand, particularly in the longer term when energy using equipment can be changed. Carbon pricing also changes the generation mix required to balance demand and supply towards gas and renewables.

Figure 4.1: Real carbon price ($2012)



The CO_2e price is $23/t from 2012-13 to 2014-15. Then, as the ETS phase begins linked to the EU scheme, the price falls to $15/t by 2015-16 rising linearly to $18/t in 2020 and $22/t in 2025.

(i) Electricity

At $23 to $27/t CO_2e the pass-through (CO_2e price impact on wholesale electricity price) is about 85 per cent, resulting in an electricity price rise of $21 to $24/MWh plus GST, or at current price levels about a 9 per cent increase in retail price. At higher CO_2e prices the pass-through percentage decreases and increases at lower CO_2e prices.

The demand response, that is, the price elasticity of demand for electricity, is estimated to be about -0.3 in the long-run. High real price increases such as the ones that have occurred in Australia over recent years could engender a short-run response close to the long-run elasticity, or even greater.

From an electricity demand viewpoint, the focus of electricity retailers on CO_2e pricing impacts will be on the following.

(i) CO_2e pricing will increase electricity prices and reduce demands compared with no carbon pricing.

(ii) Gas prices will also rise and accordingly gas versus electricity competition may not be significantly affected.

If the current Federal Opposition becomes the Government at the end of 2013 and removes the carbon tax electricity and gas prices could still rise as a result of Opposition climate change policies. The impact, however, is indeterminate at this time.

Table 4.4 Real electricity prices – New South Wales (2009-10 prices)

	Residential	Business	Total
2004-05	14.14	9.24	10.82
2005-06	14.70	9.55	11.20
2006-07	15.13	9.79	11.50
2007-08	15.81	10.18	11.99
2008-09	16.70	10.69	12.62
2009-10	19.85	12.57	14.91
2010-11	21.03	13.26	15.75
2011-12	23.48	13.91	16.98
2012-13	24.86	15.53	18.52
2013-14	25.13	15.88	18.85
2014-15	25.63	16.44	19.39
2015-16	25.38	16.20	19.14
2016-17	25.64	16.49	19.42
2017-18	25.79	16.65	19.58
2018-19	25.97	16.81	19.75
2019-20	26.03	16.90	19.83
2020-21	26.08	17.00	19.91
2021-22	26.12	17.11	20.00

5. Government policies, initiatives and programs, and trends in energy use

5.1 Introduction

Electricity demands are influenced by a very diverse range of factors including:

- **economic factors:** economic activity, income;
- **demographic factors:** population, household formation growth;
- **energy market factors:** price of electricity and other fuel sources;
- **technological and lifestyle factors:** dwelling and appliance energy efficiency and use;
- **weather factors:** temperature; and
- **government policies factors:** energy and environmental initiatives and programs.

Capturing all of these factors in econometric modelling is not easy. In most part, the models used in this study do capture the main drivers of underlying electricity demand. However, it should be acknowledge that a few factors such as some government initiatives and certain technological developments may not be fully reflected in the models. This is because these factors, for a variety of reasons, don't easily fit in an econometric equation.[2] Accordingly, results from the econometric modelling may need to be adjusted to ensure that the impacts of these factors are adequately reflected.[3]

This section examines a range of government policies, initiatives and programs, and tecnological developments that may have an impact on electricity demand. In some instances, the government measure or tecnological development is already explicity captured in the model and therefore no adjustment to the forecasts is required. Furthermore, some government measures are on-going initiviatives that have been place over many years and therefore, their impacts on electricity demand are already (implicitly) reflected historical trends; these historical trends are in most part are captured in the model. However, there are some factors that are new or likely to change going forward, which will need to be accounted in forecasts; it is these factors which are the primary focus of this section.

Table 5.1 outlines selected national, commonwealth and state government energy and environmental measures as well as a few new technological changes in energy use that may potentially impact electricity demand. Proposed or possible alternative future measures have not been reviewed for this study.

[2] For instance, there may be limited statistical information or historical profiles do not provide a representative guide to future movements.

[3] These types of modelling issues are common to most modelling exercises and certainly common to most electricity demand modelling and forecasting; these are not issues particular to the models and forecasts in this study. All econometric models are a simplified representation of a far more complex relationship between a variable of interest and its underlying factors.

Table 5.1 Selected policies and technological developments	
Policies	**Description**
COMMONWEALTH/NATIONAL	
Clean Energy Legislative Package (2011)	Carbon pricing for energy use and associated household and business assistance measures and funding clean technology development.
Renewable Energy Target (RET)	Targeted renewable energy production through certificate scheme – small scale Renewable Energy Scheme. Switch to gas boosted solar hot water and take up of small PV systems.
Energy Efficiency Opportunities Act (2006)	Targeted at large (>0.5 PJ/a) energy users.
National Energy Efficiency Scheme	White certificate program proposed but no decision made at this stage.
Minimum Energy Performance Standards (MEPS) – national program through Standing Committee on Energy (SCE)	Minimum efficiency standard mandated for a range of appliances and equipment.
Energy Labelling - national program through Standing Committee on Energy (SCE)	Labelling of energy rating for electrical appliances and equipment.
Mandatory Disclosure (*Energy Efficiency Act 2010*) under SCE	Commercial energy performance disclosure on sale or lease.
Phase-out of electric resistance hot water – national program through Standing Committee on Energy (SCE)	Moratorium on installation of electric resistance water heaters.
NEW SOUTH WALES	
BASIX	Building Standards by Climate Zone.
Solar Bonus Scheme	Feed-in-tariff. 7.7 – 12.9 c/kWh from 1 July 2012.
Energy Efficiency for Small Business	Energy audits for small business.
TECHNOLOGICAL DEVELOPMENTS	
Time-of-use metering	Moves towards more smart metering and cost-reflective pricing of electricity
Reverse-cycle air-conditioners	Increased investment in reverse-cycle air-conditioners (RACs). RACs used more frequently for space heating, as well as cooling.
Plug-in Electric Vehicles	Possibility to significantly influence future electricity loads.
Lighting	Replacement of low efficiency lighting with high efficiency halogens (HEH) and light emitting diodes (LEDs).
Standby power	National target to reduce standby power to 1W for all appliances by 2014.

5.2 National schemes

5.2.1 Clean Energy Legislative Package

On 8 November 2011, the Australian parliament passed laws called the *Clean Energy Act (2011).* The centrepiece of this legislation was a price on carbon pollution.

Carbon pricing commenced on 1 July 2012. Initially the price of a permit for one tonne of carbon equivalent was fixed at $23 for the 2012–13 financial year. On 1 July 2013, the fixed price rose to $24.15 for the 2013–14 financial year. The price is currently legislated to increase to $25.40 on 1 July 2014 for the 2013–14 financial year before moving to a floating market price from 1 July 2015 (linked to the European Union's emission trading scheme).

This legislation and associated legislation (referred to Clean Energy Legislative Package) also incorporates a number of other measures to assist some households and businesses with the introduction of carbon pricing, and to promote energy efficiency and renewable technology. These include, among other measures, the following.

- **The Jobs and Competitiveness Program** provides assistance to emissions-intensive trade-exposed industries. The assistance covers 94.5 per cent of industry average carbon costs in the first year of the carbon price. Less emissions-intensive trade-exposed activities receive assistance to cover 66 per cent of industry average carbon costs. Assistance is legislated to be reduced by 1.3 per cent each year to encourage industry to cut pollution.
- **An Energy Security Fund** maintains secure energy supplies and ensures a smooth energy market transition away from emissions intensive coal-fired generation to gas and renewable generation.
- **Household Assistance** assists Australian households, through tax cuts and increased welfare payments, to help households with increased living costs as a result of the introduction of a carbon price.
- **Clean Technology Program** provides directly help to businesses to improve energy efficiency and reduce carbon pollution in manufacturing industries and support research and development in low pollution technologies.
- **Steel Transformation Plan** supports and assists industry transition to a clean energy future, and recognises the pressures currently facing this industry.
- **Clean Energy Finance Corporation** invests in renewable energy, low-emission technology and energy efficiency in Australia. Under its enabling legislation, its investment activities will be funded through a special appropriation of $2 billion to a special account every year for five years, commencing from 1 July 2013.
- **Australian Renewable Energy Agency** improves the competitiveness of renewable energy and related technologies through supporting renewable energy technology innovation. ARENA is an independent statutory authority tasked with the objectives of improving the competitiveness of renewable energy technologies and increasing the supply of renewable energy in Australia.

The election of a Liberal-National Coalition Government in September 2013 is likely to lead to significant changes in this legislative package. The new government intends to repeal carbon pricing and many of the associated measures, replacing it with a 'Direct Action Plan'. However, new Government do not hold the balance of power in the Senate and so the future of this legislative package (and the implementation of the Direct Action Plan) is still uncertain.

5.2.2 Renewable Energy Target

The Renewable Energy Target (RET) scheme is designed to ensure that the equivalent of at least 20 per cent of Australia's electricity comes from renewable sources by 2020. The RET expands on the previous Mandatory Renewable Energy Target (MRET), which began in 2001. From 1 January 2011 the RET has operated as two parts:

- large-scale Renewable Energy Target (LRET); and
- small-scale Renewable Energy Scheme (SRES).

SRES covers small-scale renewable technology including photovoltaic system (PVs) and other small (up to 100 kW) generators and displacement technologies (solar hot water and heat pump units). LRET covers large-scale renewable technologies such as wind farms. SRES does not have a maximum target. LRET has a target of 41,000 GWh by 2020 which increases gradually from 12,500 GWh in 2011. In recent years (2009 to 2012) SRES has been dominated by photovoltaics.

Combined, the LRET and SRES are expected to deliver more renewable energy than the previous 45,000 GWh target in 2020. Renewable energy will continue to receive support under the RET until the scheme ends in 2030.

The SRES is delivered through Small-scale Technology Certificates (STCs) created through SRES regulations. In the regulations the number of certificates is specified for each equipment type installed. When eligible equipment such as a heat pump is installed, certificates can be created and sold to retailers. At a price of $30 to $40 per certificate the price of heat pumps is reduced by about $900 to $1,200 per unit. Each electricity retailer must purchase and deliver to the SRES regulator (Clean Energy Regulator) certificate in proportion to their share of the end-use electricity market. The subsidy has been reducing since 2010, but the reductions have been significantly offset by decreasing PV system costs.

A 2012 review of RET by the Climate Change Authority (CCA) recommended no major changes to RET.

5.2.3 National Energy Efficiency Scheme

The Commonwealth Government is investigating the merits of a national white certificate scheme (called Energy Saving Initiative). A white certificate scheme is a market-based tool for driving improvements in energy efficiency. It would place a requirement on obligated parties (typically energy retailers) to find and implement energy savings in households and businesses. A scheme would help energy consumers to save money by encouraging the identification and take-up of energy efficient technologies.

White certificate schemes currently operate in New South Wales (see Section 5.3.2 below), Victoria, South Australia and the Australian Capital Territory. If developed, it would likely subsume the current white certificate programs in these states and be applied in other states and territories where one does not currently existing.

5.2.4 MEPS and energy labelling

The Minimum Energy Performance Standards (MEPS) initiative is an early and major element of national energy efficiency improvement and climate change policies. The scheme was originally developed under the National Appliance and Equipment Energy Efficiency Program (NAEEP).

This scheme now forms part of the national Equipment Energy Efficiency (E3) Program. The implementation of minimum energy performance standards and energy labelling is coordinated through a joint commonwealth, state and territory government E3 committee.[4] Energy labelling (part of E3) was introduced into both Victoria and NSW in the late 1980's, and the first standards were introduced in Australia in 1999. They now cover a range of residential, commercial and industrial appliances and equipment. Once introduced, standards are regularly updated and new energy using appliances and equipment continues to be added. In addition to this, the energy rating algorithms used for appliances are updated from time-to-time and made more stringent, so the labelling scheme continues to encourage the marketing of high efficiency appliances.

The imitative set a regulated minimum energy performance standard for appliances and equipment covered by the program; that is, it prevents (subject to compliance) appliances with performance standards which do not meet minimum energy requirements from entering the Australian market directly saving consumer operating costs and reducing generation requirements. It is illegal to sell products which do not meet the required energy performance levels. Mandatory energy rating labels give an indication of energy performance (higher stars equates to higher efficiency). Some appliances (refrigerators/freezers, air conditioners and televisions) are subjected to both minimum energy performance standards and mandatory energy labelling. In general, where both the standards and energy labelling apply to an appliance, the sales weighted star rating of products sold exceeds the minimum energy performance levels by a significant margin.

In 2007 a total of 5 appliance categories were subjected to mandatory labelling, and 9 appliance categories were subjected to minimum energy performance standards. By the end of 2010, 7 appliance categories were subjected to mandatory labelling (plus 2 voluntary levels) and 16 appliance categories were subjected to minimum energy performance standards. In 2009, minimum energy performance standards were introduced for chiller towers, close controlled (computer room) air conditioners, external power supplies, set top boxes, self-ballasted compact fluorescent lamps and incandescent lamps. Both minimum energy performance standards and energy labelling have been introduced for televisions.

Given the long history of energy performance standards and the regular updates and additions, the determination of the net benefits of minimum energy performance standards on energy use over and above energy performance improvements initiative by appliance manufacturers independently is complex. Specifically, it is very difficult to estimate how energy performance for each group of appliances would have changed in the absence of these standards, and this becomes more difficult as the time elapsed since standards increases with autonomous improvement in appliance. In addition, due to minimum energy performance standards in countries which export appliances to Australia, there may be improvements in performance not related Australian standard changes.

5.2.5 Mandatory disclosure

The Commercial Building Disclosure Program requires most sellers and lessors of large office spaces to provide energy efficiency information to prospective buyers and tenants. The disclosure rules, introduced in all states as a joint Commonwealth-State initiative, applies to energy performance certification for all office building space greater than or equal to 2,000 m^2 when it is leased or sold.

[4] The E3 program (covers MEPS), mandatory and voluntary energy rating labels (ERLs) and training and support to promote use of the most energy efficiency products. Estimated E3 savings impacts are dominated (80 per cent) by MEPS.

The program requires most sellers and lessors to obtain a Building Energy Efficiency Certificate (BEEC) before the building goes on the market for sale, lease or sublease. Certificates are valid for up to 12 months and include:

- the building's National Australian Built Environment Rating System (NABERS) Energy star rating; and
- a tenancy lighting assessment of the relevant area of the building general energy efficiency guidance.

Only accredited assessors can apply for certificates on behalf of building owners or lessors.

The aim of the program is to provide buyers and tenants with consistent and meaningful information about a building's energy performance, creates a strong market-based incentive for owners to improve their properties with cost-effective energy efficient upgrades. It is expected that in an informed market, buildings with better energy performance will be rewarded, increasing returns on energy efficient investments for owners.

The commercial building sector is responsible for around 10 per cent of Australia's total greenhouse gas emissions. Improving building energy efficiency is seen as one of the quickest and most cost-effective ways to reduce greenhouse gas emissions. To date over 7 million m^2 have been rated using the NABERS tool. Ratings (star system) have been improving as initiative is implemented. The anecdotal evidence is that this program is having some impact on energy performance in the commercial office sector.

5.2.6 Energy Efficiency Opportunity Act (2006)

The Energy Efficiency Opportunities (EEO) Program is an Australian Government initiative encouraging large energy-using businesses to increase their energy efficiency by improving the identification, evaluation and implementation of cost-effective energy saving opportunities. The program is mandatory for organisations that use over 0.5 petajoules (PJ) of energy annually, but may also be undertaken voluntarily by medium energy-users. It requires entities to conduct energy audits on their operation and report on energy efficiency opportunities with up to a 3 year payback. Implementation of these opportunities is not, however, mandated.

Monitoring of the program indicates that it may accelerate energy efficiency opportunities identification and implementation, but the beyond business-as-usual impact of the program is uncertain. Moreover, there are issues of additionality with this program as energy efficiency opportunities reported may have been undertaken anyway or in response to other government initiatives independent of this program.

5.3 State-based schemes

5.3.1 Solar Bonus Scheme

In New South Wales, the Solar Bonus Scheme (SBS) was introduced on 1 January 2010. The Scheme provides a feed-in-tariff (FIT) for small solar and wind generators that are connected to the grid. The Scheme will operate until 31 December 2016 but has been closed to new applications since 28 April 2011.

The Solar Bonus Scheme offered both 'gross' and 'net' tariffs for electricity exported to the grid. Customers under a gross tariff are paid for all the electricity produced and exported to the grid. These customers are separately metered for their own 'in-house' usage. Customers under a net tariff are paid for only the net electricity exported to the grid; generation exceeds in-house usage.

Customers eligible to participate in the Solar Bonus Scheme are known as small retail customers (sometimes referred to as mass market). These are customers with an annual electricity consumption of less than 160 megawatt hours per year. Photovoltaic (PV) systems or wind turbines (up to 10 kW in capacity) that connect through an inverter were eligible for the Scheme.

In October 2010, the former New South Wales Government announced changes to the Solar Bonus Scheme. The Government reduced the feed-in-tariff from 60 cents to 20 cents and introduced a scheme capacity limit of 300 MW.

The New South Wales Solar Bonus Scheme was closed to new applicants in 2011. Customers who applied to join the Scheme by 28 April 2011 would still be eligible to join provided their renewable generator was connected by 30 June 2012. This only applied to customers who lodged an application to connect by 28 April 2011.

With the conclusion of the Solar Bonus Scheme payments on 31 December 2016, customers will migrate from gross to net tariffs. This could result in an increase in the 'in-house' usage by customers who participated in the SBS as they shift from gross to net metering for their solar power system. This would impact the revenue of distribution.

5.3.2 BASIX

Building standards for new homes have been significantly tightened since 2004, resulting in lower energy demands per m^2. In terms of actual energy use per residential unit, the enhanced thermal performance stemming from improved shell/envelope designs has been offset to some extent by increases in conditioned floor area, increased space comfort levels, higher lighting intensities and as-built non-compliance with pre-build design on building permits. Currently the nationally accepted standard is a 6-star shell.

The BASIX (Building Sustainability Index) criteria for new residences in New South Wales, introduced in 2004, are more comprehensive than new building codes in other jurisdictions (under the National Construction Code, previously the Building Code of Australia).

BASIX uses a minimum points rating to attain a target, not a star rating system for new residences, and has separate levels for heating and cooling loads and covers water use, thermal comfort and energy use. Its 12 February 2012 draft upgrade is probably equivalent to a 5.5 to 6.5 star, compared with a minimum 6 star rating in other jurisdictions. That is, the BASIX requirements are likely to have a similar impact on the energy performance of new residences to requirements in other jurisdictions (note that requirements are lower in Tasmania).

We are not aware of any detailed historical study that examines the net energy impact of new building standards and other factors affecting building energy use over the study period

5.3.3 Phase-out of electric resistance hot water

The Commonwealth Government has been working with the state and territory governments to phase out greenhouse intensive hot water systems. In December 2010, all states and territories except Tasmania agreed to phase out greenhouse intensive (electric) hot water systems. The phase out is intended as national policy overseen by the Standing Committee on Energy (SCE) under the E3 Program. However, the impact of policy depends on jurisdictional approaches to phase-out in existing residences. Some restrictions are already in place regarding the installation of greenhouse intensive water heaters in new detached, terrace, row and town houses (Class 1 buildings under the Building Code of Australia 2010).

On 28 November 2012, the NSW Government (after initially agreeing to the phase out) announced that it will not implement the mandatory phase out of electric hot water systems in existing homes. Standards for hot water installations in new detached, terrace or town houses will continue under the NSW Building Sustainability Index BASIX system.

5.3.4 Energy Efficiency for small businesses

This program[5] is aimed at assisting small businesses in New South Wales to both reduced their power bills and their carbon emissions. Eligible businesses are able to register for the program.

The first stage in the program is the undertaking of an energy assessment and the development of an 'action plan' which outlines ways in which the business can reduce its energy consumption.

After implementing the suggested changes, the business is then able to apply for a rebate to partially offset the costs associated with implementation of energy efficiency measures. The rebate will offset up to 50 percent of the associated costs, to a maximum of $5,000.

[5] http://www.environment.nsw.gov.au/resources/sustainbus/09542EnergyEfficiency.pdf.

5.4 Technological developments

5.4.1 Time-of-use metering and pricing

The standard meters that most households and small businesses have are known as "accumulation" or "Type 6" meters. These meters simply keep a record of how much electricity a customer uses in total over a period of time. Type 6 meters cannot record at what time of day a customer uses electricity. A smaller number of households and small businesses have "Interval" or "Type 5" meters that can record not only how much electricity a customer uses, but also when they use it. Both the Type 5 and Type 6 meters need to be read manually.

Some households and small businesses have a "Smart" or "Type 4" meter. Smart meters record how much electricity a customer uses, when they used it, and have a communications capability that allows electricity distribution network service providers (DNSPs) to have real-time or near real-time access to read them remotely. Types 1 to 3 meters are also smart meters but these are used by large business customers (Type 1 meters are used by the largest energy users). Unlike with the household and small businesses sectors where smart metering is relatively new, large users have been using smart metering for many years now.[6]

Customers with a Type 6 meter are typically billed a flat rate for each unit of electricity consumed (irrespective of the time of day the electricity was consumed) plus a fixed supply charge per billing period. In contrast, customers with an interval or smart meter could face a range of different time-based charges (addition to a fixed supply charge). Possible charging arrangements may include:

- **time-of-use pricing**: electricity prices for each unit of energy supplied are set for a specific time of day (such as peak, off-peak and shoulder); prices paid for energy consumed during these periods are pre-established and known to consumers in advance;
- **critical peak pricing**: electricity prices for each unit of energy supplied over certain peak periods are set at a much higher rate than other periods. Prices paid for energy consumed during these periods are pre-established and known to consumers in advance but the periods that they cover may only be known with short notice.
- **real-time pricing or dynamic pricing**: electricity prices for each unit of energy supplied are set on an hourly basis; prices paid are based on the underlying cost of generating and/or purchasing electricity at the wholesale level; and
- **peak load reduction credits** for consumers with large loads who enter into pre-established peak load reduction agreements that reduce a utility's planned capacity obligations;

Interval and smart metering also enables other types of pricing to be more easily applied such as a peak capacity charge whereby a charge is paid for each unit of maximum demand (not energy) supplied; these are typically calculated from each customer's recorded highest half-hourly demand reading.

Time-based pricing for electricity is not a new concept. Some flexible electricity retail pricing options are currently already available for many households and businesses.[7]

[6] A Type 7 metering installation is an unmetered connection point. This means that a device is connected to the network and uses electricity but does not have any meter. Streetlights and other public lights like traffic lights are examples of Type 7 metering installations.

[7] AEMC (2012) "Fact sheet: efficient and flexible pricing options", Australian Energy Market Commission.

NSW Taskforce

Electricity customers in NSW can choose to have a smart meter (Type 4), but there is a considerable cost. In 2012, the NSW Government established a Smart Meter Task Force to provide advice to the Government on a range of options for the potential introduction of smart meters in NSW.[8] The Taskforce saw a number of benefits from the increased use of smart meters including:

- the potential to assist households manage their energy needs, by providing customers with much better information about their energy consumption and costs;
- allowing new services and pricing plans to be offered; and
- helping the energy businesses better plan and manage the way they supply energy to customers, reducing the costs of operating the businesses

The Taskforce also notes that the benefits of smart meters may not be equally spread.

The Taskforce examined a number of ways to increase the use of smart meters including a large scale mandated roll-out of smart meters as has been undertaken in Victoria. The Taskforce's preferred option was a market-led rollout whereby energy companies have an incentive to offer innovative pricing products with new metering equipment. The Taskforce acknowledged that there is no guarantee that a large-scale take up would be achieved under this option. Moreover, the take up of smart meters might be limited to customers, whom have greater financial incentive to take responsibility for their electricity consumption, make energy efficiency investments and change behaviour. On this basis, the take up of smart meter would likely be small.

5.4.2 Electric vehicles (EVs)

Electric vehicles could have a significant future impact on electricity loads, although currently there is virtually no electric vehicle on roads in NSW. Electric vehicles often referred to as plug-in electric vehicles can be divided into battery electric vehicles (no other energy source) and plug-in hybrid electric vehicles. The take up of electric will depend on a range of factors including (among other things) the

- cost of electric vehicles ;
- price of oil; and
- price of electricity.

Also, fuel excise charges act as a proxy for road user charge. Currently, electric vehicles do not incur a fuel excise charge. A large increase in the penetration of electric vehicles into the Australian car market could see government revenue from fuel excise charges fall. Change to fuel excise charges to include electricity (for vehicle use) would also impact the take up of electric vehicles.

Our analysis[9] indicates low penetration until post-2020.[10]: The penetration ranges of plug-in electric vehicles for 2020-2040 (percentage of annual vehicle sales: autos and light commercial vehicles) are estimated as follows.

[8] NSW Government (2012) "NSW Smart Meter Taskforce Discussion Paper", November 2012.

[9] Study for DECCW (NSW) by NIEIR/SCR/Futura in 2010-11.

[10] Reported in an SCR submission to AEMO in April 2012.

Table 5.2 Estimated penetration of PEVs in Australia				
	2015	2020	2030	2040
Battery electric vehicles	0.01 – 0.10	0.6 – 1.5	2.2 – 5.9	5.9 – 16.0
Plug-in hybrid electric vehicles	0.02 – 0.15	1.9 – 2.2	25.2 – 32.2	49.2 – 62.9

Impacts on the electricity demand of these penetrations will depend on their actual on-road energy performance and use characteristics (kilometres travelled, charging time: levels and timing). The impacts on maximum demand could be managed by time-of-use tariffs (with or without direct controls) and the use of smart grid techniques.

5.4.3 Lighting

Lighting efficiency in all sectors, particularly since 2005, has increased significantly as incandescent lighting has been replaced by compact fluorescent lighting, higher efficiency halogens and light emitting diodes. This trend was accelerated by banning of incandescent imports in 2010 and programs in New South Wales and other states to subsidise the acceleration of incandescent replacement.

Lighting efficiency has not only been improved by the replacement of incandescents, but also by increasing efficiencies of fluorescent tube luminaries used in the commercial and industrial sectors. This trend has been offset to some extent by the increased penetration of relatively inefficient low voltage halogens and increases in lighting intensity demands (lumens per square metre).

5.4.4 Standby power

Standby power, the non-primary electricity use in a range of appliances, currently accounts for an average of about 10 per cent of total electricity use per residence. Australia proposes to adopt a less than 1W standby target for new appliances with a standby function by 2014.

Appliances and equipment with a standby mode may include any product that consumes power while not performing its primary function. A simple definition of standby is when an appliance is at its lowest power consumption when connected to mains power, even if the appliance is turned off (lowest power mode that can be influenced by the user). However, standby is better defined under various modes and for the purpose of the E3 store survey of standby power the following definitions were used.

Power – In use (on): The power used by the product when performing its primary function.

Power – Active (or idle) standby: Active standby is when the appliance is on, but not performing its main function. For example, the DVD may be on, but is not playing or recording. This mode is usually only present in devices:

(a) where there is a mechanical function which is not active (e.g. DVD drive or motor) but where power circuits are on; or

(b) where a device has a battery and the device is charging.

Over 2001 and 2011 active standby reduced on average from 11.6W to 9.6W.

Power – Passive standby: when a product or appliance is not performing its main function (sleeping) but it is ready to be switched on (in most cases with a remote control) or is performing some secondary function (e.g. has a display or clock which is active in this mode). This mode also applies to power supplies for battery operated equipment (portable appliances which are intended to be used when disconnected from the base station) when the appliance is not being charge (disconnected). Over 2001 and 2011, this standby reduced, on average, from 5.8W to 1.1W.

Power – Off: The product must have a power switch located on the product. Off mode is when a product or appliance is connected to a power source, but does not produce any sound or picture, transmit or receive information or is waiting to be switched on by the consumer. If the product has a remote control, it cannot be woken by the remote control form off mode – it can only be activated via the power switch on the product. No display should be active in off mode. While the product may be doing some internal functions in off more (e.g. memory functions, EMC filters) these are not obvious to the user. An LED may be present to indicate off mode. Over 2001 and 2011 this standby reduced, on average, from 1.2W to 0.8W.

Delay start: Delay start is becoming common place on many major appliances. Essentially the appliance can be programmed to begin functioning at a later time; in some cases up to 24 hours later. Appliances left in this mode are in neither active nor passive standby and therefore this mode is measured as a separate category. (Note this is different to sleep mode where the timer is used to stop in use operation after a set period.) No trends evaluated.

Overall there appears to be a reduction in standby/appliance over 2001 and 2011 but overall standby electricity consumption could be increasing as:

(i) more products now have an active/idle mode; and

(ii) appliance sales have increased substantially.

Many appliances do not meet the 1W standby target so regulation in 2013-14 is likely to be necessary for target attainment.

5.5 Post modelling adjustments

Table 5.3 contains a summary of the modelling adjustments required for each policy or trend.

Table 5.3 Modelling adjustments

Policies	Modelling adjustments
COMMONWEALTH/NATIIONAL	
Climate change energy pricing	Included in econometric modelling procedure – See section 4.2.
Renewable Energy Target (RET)	No modelling adjustments required
Energy Efficiency Opportunities Act (2006)	No modelling adjustments required
National Energy Efficiency Scheme	No modelling adjustments required
Minimum Energy Performance Standards (MEPS) – national program through Standing Committee on Energy (SCE) and energy labelling	Adjustments made – see below.
Mandatory Disclosure (*Energy Efficiency Act 2010*) under SCE	No modelling adjustments required
Phase-out of electric resistance hot water	No modelling adjustments required
NEW SOUTH WALES	
BASIX	No modelling adjustments required
Solar Bonus Scheme	See sections 4.1 and 6.2.
Energy Efficiency for Small Business	No modelling adjustments required
TECHNOLOGICAL DEVELOPMENTS	
Time-of-use metering	No modelling adjustments required
Reverse-cycle air-conditioners	Included in econometric modelling procedure
Plug-in Electric Vehicles	Adjustments made – see below.
Lighting	Adjustments made – see below.
Standby power	Adjustments included in calculations.

Table 5.4 Policy adjustments for annual energy (GWh)										
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Plug-in electric vehicles	0.00	0.01	0.03	0.05	0.09	0.13	0.18	0.24	0.30	0.37
MEPS air conditioning	5.71	8.62	11.58	14.58	17.63	20.71	23.84	27.01	30.22	33.47
Lighting	1.35	2.56	3.61	4.52	5.27	5.87	6.32	6.62	6.77	6.92
6-Star Building Standards	2.35	4.73	7.15	9.44	11.69	13.96	16.33	18.85	20.99	22.50
Total energy savings	**43.69**	**100.58**	**170.75**	**253.11**	**346.15**	**446.70**	**553.69**	**666.02**	**761.98**	**841.50**

6. Essential Energy electrical energy forecasts to 2021-22

This section presents customer terminal electrical energy forecasts by class for Essential Energy to 2021-22. Energy forecasts by class for Essential Energy region are presented in Table 6.1.

6.1 Electricity sales by customer class

The key drivers of the medium term outlook for electricity sales in the Essential Energy region

The electricity sales forecasts for Essential Energy in New South Wales to 2021-22 are shaped by a number of factors. These include:

- the economic outlook for the New South Wales economy;
- the impact of small scale photovoltaic systems being installed in the Essential Energy region over the last three years in particular when generous FIT schemes were offered to residential customers;
- the introduction of a carbon price as part of the Federal Government's Carbon Pollution Reduction Scheme in July 2012. The changes to carbon associated with the election of the Coalition Government in September 2013 have not been incorporated into this forecast;
- the impact of sharp increases in electricity prices in New South Wales between 2008 and 2011. Residential prices rose by around 33 per cent in real terms; and
- other Commonwealth Government policies such as changes to MRET relating to solar hot water, new Minimum Energy Performance Standards (MEPS) for air conditioning equipment and other electrical appliances and the phasing out of incandescent light bulbs by 2010.

Sales projections

Total sales by class for Essential Energy are shown in Table 6.1. Tables 6.2 to 6.5 show projections of customers, anytime energy, peak energy, off-peak energy and shoulder energy. Appendix A provides further detail by network tariff, including demand tariffs for Essential Energy.

Total electricity sales rose by 1.0 per cent in 2011-12, following a fall of 2.3 per cent in 2010-11. Sales growth in 2012-13 was 2.3 per cent, mainly reflecting a large increase in customer specific load. Over the following two years, 2013-14 and 2014-15, sales fell by 3.8 per cent and 0.9 per cent respectively. Overall sales growth over the 2013-14 to 2021-22 period is 0.0 per cent.

Residential sales fell by 3.7 per cent in 2011-12 following a fall of 4.0 per cent in 2010-11. Residential sales are falling in the Essential Energy region due to very significant real electricity price increases, as well as the very rapid take-up of small scale PV. Forecasts of PV systems in terms of customer numbers, total capacity, energy produced and "in-house" and export to grid are presented in Tables 6.7 to 6.16. Overall residential sales fell by 1.4 per cent per annum over the 2013-14 to 2021-22 period for Essential Energy.

As indicated in Table 6.11, PV installations are expected to fall to around 10,000 per year, however, this remains highly uncertain. By 2021-22, small scale PV will have displaced nearly 340 GWh of residential sales.

Controlled load sales are projected to fall by an average rate of 0.8 per cent per annum between 2013-14 and 2021-22. This reflects the modelling assumptions outlined in the previous section.

Business sales fell by 3.9 per cent in 2010-11 but then increased by 2.9 per cent in 2011-12. Overall, business sales growth grows by 0.5 per cent per annum over the 2013-14 to 2021-22 period.

Customer specific sales growth in the Essential Energy region rose by 10.7 per cent in 2012-13. There remains the risk that existing manufacturing customers will close their operations in New South Wales in response to import competition. Overall, customer specific sales growth averages 1.0 per cent over the 2013-14 to 2021-22 period.

Figure 6.1: Essential Energy electricity sales by class
Base scenario – 2014 to 2022

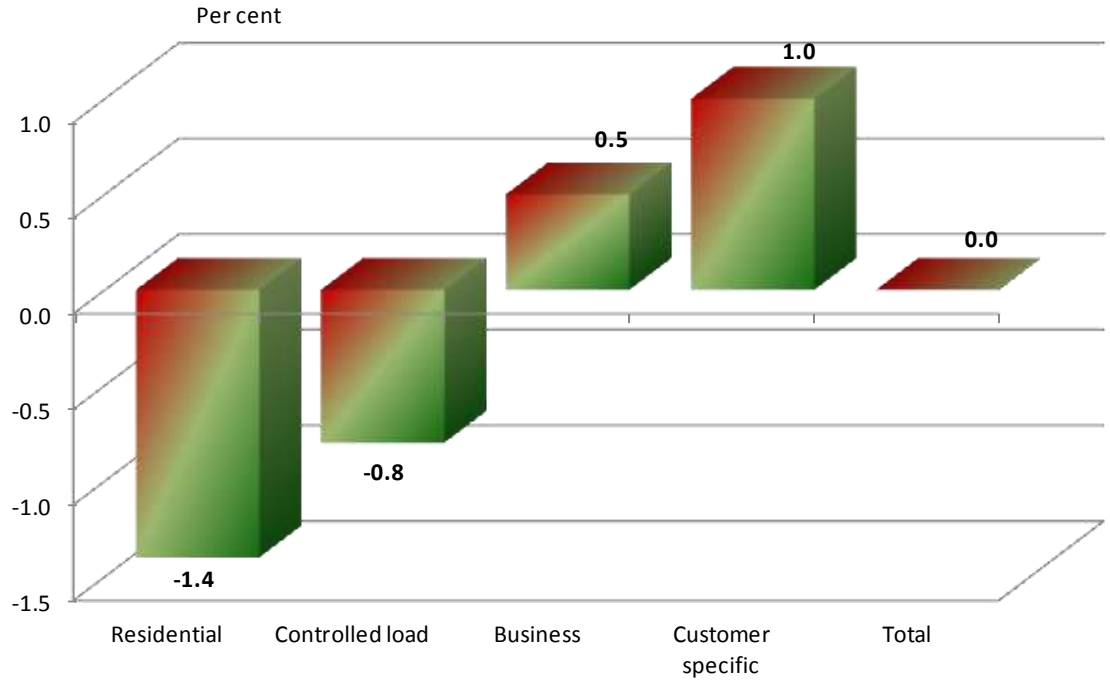


Figure 6.2: Essential Energy customer growth by class
Base scenario – 2014 to 2022

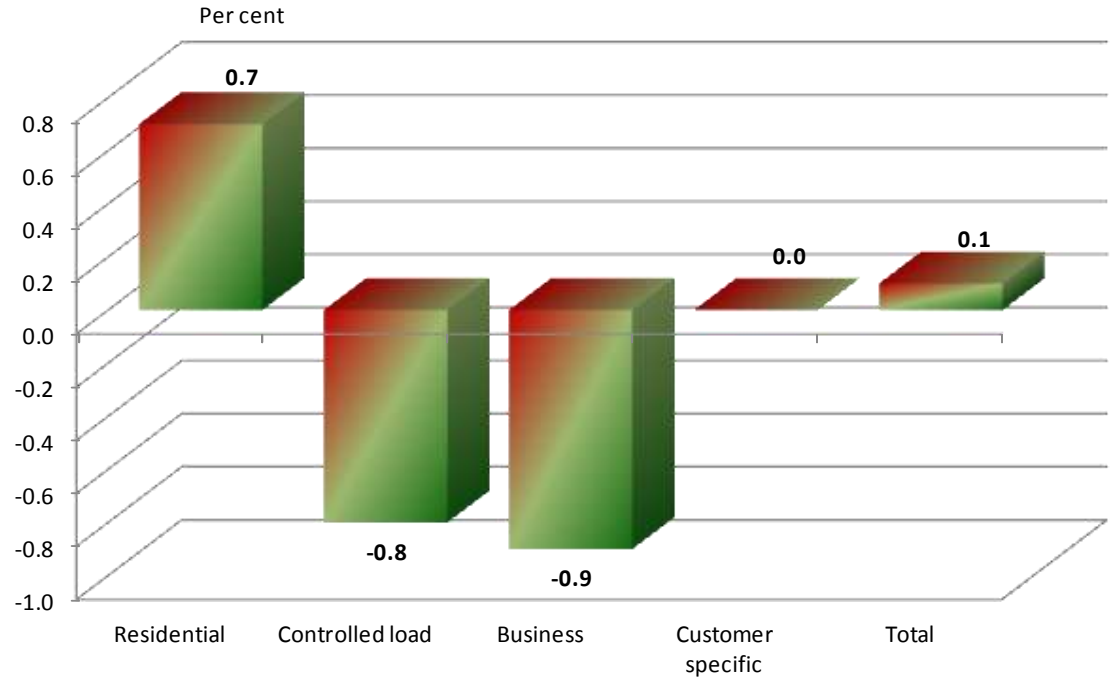


Figure 6.3: Electricity sales – Essential Energy
Base scenario – GWh

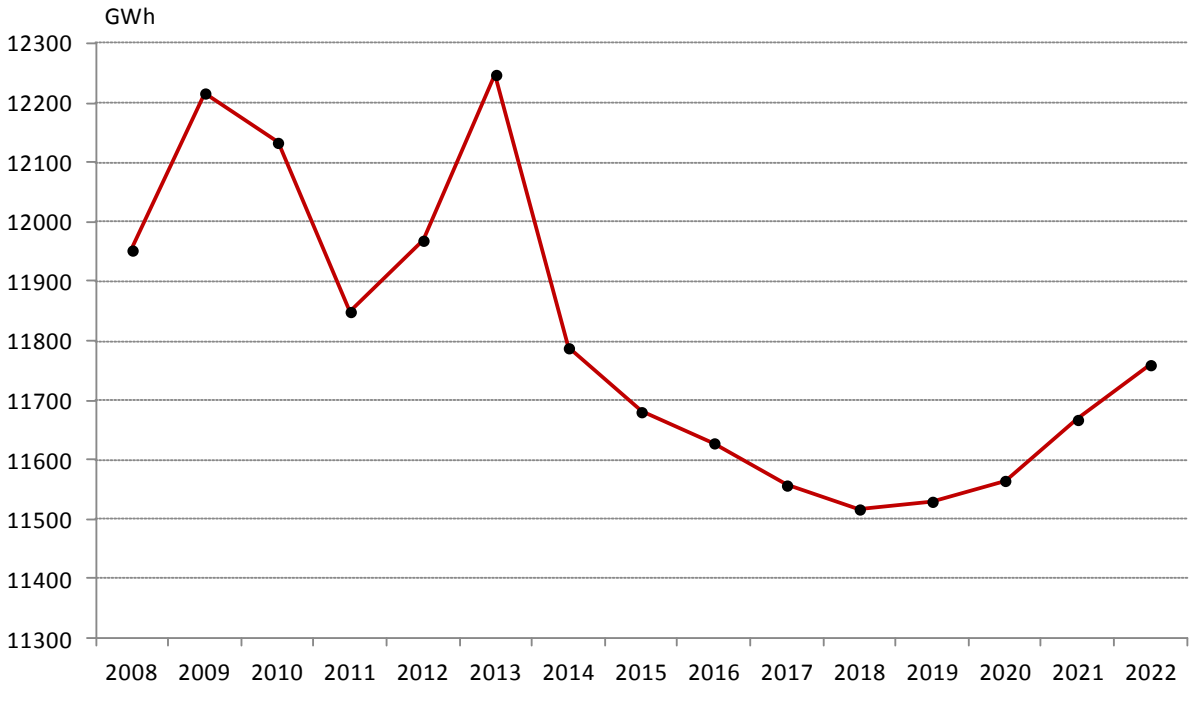


Figure 6.4: Residential sales – Essential Energy
Base scenario – GWh

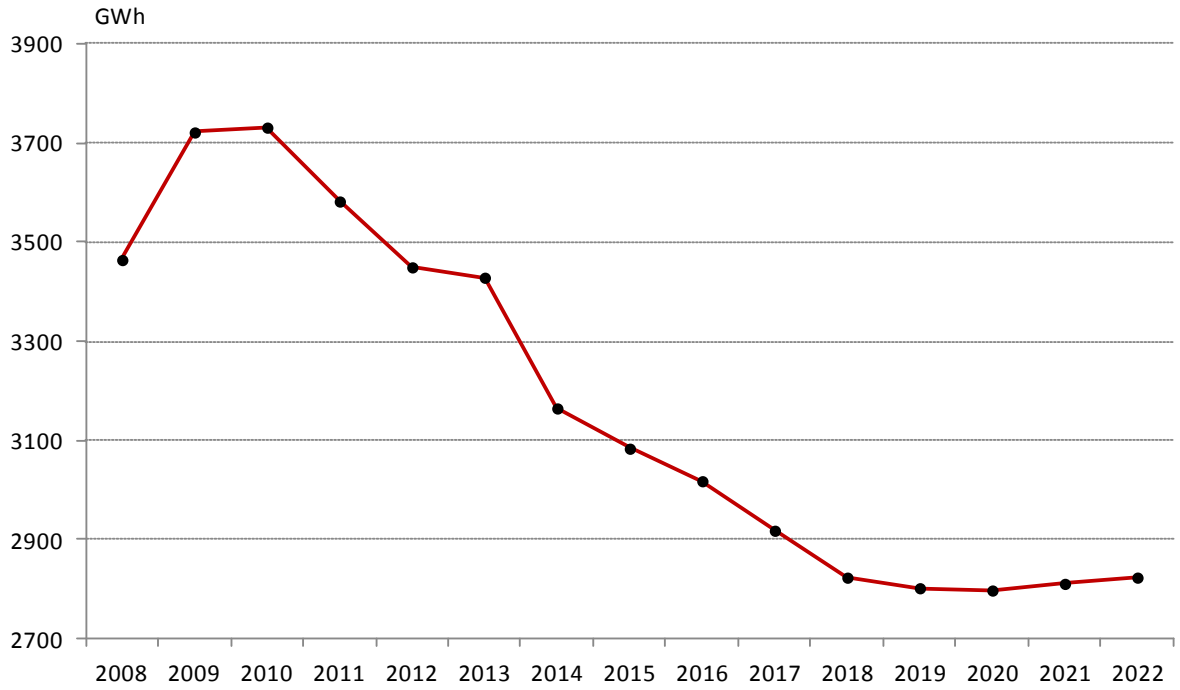


Figure 6.5: Total business sales – Essential Energy
Base scenario – GWh

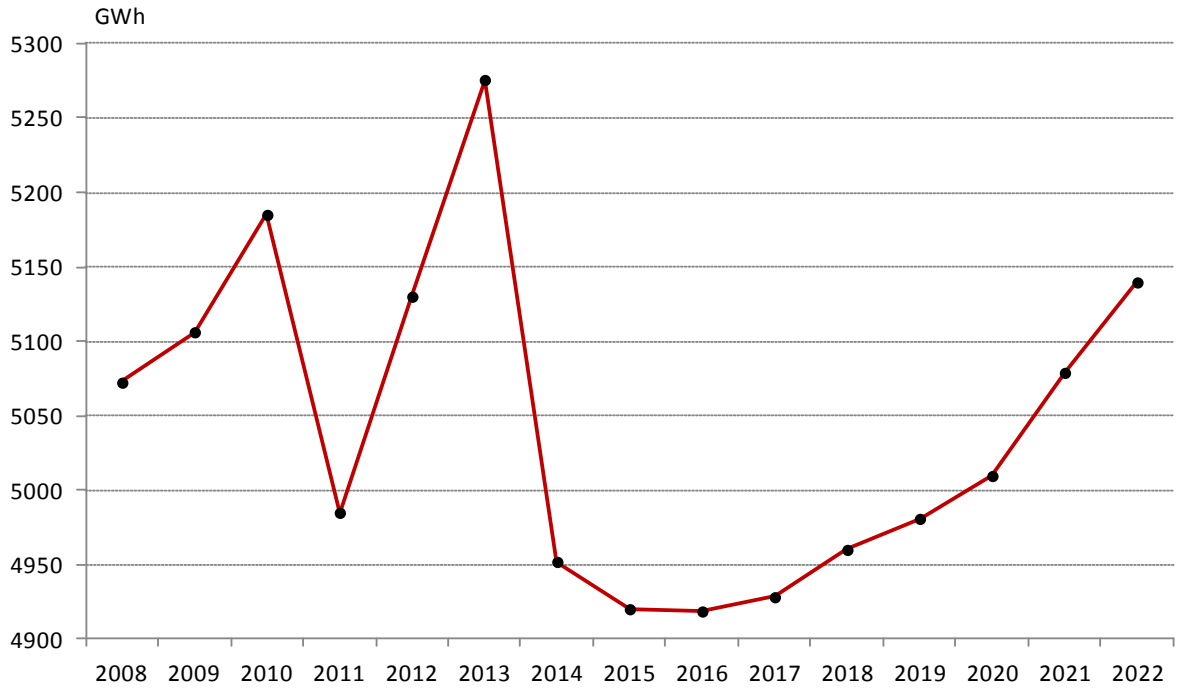


Figure 6.6: Customer specific (large) sales – Essential Energy
Base scenario – GWh

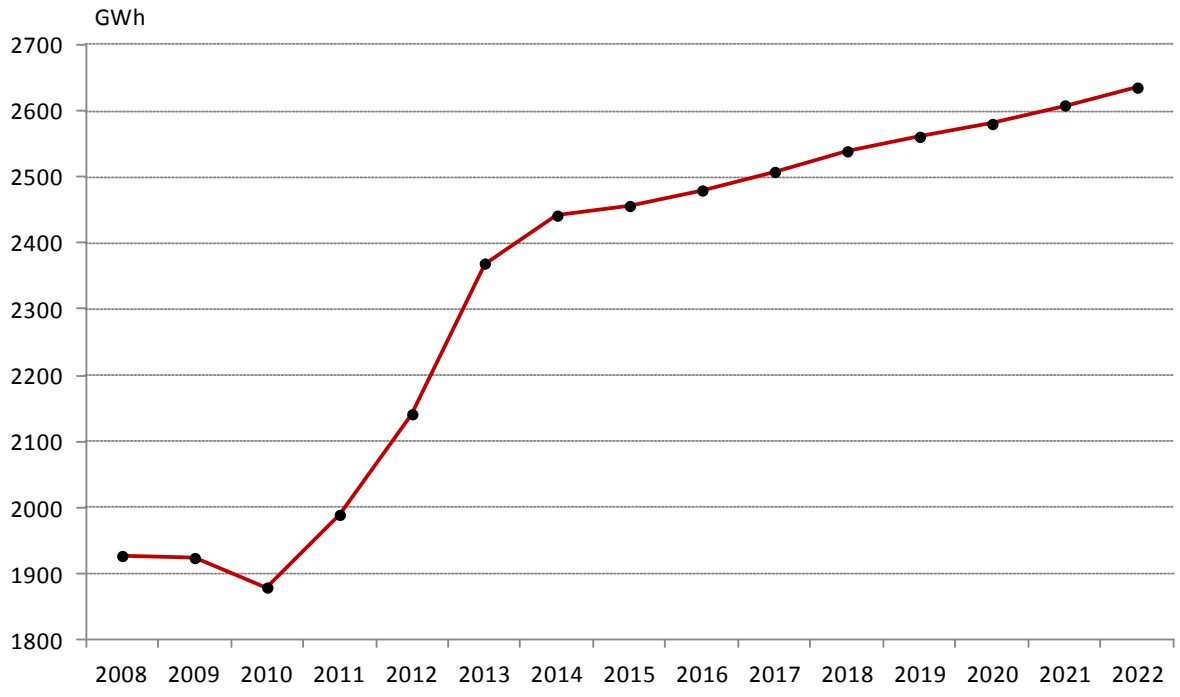


Table 6.1	Total energy – Essential Energy (GWh)					
FYear	Residential total	Controlled load total	Business total	Customer specific total	Public lighting	Essential total
2008	3464.50	1437.80	5072.30	1927.20	50.55	11952.30
2009	3721.80	1409.50	5106.20	1924.10	54.66	12216.30
2010	3731.60	1278.20	5185.10	1879.40	58.90	12133.30
2011	3582.50	1242.80	4984.80	1989.40	49.41	11849.00
2012	3449.70	1214.90	5130.10	2141.60	32.47	11968.80
2013	3428.80	1140.40	5275.80	2369.60	32.81	12247.50
2014	3165.12	1195.90	4951.78	2442.10	33.18	11788.08
2015	3083.96	1186.50	4919.98	2456.60	33.62	11680.66
2016	3018.36	1177.20	4918.46	2480.10	34.09	11628.20
2017	2918.48	1168.00	4928.04	2508.20	34.58	11557.30
2018	2823.85	1158.90	4959.87	2539.40	35.07	11517.09
2019	2802.52	1149.90	4980.72	2561.30	35.56	11530.00
2020	2797.89	1140.90	5009.54	2580.70	36.08	11565.11
2021	2811.31	1132.00	5078.87	2608.80	36.59	11667.58
2022	2823.92	1123.30	5139.68	2635.70	37.10	11759.70
Percentage changes						
2014	-7.69	4.87	-6.14	3.06	1.12	-3.75
2015	-2.56	-0.79	-0.64	0.59	1.32	-0.91
2016	-2.13	-0.78	-0.03	0.96	1.40	-0.45
2017	-3.31	-0.78	0.19	1.13	1.44	-0.61
2018	-3.24	-0.78	0.65	1.24	1.42	-0.35
2019	-0.76	-0.78	0.42	0.86	1.40	0.11
2020	-0.17	-0.78	0.58	0.76	1.45	0.30
2021	0.48	-0.78	1.38	1.09	1.42	0.89
2022	0.45	-0.77	1.20	1.03	1.39	0.79
Compound growth rate (per cent)						
2014-2022	-1.42	-0.78	0.47	0.96	1.40	-0.03

Note: All data are for the financial year ending in June of the year specified.

Table 6.2	Total customers 30 June – Essential Energy (number)					
FYear	Residential total	Controlled load total	Business total	Customer specific total	Public lighting	Essential total
2008	691390	502855	95798	31	85	1290159
2009	696591	502067	95958	29	85	1294730
2010	702585	500405	95662	30	85	1298767
2011	708524	497737	95771	31	85	1302148
2012	708750	493193	94605	31	85	1296664
2013	715305	489271	95825	34	85	1300520
2014	719059	485385	93775	34	85	1298339
2015	724585	481537	93500	34	85	1299741
2016	729656	477724	92732	34	85	1300231
2017	734390	473948	91933	34	85	1300389
2018	739969	470206	91258	34	85	1301552
2019	746114	466500	90244	34	85	1302978
2020	752379	462829	89201	34	85	1304527
2021	758585	459191	88653	34	85	1306547
2022	764274	455588	88050	34	85	1308031
Percentage changes						
2014	0.52	-0.79	-2.14	0.00	0.00	-0.17
2015	0.77	-0.79	-0.29	0.00	0.00	0.11
2016	0.70	-0.79	-0.82	0.00	0.00	0.04
2017	0.65	-0.79	-0.86	0.00	0.00	0.01
2018	0.76	-0.79	-0.73	0.00	0.00	0.09
2019	0.83	-0.79	-1.11	0.00	0.00	0.11
2020	0.84	-0.79	-1.16	0.00	0.00	0.12
2021	0.82	-0.79	-0.62	0.00	0.00	0.15
2022	0.75	-0.78	-0.68	0.00	0.00	0.11
Compound growth rate (per cent)						
2014-2022	0.77	-0.79	-0.78	0.00	0.00	0.09

Note: All data are for the financial year ending in June of the year specified.

Table 6.3	Total anytime energy – Essential Energy (GWh)					
FYear	Residential total	Controlled load total	Business total	Customer specific total	Public lighting	Essential total
2008	3406.90	1437.80	1495.62	0.00	1.98	6342.30
2009	3657.00	1409.50	1382.19	0.00	2.03	6450.70
2010	3650.50	1278.20	1281.19	0.00	2.02	6212.00
2011	3495.80	1242.80	1113.78	0.00	1.17	5853.50
2012	3339.80	1214.90	1075.42	0.00	0.00	5630.10
2013	3298.70	1140.40	1005.20	0.00	0.00	5444.30
2014	3044.53	1195.90	921.01	0.00	0.00	5131.58
2015	2956.66	1186.50	888.91	0.00	0.00	4958.35
2016	2885.11	1177.20	875.24	0.00	0.00	4808.33
2017	2780.76	1168.00	868.34	0.00	0.00	4621.58
2018	2680.33	1158.90	872.73	0.00	0.00	4440.70
2019	2650.90	1149.90	880.22	0.00	0.00	4327.82
2020	2637.66	1140.90	894.05	0.00	0.00	4672.61
2021	2642.14	1132.00	917.23	0.00	0.00	4691.37
2022	2646.61	1123.30	933.09	0.00	0.00	4703.00
Percentage changes						
2014	-7.71	4.87	-8.38	0.00	0.00	-5.74
2015	-2.89	-0.79	-3.49	0.00	0.00	-3.38
2016	-2.42	-0.78	-1.54	0.00	0.00	-3.03
2017	-3.62	-0.78	-0.79	0.00	0.00	-3.88
2018	-3.61	-0.78	0.51	0.00	0.00	-3.91
2019	-1.10	-0.78	0.86	0.00	0.00	-2.54
2020	-0.50	-0.78	1.57	0.00	0.00	7.97
2021	0.17	-0.78	2.59	0.00	0.00	0.40
2022	0.17	-0.77	1.73	0.00	0.00	0.25
Compound growth rate (per cent)						
2014-2022	-1.74	-0.78	0.16	0.00	0.00	-1.08

Note: All data are for the financial year ending in June of the year specified.

Table 6.4	Total peak energy – Essential Energy (GWh)					
FYear	Residential total	Controlled load total	Business total	Customer specific total	Public lighting	Essential total
2008	9.61	0.00	607.75	284.15	4.39	905.90
2009	11.07	0.00	631.16	282.75	4.88	929.86
2010	14.25	0.00	656.99	272.69	5.15	949.08
2011	15.37	0.00	652.71	291.18	4.21	963.47
2012	19.92	0.00	676.13	311.61	2.87	1010.53
2013	23.32	0.00	716.49	331.91	2.88	1074.61
2014	21.73	0.00	674.61	348.72	2.92	1047.99
2015	22.88	0.00	675.51	347.46	2.96	1048.80
2016	23.98	0.00	677.13	352.32	3.00	1056.42
2017	24.77	0.00	680.05	355.49	3.04	1063.34
2018	25.82	0.00	684.50	360.33	3.09	1073.73
2019	27.27	0.00	686.71	363.22	3.13	1080.33
2020	28.82	0.00	689.11	366.09	3.18	1087.19
2021	30.43	0.00	696.77	370.01	3.22	1100.43
2022	31.89	0.00	704.19	373.86	3.27	1113.21
Percentage changes						
2014	-6.79	0.00	-5.85	5.06	1.44	-2.48
2015	5.26	0.00	0.13	-0.36	1.16	0.08
2016	4.82	0.00	0.24	1.40	1.48	0.73
2017	3.28	0.00	0.43	0.90	1.40	0.66
2018	4.25	0.00	0.65	1.36	1.44	0.98
2019	5.62	0.00	0.32	0.80	1.39	0.61
2020	5.69	0.00	0.35	0.79	1.45	0.63
2021	5.58	0.00	1.11	1.07	1.42	1.22
2022	4.81	0.00	1.06	1.04	1.39	1.16
		0.00				
Compound growth rate (per cent)						
2014-2022	4.91	0.00	0.54	0.87	1.39	0.76

Note: All data are for the financial year ending in June of the year specified.

Table 6.5	Total off-peak energy – Essential Energy (GWh)					
FYear	Residential total	Controlled load total	Business total	Customer specific total	Public lighting	Essential total
2008	30.81	0.00	1671.30	1075.20	38.34	2815.70
2009	34.51	0.00	1735.20	1073.30	41.45	2884.50
2010	42.66	0.00	1819.00	1036.70	44.56	2942.90
2011	46.09	0.00	1796.00	1106.80	38.31	2987.10
2012	58.77	0.00	1910.80	1201.50	25.79	3196.90
2013	69.35	0.00	1999.60	1281.60	26.06	3376.70
2014	64.37	0.00	1893.70	1346.40	26.35	3330.80
2015	67.90	0.00	1890.80	1342.60	26.70	3328.00
2016	71.10	0.00	1898.20	1362.00	27.08	3358.30
2017	73.47	0.00	1905.30	1374.30	27.47	3380.60
2018	76.58	0.00	1918.80	1393.00	27.86	3416.20
2019	80.89	0.00	1925.10	1404.20	28.25	3438.40
2020	85.49	0.00	1932.40	1415.20	28.65	3461.80
2021	90.26	0.00	1954.30	1430.40	29.06	3504.00
2022	94.60	0.00	1975.60	1445.30	29.46	3544.90
Percentage changes						
2014	-7.17	0.00	-5.30	5.06	1.13	-1.36
2015	5.48	0.00	-0.15	-0.28	1.32	-0.08
2016	4.71	0.00	0.39	1.44	1.40	0.91
2017	3.33	0.00	0.37	0.90	1.44	0.66
2018	4.22	0.00	0.71	1.36	1.42	1.05
2019	5.64	0.00	0.33	0.80	1.40	0.65
2020	5.68	0.00	0.38	0.78	1.45	0.68
2021	5.58	0.00	1.13	1.07	1.42	1.22
2022	4.81	0.00	1.09	1.04	1.39	1.17
		0.00				
Compound growth rate (per cent)						
2014-2022	4.93	0.00	0.53	0.89	1.40	0.78

Note: All data are for the financial year ending in June of the year specified.

Table 6.6	Total shoulder energy – Essential Energy (GWh)					
FYear	Residential total	Controlled load total	Business total	Customer specific total	Public lighting	Essential total
2008	17.09	0.00	1297.70	567.91	5.85	1888.50
2009	19.21	0.00	1357.70	568.08	6.30	1951.30
2010	24.15	0.00	1428.00	570.07	7.17	2029.40
2011	25.28	0.00	1422.40	591.52	5.72	2044.90
2012	31.23	0.00	1467.70	628.60	3.81	2131.30
2013	37.44	0.00	1554.50	756.11	3.87	2351.90
2014	34.48	0.00	1462.50	747.07	3.90	2248.00
2015	36.52	0.00	1464.80	766.57	3.96	2271.80
2016	38.16	0.00	1467.90	765.85	4.01	2275.90
2017	39.47	0.00	1474.30	778.45	4.07	2296.30
2018	41.12	0.00	1483.90	786.16	4.13	2315.30
2019	43.45	0.00	1488.70	793.92	4.19	2330.30
2020	45.91	0.00	1494.00	799.45	4.25	2343.60
2021	48.48	0.00	1510.60	808.38	4.31	2371.80
2022	50.81	0.00	1526.80	816.61	4.37	2398.60
Percentage changes						
2014	-7.91	0.00	-5.92	-1.20	0.86	-4.42
2015	5.90	0.00	0.16	2.61	1.45	1.06
2016	4.50	0.00	0.21	-0.09	1.33	0.18
2017	3.44	0.00	0.44	1.65	1.48	0.90
2018	4.17	0.00	0.65	0.99	1.40	0.83
2019	5.66	0.00	0.32	0.99	1.41	0.65
2020	5.67	0.00	0.36	0.70	1.44	0.57
2021	5.59	0.00	1.11	1.12	1.42	1.20
2022	4.81	0.00	1.07	1.02	1.39	1.13
		0.00				
Compound growth rate (per cent)						
2014-2022	4.96	0.00	0.54	1.12	1.42	0.81

Note: All data are for the financial year ending in June of the year specified.

6.2 Photovoltaics

Tables 6.7 to 6.16 show the projections for small scale PV by scheme for residential and business customers. This includes customers, total capacity, average unit size, energy produced, exports, in-house usage and capacity at system peak. These projections have been revised upwards since the October 2012 projection.

The "gross" FIT schemes conclude in 2016 so that customers switch to the "net" FIT PV schemes at this time. For Essential Energy, for residential customers, this is some 40,000 customers under the "gross" 60 cent FIT and some 2,900 customers under the gross 20 cent scheme. This is shown in Tables 6.8 and 6.10 respectively.

New residential PV customers who are not covered by the Solar Bonus Scheme are shown in Table 6.11.

Figure 6.7: Total residential PV customers – Essential Energy

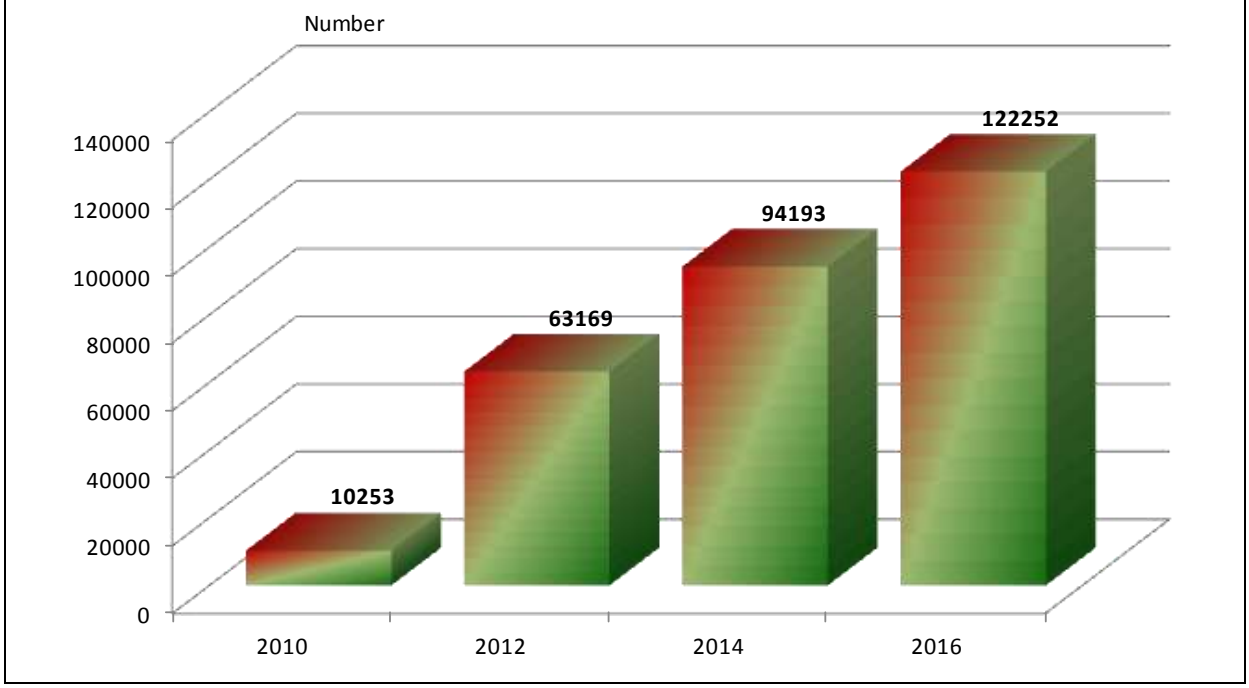


Figure 6.8: Total residential PV capacity – Essential Energy

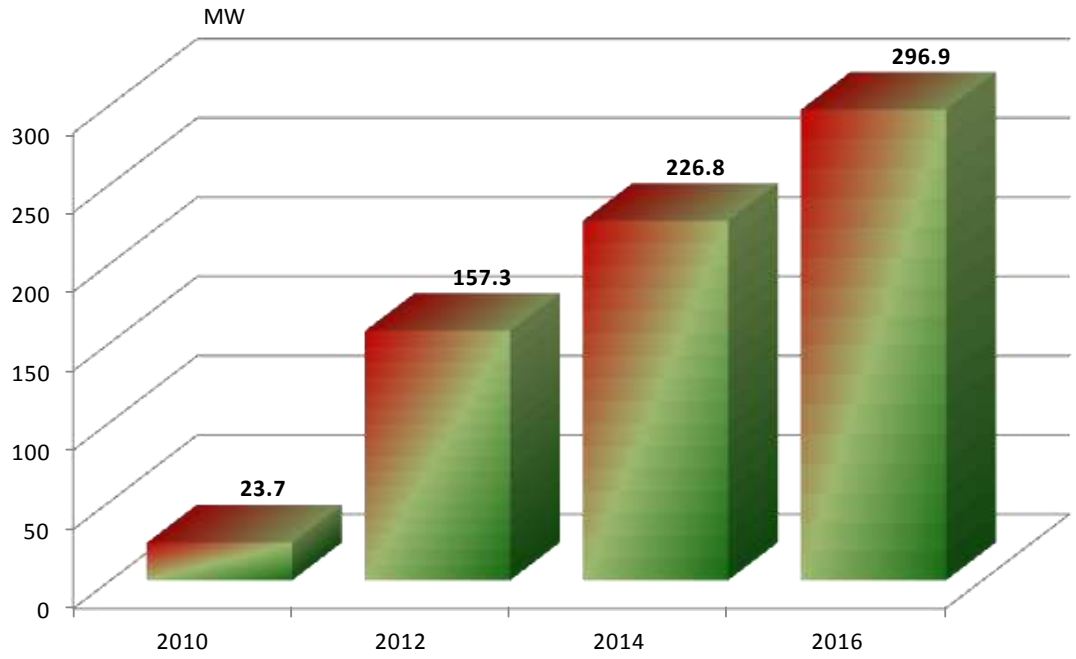


Table 6.7	Small scale residential PV – net Tariff 60 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	876	1.45	1.66	0.52	0.00	0.00	0.00
2009	2831	5.01	1.77	4.32	0.00	0.00	1.20
2010	3029	5.73	1.89	7.28	2.18	5.10	1.37
2011	4161	8.24	1.98	9.45	2.83	6.61	1.98
2012	3308	6.30	1.91	9.85	2.96	6.90	1.51
2013	3010	5.77	1.92	8.20	2.46	5.74	1.38
2014	3006	6.09	2.03	8.05	2.42	5.64	1.46
2015	3002	6.41	2.14	8.49	2.55	5.94	1.54
2016	2998	6.73	2.25	8.92	2.68	6.25	1.62
2017	38759	114.69	2.96	73.78	22.14	51.65	27.53
2018	42732	126.89	2.97	164.02	49.21	114.81	30.45
2019	42674	127.99	3.00	173.07	51.92	121.15	30.72
2020	42615	129.10	3.03	174.56	52.37	122.20	30.98
2021	42556	128.92	3.03	175.19	52.56	122.63	30.94
2022	42498	128.74	3.03	174.95	52.49	122.47	30.90
Percentage changes							
2014	-0.14	5.60	5.74	-1.79	-1.79	-1.80	5.56
2015	-0.14	5.29	5.43	5.43	5.42	5.43	5.34
2016	-0.14	4.99	5.15	5.15	5.15	5.13	5.00
2017	1192.99	1603.95	31.78	726.80	726.86	726.91	1603.34
2018	10.25	10.63	0.34	122.30	122.30	122.30	10.63
2019	-0.14	0.87	1.01	5.51	5.51	5.51	0.87
2020	-0.14	0.86	1.00	0.87	0.87	0.87	0.86
2021	-0.14	-0.14	0.00	0.36	0.36	0.36	-0.14
2022	-0.14	-0.14	0.00	-0.14	-0.14	-0.14	-0.14
Compound growth rate (per cent)							
2014-2022	39.25	47.46	5.90	46.63	46.63	46.63	47.46

Note: All data are for the financial year ending in June of the year specified.

Table 6.8	Small scale residential PV – gross Tariff 60 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0	0.00	0.00	0.00	0.00	0.00	0.00
2009	0	0.00	0.00	0.00	0.00	0.00	0.00
2010	7224	18.06	2.50	6.13	6.13	0.00	4.33
2011	37464	95.53	2.55	76.62	76.62	0.00	22.93
2012	41080	109.33	2.66	138.96	138.96	0.00	26.24
2013	39899	107.29	2.69	147.09	147.09	0.00	25.75
2014	39844	111.52	2.80	148.57	148.57	0.00	26.77
2015	39789	115.75	2.91	154.32	154.32	0.00	27.78
2016	39735	119.96	3.02	160.05	160.05	0.00	28.79
2017	3974	12.19	3.07	90.34	90.34	0.00	2.93
2018	0	0.00	0.00	4.14	4.14	0.00	0.00
2019	0	0.00	0.00	0.00	0.00	0.00	0.00
2020	0	0.00	0.00	0.00	0.00	0.00	0.00
2021	0	0.00	0.00	0.00	0.00	0.00	0.00
2022	0	0.00	0.00	0.00	0.00	0.00	0.00
Percentage changes							
2014	-0.14	3.95	4.09	1.01	1.01	0.00	3.95
2015	-0.14	3.79	3.93	3.87	3.87	0.00	3.79
2016	-0.14	3.64	3.78	3.71	3.71	0.00	3.64
2017	-90.00	-89.83	1.66	-43.55	-43.55	0.00	-89.83
2018	-100.00	-100.00	-100.00	-95.42	-95.42	0.00	-100.00
2019	0.00	0.00	0.00	-100.00	-100.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compound growth rate (per cent)							
2014-2022	-100.00	-100.00	-100.00	-100.00	-100.00	0.00	-100.00

Note: All data are for the financial year ending in June of the year specified.

Table 6.9	Small scale residential PV – net Tariff 20 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0	0.00	0.00	0.00	0.00	0.00	0.00
2009	0	0.00	0.00	0.00	0.00	0.00	0.00
2010	0	0.00	0.00	0.00	0.00	0.00	0.00
2011	2861	6.29	2.20	2.14	0.64	1.50	1.51
2012	4324	9.83	2.27	10.91	3.27	7.64	2.36
2013	4565	10.32	2.26	13.68	4.10	9.58	2.48
2014	4559	10.80	2.37	14.34	4.30	10.04	2.59
2015	4553	11.29	2.48	15.00	4.50	10.50	2.71
2016	4546	11.77	2.59	15.66	4.70	10.96	2.83
2017	8197	20.33	2.48	21.94	6.58	15.36	4.88
2018	8602	21.31	2.48	28.27	8.48	19.79	5.11
2019	8591	21.53	2.51	29.09	8.73	20.36	5.17
2020	8579	21.76	2.54	29.40	8.82	20.58	5.22
2021	8567	21.73	2.54	29.53	8.86	20.67	5.22
2022	8555	21.70	2.54	29.49	8.85	20.64	5.21
Percentage changes							
2014	-0.14	4.72	4.87	4.80	4.80	4.80	4.73
2015	-0.14	4.50	4.64	4.61	4.61	4.61	4.50
2016	-0.14	4.30	4.44	4.39	4.39	4.39	4.29
2017	80.30	72.69	-4.21	40.08	40.08	40.08	72.70
2018	4.95	4.78	-0.17	28.89	28.89	28.89	4.78
2019	-0.14	1.07	1.21	2.88	2.88	2.88	1.07
2020	-0.14	1.06	1.20	1.07	1.07	1.06	1.06
2021	-0.14	-0.14	0.00	0.46	0.46	0.46	-0.14
2022	-0.14	-0.14	0.00	-0.14	-0.14	-0.14	-0.14
Compound growth rate (per cent)							
2014-2022	8.19	9.76	1.45	10.09	10.09	10.09	9.76

Note: All data are for the financial year ending in June of the year specified.

Table 6.10	Small scale residential PV – gross Tariff 20 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0	0.00	0.00	0.00	0.00	0.00	0.00
2009	0	0.00	0.00	0.00	0.00	0.00	0.00
2010	0	0.00	0.00	0.00	0.00	0.00	0.00
2011	1840	3.68	2.00	1.25	1.25	0.00	0.88
2012	2964	5.71	1.93	6.41	6.41	0.00	1.37
2013	4073	8.21	2.01	9.42	9.42	0.00	1.97
2014	4067	8.64	2.12	11.44	11.44	0.00	2.07
2015	4062	9.08	2.23	12.03	12.03	0.00	2.18
2016	4056	9.51	2.34	12.62	12.62	0.00	2.28
2017	406	0.97	2.39	7.18	7.18	0.00	0.23
2018	0	0.00	0.00	0.33	0.33	0.00	0.00
2019	0	0.00	0.00	0.00	0.00	0.00	0.00
2020	0	0.00	0.00	0.00	0.00	0.00	0.00
2021	0	0.00	0.00	0.00	0.00	0.00	0.00
2022	0	0.00	0.00	0.00	0.00	0.00	0.00
Percentage changes							
2014	-0.14	5.31	5.46	21.46	21.46	0.00	5.31
2015	-0.14	5.03	5.18	5.17	5.17	0.00	5.03
2016	-0.14	4.78	4.92	4.90	4.90	0.00	4.78
2017	-90.00	-89.79	2.13	-43.12	-43.12	0.00	-89.79
2018	-100.00	-100.00	-100.00	-95.41	-95.41	0.00	-100.00
2019	0.00	0.00	0.00	-100.00	-100.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compound growth rate (per cent)							
2014-2022	-100.00	-100.00	-100.00	-100.00	-100.00	0.00	-100.00

Note: All data are for the financial year ending in June of the year specified.

Table 6.11	Small scale residential PV – net Tariff 0 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0	0.00	0.00	0.00	0.00	0.00	0.00
2009	0	0.00	0.00	0.00	0.00	0.00	0.00
2010	0	0.00	0.00	0.00	0.00	0.00	0.00
2011	216	0.00	0.00	0.00	0.00	0.00	0.00
2012	11493	26.12	2.27	9.03	2.71	6.32	6.27
2013	27717	62.80	2.27	60.41	18.12	42.29	15.07
2014	42717	89.71	2.38	110.98	33.30	77.69	21.53
2015	57717	121.21	2.49	165.76	49.73	116.03	29.09
2016	70917	148.93	2.60	221.91	66.57	155.33	35.74
2017	84117	176.65	2.65	275.87	82.76	193.11	42.40
2018	94917	199.33	2.70	324.65	97.40	227.26	47.84
2019	105717	222.01	2.73	369.27	110.78	258.49	53.28
2020	115317	242.17	2.76	411.32	123.40	287.93	58.12
2021	124917	262.33	2.76	449.50	134.85	314.65	62.96
2022	134517	282.49	2.76	485.42	145.63	339.80	67.80
Percentage changes							
2014	54.12	42.85	4.86	83.71	83.71	83.71	42.85
2015	35.11	35.11	4.63	49.36	49.35	49.35	35.12
2016	22.87	22.87	4.43	33.87	33.87	33.87	22.87
2017	18.61	18.61	1.93	24.32	24.32	24.32	18.61
2018	12.84	12.84	1.89	17.68	17.68	17.68	12.84
2019	11.38	11.38	1.11	13.74	13.74	13.74	11.38
2020	9.08	9.08	1.10	11.39	11.39	11.39	9.08
2021	8.32	8.32	0.00	9.28	9.28	9.28	8.32
2022	7.69	7.68	0.00	7.99	7.99	7.99	7.69
Compound growth rate (per cent)							
2014-2022	20.71	19.57	2.48	28.51	28.51	28.51	19.57

Note: All data are for the financial year ending in June of the year specified.

Table 6.12	Small scale business PV – net Tariff 60 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	44	0.18	4.00	0.00	0.00	0.00	0.00
2009	73	0.30	4.10	0.32	0.00	0.00	0.07
2010	98	0.44	4.50	0.50	0.20	0.30	0.11
2011	166	0.75	4.50	0.81	0.32	0.48	0.18
2012	155	0.66	4.26	0.95	0.38	0.57	0.16
2013	142	0.59	4.16	0.85	0.34	0.51	0.14
2014	142	0.61	4.27	0.81	0.33	0.49	0.15
2015	142	0.62	4.38	0.83	0.33	0.50	0.15
2016	141	0.64	4.49	0.85	0.34	0.51	0.15
2017	1456	10.10	6.94	6.20	2.48	3.72	2.42
2018	1602	11.17	6.97	14.44	5.78	8.66	2.68
2019	1600	11.33	7.08	15.28	6.11	9.17	2.72
2020	1598	11.49	7.19	15.49	6.20	9.30	2.76
2021	1596	11.65	7.30	15.71	6.28	9.43	2.80
2022	1594	11.81	7.41	15.93	6.37	9.56	2.83
Percentage changes							
2014	-0.13	2.50	2.64	-4.29	-4.27	-4.28	2.50
2015	-0.14	2.43	2.57	2.47	2.46	2.46	2.43
2016	-0.13	2.37	2.51	2.40	2.40	2.40	2.37
2017	929.76	1490.22	54.41	626.97	626.94	626.99	1490.10
2018	10.03	10.57	0.49	132.96	132.95	132.96	10.57
2019	-0.14	1.44	1.58	5.79	5.79	5.79	1.44
2020	-0.14	1.41	1.55	1.43	1.43	1.43	1.41
2021	-0.14	1.39	1.53	1.40	1.40	1.40	1.39
2022	-0.14	1.37	1.51	1.38	1.38	1.38	1.37
Compound growth rate (per cent)							
2014-2022	35.31	45.16	7.28	44.02	44.02	44.02	45.16

Note: All data are for the financial year ending in June of the year specified.

Table 6.13	Small scale business PV – gross Tariff 60 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0	0.00	0.00	0.00	0.00	0.00	0.00
2009	0	0.00	0.00	0.00	0.00	0.00	0.00
2010	204	1.33	6.50	0.45	0.45	0.00	0.32
2011	1163	7.62	6.55	6.06	6.06	0.00	1.83
2012	1494	10.20	6.82	12.06	12.06	0.00	2.45
2013	1467	10.08	6.87	13.77	13.77	0.00	2.42
2014	1465	10.22	6.98	13.78	13.78	0.00	2.45
2015	1463	10.37	7.09	13.98	13.98	0.00	2.49
2016	1461	10.52	7.20	14.18	14.18	0.00	2.52
2017	146	1.07	7.31	7.92	7.92	0.00	0.26
2018	0	0.00	0.00	0.36	0.36	0.00	0.00
2019	0	0.00	0.00	0.00	0.00	0.00	0.00
2020	0	0.00	0.00	0.00	0.00	0.00	0.00
2021	0	0.00	0.00	0.00	0.00	0.00	0.00
2022	0	0.00	0.00	0.00	0.00	0.00	0.00
Percentage changes							
2014	-0.14	1.46	1.60	0.14	0.14	0.00	1.46
2015	-0.14	1.44	1.58	1.45	1.45	0.00	1.44
2016	-0.14	1.41	1.55	1.42	1.42	0.00	1.41
2017	-90.00	-89.85	1.53	-44.19	-44.19	0.00	-89.85
2018	-100.00	-100.00	-100.00	-95.42	-95.42	0.00	-100.00
2019	0.00	0.00	0.00	-100.00	-100.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compound growth rate (per cent)							
2014-2022	-100.00	-100.00	-100.00	-100.00	-100.00	0.00	-100.00

Note: All data are for the financial year ending in June of the year specified.

Table 6.14	Small scale business PV – net Tariff 20 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0	0.00	0.00	0.00	0.00	0.00	0.00
2009	0	0.00	0.00	0.00	0.00	0.00	0.00
2010	0	0.00	0.00	0.00	0.00	0.00	0.00
2011	54	0.23	4.20	0.08	0.03	0.05	0.05
2012	105	0.46	4.35	0.46	0.18	0.28	0.11
2013	115	0.52	4.50	0.66	0.26	0.40	0.12
2014	115	0.53	4.61	0.71	0.28	0.43	0.13
2015	115	0.54	4.72	0.73	0.29	0.44	0.13
2016	115	0.55	4.83	0.74	0.30	0.45	0.13
2017	190	0.89	4.67	0.98	0.39	0.59	0.21
2018	198	0.92	4.67	1.23	0.49	0.74	0.22
2019	198	0.95	4.78	1.27	0.51	0.76	0.23
2020	198	0.97	4.89	1.30	0.52	0.78	0.23
2021	197	0.99	5.00	1.33	0.53	0.80	0.24
2022	197	1.01	5.11	1.35	0.54	0.81	0.24
Percentage changes							
2014	-0.14	2.31	2.45	7.46	7.46	7.46	2.30
2015	-0.14	2.25	2.39	2.28	2.28	2.28	2.25
2016	-0.14	2.19	2.33	2.22	2.22	2.22	2.20
2017	65.74	60.45	-3.19	32.16	32.17	32.16	60.45
2018	4.41	4.29	-0.11	25.35	25.35	25.35	4.29
2019	-0.14	2.22	2.36	3.23	3.23	3.23	2.22
2020	-0.14	2.16	2.30	2.19	2.19	2.19	2.16
2021	-0.14	2.11	2.25	2.14	2.14	2.14	2.11
2022	-0.14	2.06	2.20	2.09	2.08	2.09	2.06
Compound growth rate (per cent)							
2014-2022	6.98	8.41	1.33	9.09	9.09	9.09	8.41

Note: All data are for the financial year ending in June of the year specified.

Table 6.15	Small scale business PV – gross Tariff 20 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0	0.00	0.00	0.00	0.00	0.00	0.00
2009	0	0.00	0.00	0.00	0.00	0.00	0.00
2010	0	0.00	0.00	0.00	0.00	0.00	0.00
2011	31	0.09	2.90	0.03	0.03	0.00	0.02
2012	59	0.20	3.31	0.19	0.19	0.00	0.05
2013	84	0.35	4.11	0.36	0.36	0.00	0.08
2014	84	0.35	4.22	0.47	0.47	0.00	0.08
2015	84	0.36	4.33	0.49	0.49	0.00	0.09
2016	84	0.37	4.44	0.50	0.50	0.00	0.09
2017	8	0.04	4.55	0.28	0.28	0.00	0.01
2018	0	0.00	0.00	0.01	0.01	0.00	0.00
2019	0	0.00	0.00	0.00	0.00	0.00	0.00
2020	0	0.00	0.00	0.00	0.00	0.00	0.00
2021	0	0.00	0.00	0.00	0.00	0.00	0.00
2022	0	0.00	0.00	0.00	0.00	0.00	0.00
Percentage changes							
2014	-0.14	2.54	2.68	31.85	31.85	0.00	2.54
2015	-0.14	2.47	2.61	2.50	2.50	0.00	2.47
2016	-0.14	2.40	2.54	2.43	2.43	0.00	2.40
2017	-90.00	-89.75	2.48	-43.66	-43.66	0.00	-89.75
2018	-100.00	-100.00	-100.00	-95.40	-95.40	0.00	-100.00
2019	0.00	0.00	0.00	-100.00	-100.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compound growth rate (per cent)							
2014-2022	-100.00	-100.00	-100.00	-100.00	-100.00	0.00	-100.00

Note: All data are for the financial year ending in June of the year specified.

Table 6.16	Small scale business PV – net Tariff 0 cents						
FYear	Customers – 30 June (number)	Capacity – total (MW)	Average unit size (kW)	Total energy produced (GWh)	Export to grid (GWh)	In-house usage (GWh)	Capacity at system peak (MW)
2005	0	0.00	0.00	0.00	0.00	0.00	0.00
2006	0	0.00	0.00	0.00	0.00	0.00	0.00
2007	0	0.00	0.00	0.00	0.00	0.00	0.00
2008	0	0.00	0.00	0.00	0.00	0.00	0.00
2009	0	0.00	0.00	0.00	0.00	0.00	0.00
2010	0	0.00	0.00	0.00	0.00	0.00	0.00
2011	3	0.00	0.00	0.00	0.00	0.00	0.00
2012	313	1.43	4.58	0.49	0.20	0.30	0.34
2013	1053	4.78	4.54	4.23	1.69	2.54	1.15
2014	1773	8.04	4.54	8.70	3.48	5.22	1.93
2015	2493	11.58	4.65	13.30	5.32	7.98	2.78
2016	3513	16.71	4.76	19.17	7.67	11.50	4.01
2017	4533	22.06	4.87	26.28	10.51	15.77	5.29
2018	5793	28.82	4.98	34.50	13.80	20.70	6.92
2019	7053	35.87	5.09	43.88	17.55	26.33	8.61
2020	8253	42.88	5.20	53.43	21.37	32.06	10.29
2021	9453	50.15	5.31	63.13	25.25	37.88	12.04
2022	10653	57.69	5.42	73.18	29.27	43.91	13.85
Percentage changes							
2014	68.38	68.38	0.00	105.84	105.85	105.83	68.38
2015	40.61	44.02	2.43	52.79	52.78	52.78	44.02
2016	40.91	44.24	2.37	44.16	44.16	44.17	44.25
2017	29.04	32.02	2.31	37.11	37.10	37.10	32.02
2018	27.80	30.69	2.26	31.27	31.27	31.27	30.69
2019	21.75	24.44	2.21	27.19	27.19	27.19	24.44
2020	17.01	19.54	2.16	21.76	21.76	21.75	19.55
2021	14.54	16.97	2.12	18.16	18.16	18.16	16.97
2022	12.69	15.03	2.07	15.93	15.93	15.93	15.03
Compound growth rate (per cent)							
2014-2022	31.57	34.17	1.98	40.20	40.20	40.20	34.17

Note: All data are for the financial year ending in June of the year specified.

Appendix A: Energy and demand by network tariff – Essential Energy

Table A.1 Total energy – Essential Energy (GWh)

	Residential			Controlled load			Business			
FYear	BLNN2AU LV residential continuous	BLNT3AU LV TOU RES	Residential total	BLNC1AU Controlled load 1	BLNC2AU Controlled load 2	Controlled load total	BLND1CO & BLND1SR & BLND1SU LV 1 rate	BLNT1SU & BLNT1AO LV TOU over 100 MWh	BLNS1AO LV TOU average daily demand	BLNT2AU LV TOU <100 MWh
2008	3406.90	57.51	3464.50	1086.32	351.43	1437.80	2064.80	351.21	19.64	503.48
2009	3657.00	64.79	3721.80	1066.91	342.57	1409.50	1896.80	352.58	37.08	548.37
2010	3650.50	81.07	3731.60	968.86	309.37	1278.20	1765.00	356.16	42.18	483.65
2011	3495.80	86.74	3582.50	949.11	293.69	1242.80	1548.00	342.91	68.30	433.06
2012	3339.80	109.93	3449.70	931.35	283.59	1214.90	1440.40	340.64	107.90	475.46
2013	3298.70	130.11	3428.80	874.79	265.64	1140.40	1371.20	359.06	109.43	549.12
2014	3044.53	120.59	3165.12	920.21	275.71	1195.90	1238.05	325.64	103.61	507.96
2015	2956.66	127.30	3083.96	914.69	271.85	1186.50	1189.90	311.39	103.44	495.46
2016	2885.11	133.25	3018.36	909.20	268.04	1177.20	1155.97	298.31	103.45	484.14
2017	2780.76	137.72	2918.48	903.74	264.29	1168.00	1132.56	285.54	103.38	472.67
2018	2680.33	143.52	2823.85	898.32	260.59	1158.90	1120.45	273.65	103.43	462.05
2019	2650.90	151.62	2802.52	892.93	256.94	1149.90	1111.93	260.92	102.96	449.37
2020	2637.66	160.23	2797.89	887.57	253.34	1140.90	1110.25	248.54	102.39	436.62
2021	2642.14	169.17	2811.31	882.25	249.79	1132.00	1120.35	238.27	102.48	426.94
2022	2646.61	177.31	2823.92	876.95	246.30	1123.30	1123.69	228.14	102.44	416.97
Percentage changes										
2014	-7.71	-7.32	-7.69	5.19	3.79	4.87	-9.71	-9.31	-5.32	-7.50
2015	-2.89	5.56	-2.56	-0.60	-1.40	-0.79	-3.89	-4.38	-0.17	-2.46
2016	-2.42	4.67	-2.13	-0.60	-1.40	-0.78	-2.85	-4.20	0.01	-2.28
2017	-3.62	3.35	-3.31	-0.60	-1.40	-0.78	-2.03	-4.28	-0.07	-2.37
2018	-3.61	4.21	-3.24	-0.60	-1.40	-0.78	-1.07	-4.16	0.05	-2.25
2019	-1.10	5.64	-0.76	-0.60	-1.40	-0.78	-0.76	-4.65	-0.46	-2.74
2020	-0.50	5.68	-0.17	-0.60	-1.40	-0.78	-0.15	-4.74	-0.55	-2.84
2021	0.17	5.58	0.48	-0.60	-1.40	-0.78	0.91	-4.13	0.08	-2.22
2022	0.17	4.81	0.45	-0.60	-1.40	-0.77	0.30	-4.25	-0.04	-2.34
Compound growth rate (per cent)										
2014-2022	-1.74	4.94	-1.42	-0.60	-1.40	-0.78	-1.20	-4.35	-0.14	-2.44

Note: All data are for the financial year ending in June of the year specified.

Table A.1 Total energy – Essential Energy (GWh) – continued

	Business						Unmetered			
FYear	BLND3TO & BLND3AO & BLND4NO & TLD LV TOU 3 rate	BHND1CO & BHND1SO HV 1 rate	BHND3AO & TLD HV TOU	BHNS1AO HV TOU average daily demand	Business total	Customer specific total	BLNP1AO LV public lighting NUOS	BLNN3AO & BLNP3AO & BLNP3AO not in use LV unmetered	Unmetered total	Essential TOTAL
2008	1431.30	448.36	250.34	3.28	5072.30	1927.20	0.00	50.55	50.55	**11952.30**
2009	1551.00	369.77	342.12	8.55	5106.20	1924.10	2.03	52.63	54.66	**12216.30**
2010	1803.20	310.95	390.22	33.80	5185.10	1879.40	2.02	56.88	58.90	**12133.30**
2011	1831.80	208.59	501.41	50.78	4984.80	1989.40	1.17	48.24	49.41	**11849.00**
2012	1915.60	197.81	599.89	52.36	5130.10	2141.60	0.00	32.47	32.47	**11968.80**
2013	2000.40	183.23	647.28	55.96	5275.80	2369.60	0.00	32.81	32.81	**12247.50**
2014	1950.30	151.12	621.84	53.26	4951.78	2442.10	0.00	33.18	33.18	**11788.08**
2015	2004.90	131.44	630.01	53.45	4919.98	2456.60	0.00	33.62	33.62	**11680.66**
2016	2064.70	115.12	642.75	54.01	4918.46	2480.10	0.00	34.09	34.09	**11628.20**
2017	2124.50	100.61	654.31	54.47	4928.04	2508.20	0.00	34.58	34.58	**11557.30**
2018	2188.70	88.21	668.27	55.10	4959.87	2539.40	0.00	35.07	35.07	**11517.09**
2019	2243.40	77.02	679.61	55.51	4980.72	2561.30	0.00	35.56	35.56	**11530.00**
2020	2297.30	67.25	691.26	55.93	5009.54	2580.70	0.00	36.08	36.08	**11565.11**
2021	2367.50	59.09	707.54	56.71	5078.87	2608.80	0.00	36.59	36.59	**11667.58**
2022	2436.90	51.80	722.39	57.35	5139.68	2635.70	0.00	37.10	37.10	**11759.70**
Percentage changes										
2014	-2.50	-17.52	-3.93	-4.84	-6.14	3.06	0.00	1.12	1.12	**-3.75**
2015	2.80	-13.02	1.31	0.36	-0.64	0.59	0.00	1.32	1.32	**-0.91**
2016	2.98	-12.42	2.02	1.06	-0.03	0.96	0.00	1.40	1.40	**-0.45**
2017	2.90	-12.60	1.80	0.84	0.19	1.13	0.00	1.44	1.44	**-0.61**
2018	3.02	-12.32	2.13	1.17	0.65	1.24	0.00	1.42	1.42	**-0.35**
2019	2.50	-12.69	1.70	0.74	0.42	0.86	0.00	1.40	1.40	**0.11**
2020	2.40	-12.69	1.71	0.75	0.58	0.76	0.00	1.45	1.45	**0.30**
2021	3.06	-12.13	2.36	1.39	1.38	1.09	0.00	1.42	1.42	**0.89**
2022	2.93	-12.34	2.10	1.14	1.20	1.03	0.00	1.39	1.39	**0.79**
Compound growth rate (per cent)										
2014-2022	2.82	-12.53	1.89	0.93	0.47	0.96	0.00	1.40	1.40	**-0.03**

Note: All data are for the financial year ending in June of the year specified.

Table A.2 Total customers – Essential Energy (number)

	Residential			Controlled load			Business			
FYear	BLNN2AU LV residential continuous	BLNT3AU LV TOU RES	Residential total	BLNC1AU Controlled load 1	BLNC2AU Controlled load 2	Controlled load total	BLND1CO & BLND1SR & BLND1SU LV 1 rate	BLNT1SU & BLNT1AO LV TOU over 100 MWh	BLNS1AO LV TOU average daily demand	BLNT2AU LV TOU <100 MWh
2008	687632	3758	691390	377790	125065	502855	83845	1317	20	8405
2009	692346	4245	696591	376652	125415	502067	83397	1302	23	8809
2010	697236	5349	702585	375176	125229	500405	82323	1384	24	8803
2011	700853	7671	708524	374569	123168	497737	81904	1424	22	9131
2012	698383	10367	708750	372802	120391	493193	80320	1404	23	9489
2013	703627	11678	715305	370565	118706	489271	80290	1462	26	9996
2014	706630	12429	719059	368342	117044	485385	75908	1605	26	12070
2015	711051	13534	724585	366132	115405	481537	74974	1643	28	12470
2016	715107	14548	729656	363935	113789	477724	73784	1658	28	12701
2017	718895	15495	734390	361751	112196	473948	72559	1672	29	12932
2018	723358	16611	739969	359581	110626	470206	71432	1687	30	13174
2019	728274	17840	746114	357423	109077	466500	70002	1698	31	13388
2020	733286	19093	752379	355279	107550	462829	68541	1708	32	13599
2021	738251	20334	758585	353147	106044	459191	67497	1724	33	13857
2022	742802	21472	764274	351028	104559	455588	66396	1739	34	14111
Percentage changes										
2014	0.43	6.43	0.52	-0.60	-1.40	-0.79	-5.46	9.79	2.08	20.75
2015	0.63	8.89	0.77	-0.60	-1.40	-0.79	-1.23	2.36	4.36	3.31
2016	0.57	7.49	0.70	-0.60	-1.40	-0.79	-1.59	0.89	2.93	1.85
2017	0.53	6.51	0.65	-0.60	-1.40	-0.79	-1.66	0.85	2.89	1.81
2018	0.62	7.20	0.76	-0.60	-1.40	-0.79	-1.55	0.91	2.96	1.88
2019	0.68	7.40	0.83	-0.60	-1.40	-0.79	-2.00	0.66	2.72	1.62
2020	0.69	7.02	0.84	-0.60	-1.40	-0.79	-2.09	0.61	2.67	1.58
2021	0.68	6.50	0.82	-0.60	-1.40	-0.79	-1.52	0.93	2.99	1.89
2022	0.62	5.60	0.75	-0.60	-1.40	-0.78	-1.63	0.86	2.93	1.83
Compound growth rate (per cent)										
2014-2022	0.63	7.07	0.77	-0.60	-1.40	-0.79	-1.66	1.01	3.06	1.97

Note: All data are for the financial year ending in June of the year specified.

Table A.2 Total customers – Essential Energy (number) – continued

	Business						Unmetered			
FYear	BLND3TO & BLND3AO & BLND4NO & TLD LV TOU 3 rate	BHND1CO & BHND1SO HV 1 rate	BHND3AO & TLD HV TOU	BHNS1AO HV TOU average daily demand	Business total	Customer specific total	BLNP1AO LV public lighting NUOS	BLNN3AO & BLNP3AO & BLNP3AO not in use LV unmetered	Unmetered total	Essential TOTAL
2008	2100	55	54	2	95798	31	4	81	85	**1290159**
2009	2311	51	63	2	95958	29	4	81	85	**1294730**
2010	3009	46	69	4	95662	30	4	81	85	**1298767**
2011	3148	37	100	5	95771	31	4	81	85	**1302148**
2012	3230	35	100	4	94605	31	4	81	85	**1296664**
2013	3901	36	110	4	95825	34	4	81	85	**1300520**
2014	4027	31	104	4	93775	34	4	81	85	**1298339**
2015	4249	29	103	4	93500	34	4	81	85	**1299741**
2016	4426	27	104	4	92732	34	4	81	85	**1300231**
2017	4610	25	104	4	91933	34	4	81	85	**1300389**
2018	4804	23	104	4	91258	34	4	81	85	**1301552**
2019	4996	21	104	4	90244	34	4	81	85	**1302978**
2020	5193	20	104	4	89201	34	4	81	85	**1304527**
2021	5416	18	104	4	88653	34	4	81	85	**1306547**
2022	5645	17	105	4	88050	34	4	81	85	**1308031**
Percentage changes										
2014	3.23	-12.76	-5.84	-6.29	-2.14	0.00	0.00	0.00	0.00	**-0.17**
2015	5.52	-7.48	-0.14	-0.61	-0.29	0.00	0.00	0.00	0.00	**0.11**
2016	4.16	-7.16	0.20	-0.27	-0.82	0.00	0.00	0.00	0.00	**0.04**
2017	4.14	-7.26	0.09	-0.38	-0.86	0.00	0.00	0.00	0.00	**0.01**
2018	4.22	-7.11	0.26	-0.21	-0.73	0.00	0.00	0.00	0.00	**0.09**
2019	3.99	-7.31	0.04	-0.43	-1.11	0.00	0.00	0.00	0.00	**0.11**
2020	3.96	-7.30	0.05	-0.42	-1.16	0.00	0.00	0.00	0.00	**0.12**
2021	4.28	-7.01	0.37	-0.10	-0.62	0.00	0.00	0.00	0.00	**0.15**
2022	4.23	-7.12	0.24	-0.23	-0.68	0.00	0.00	0.00	0.00	**0.11**
Compound growth rate (per cent)										
2014-2022	4.31	-7.22	0.14	-0.33	-0.78	0.00	0.00	0.00	0.00	**0.09**

Note: All data are for the financial year ending in June of the year specified.

Table A.3 Total anytime demand – Essential Energy (MW)

	Residential			Controlled load			Business			
FYear	BLNN2AU LV residential continuous	BLNT3AU LV TOU RES	Residential total	BLNC1AU Controlled load 1	BLNC2AU Controlled load 2	Controlled load total	BLND1CO & BLND1SR & BLND1SU LV 1 rate	BLNT1SU & BLNT1AO LV TOU over 100 MWh	BLNS1AO LV TOU average daily demand	BLNT2AU LV TOU <100 MWh
2008	0.00	0.00	0.00	0.00	0.00	0.00	1930.00	0.00	0.00	0.00
2009	0.00	0.00	0.00	0.00	0.00	0.00	1720.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00	0.00	0.00	1610.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00	0.00	0.00	1440.00	0.00	0.00	0.00
2012	0.00	0.00	0.00	0.00	0.00	0.00	1220.00	0.00	0.00	0.00
2013	0.00	0.00	0.00	0.00	0.00	0.00	1174.70	0.00	0.00	0.00
2014	0.00	0.00	0.00	0.00	0.00	0.00	1072.70	0.00	0.00	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	1020.40	0.00	0.00	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	972.00	0.00	0.00	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	925.30	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	881.60	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	836.80	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	793.60	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	756.40	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	720.20	0.00	0.00	0.00
Percentage changes										
2014	0.00	0.00	0.00	0.00	0.00	0.00	-8.68	0.00	0.00	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	-4.88	0.00	0.00	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	-4.74	0.00	0.00	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	-4.80	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	-4.72	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	-5.08	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	-5.16	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	-4.69	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	-4.79	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
Compound growth rate (per cent)										
2014-2022	0.00	0.00	0.00	0.00	0.00	0.00	-4.86	0.00	0.00	0.00

Note: All data are for the financial year ending in June of the year specified.

Table A.3 Total anytime demand – Essential Energy (MW) – continued

	Business						Unmetered			
FYear	BLND3TO & BLND3AO & BLND4NO & TLD LV TOU 3 rate	BHND1CO & BHND1SO HV 1 rate	BHND3AO & TLD HV TOU	BHNS1AO HV TOU average daily demand	Business total	Customer specific total	BLNP1AO LV public lighting NUOS	BLNN3AO & BLNP3AO & BLNP3AO not in use LV unmetered	Unmetered total	Essential TOTAL
2008	50.00	1180.00	10.00	0.00	3170.00	2720.00	0.00	0.00	0.00	**5890.00**
2009	40.00	1010.00	10.00	0.00	2780.00	2690.00	0.00	0.00	0.00	**5470.00**
2010	40.00	870.00	0.00	0.00	2520.00	3820.00	0.00	0.00	0.00	**6340.00**
2011	30.00	610.00	0.00	0.00	2080.00	2740.00	0.00	0.00	0.00	**4820.00**
2012	30.00	570.00	0.00	0.00	1820.00	2970.00	0.00	0.00	0.00	**4790.00**
2013	30.92	537.79	0.00	0.00	1743.40	3191.80	0.00	0.00	0.00	**4935.20**
2014	30.38	464.53	0.00	0.00	1567.60	3279.00	0.00	0.00	0.00	**4846.60**
2015	30.97	417.79	0.00	0.00	1469.20	3287.30	0.00	0.00	0.00	**4756.50**
2016	31.62	377.75	0.00	0.00	1381.40	3304.60	0.00	0.00	0.00	**4686.00**
2017	32.25	340.98	0.00	0.00	1298.50	3331.20	0.00	0.00	0.00	**4629.70**
2018	32.93	308.56	0.00	0.00	1223.10	3360.70	0.00	0.00	0.00	**4583.80**
2019	33.51	278.31	0.00	0.00	1148.60	3381.30	0.00	0.00	0.00	**4529.90**
2020	34.07	251.06	0.00	0.00	1078.70	3399.60	0.00	0.00	0.00	**4478.30**
2021	34.80	227.56	0.00	0.00	1018.70	3425.80	0.00	0.00	0.00	**4444.50**
2022	35.51	205.87	0.00	0.00	961.60	3451.00	0.00	0.00	0.00	**4412.50**
Percentage changes										
2014	-1.76	-13.62	0.00	0.00	-10.08	2.73	0.00	0.00	0.00	**-1.80**
2015	1.95	-10.06	0.00	0.00	-6.28	0.25	0.00	0.00	0.00	**-1.86**
2016	2.08	-9.58	0.00	0.00	-5.98	0.53	0.00	0.00	0.00	**-1.48**
2017	2.02	-9.73	0.00	0.00	-6.00	0.80	0.00	0.00	0.00	**-1.20**
2018	2.11	-9.51	0.00	0.00	-5.81	0.89	0.00	0.00	0.00	**-0.99**
2019	1.75	-9.80	0.00	0.00	-6.09	0.61	0.00	0.00	0.00	**-1.18**
2020	1.67	-9.79	0.00	0.00	-6.09	0.54	0.00	0.00	0.00	**-1.14**
2021	2.13	-9.36	0.00	0.00	-5.56	0.77	0.00	0.00	0.00	**-0.75**
2022	2.04	-9.53	0.00	0.00	-5.61	0.74	0.00	0.00	0.00	**-0.72**
			0.00	0.00			0.00	0.00	0.00	
Compound growth rate (per cent)										
2014-2022	1.97	-9.67	0.00	0.00	-5.93	0.64	0.00	0.00	0.00	**-1.17**

Note: All data are for the financial year ending in June of the year specified.

Table A.4 Total peak demand – Essential Energy (MW)

	Residential			Controlled load			Business			
FYear	BLNN2AU LV residential continuous	BLNT3AU LV TOU RES	Residential total	BLNC1AU Controlled load 1	BLNC2AU Controlled load 2	Controlled load total	BLND1CO & BLND1SR & BLND1SU LV 1 rate	BLNT1SU & BLNT1AO LV TOU over 100 MWh	BLNS1AO LV TOU average daily demand	BLNT2AU LV TOU <100 MWh
2008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	0.00
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
2010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	150.00	0.00
2012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	200.00	0.00
2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	207.97	0.00
2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.01	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	198.19	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.50	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.75	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.65	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.08	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	196.24	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	196.38	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	196.32	0.00
Percentage changes										
2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-5.27	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.35	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.29	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.43	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Compound growth rate (per cent)										
2014-2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04	0.00

Note: All data are for the financial year ending in June of the year specified.

Table A.4 Total peak demand – Essential Energy (MW) – continued

	Business						Unmetered			
FYear	BLND3TO & BLND3AO & BLND4NO & TLD LV TOU 3 rate	BHND1CO & BHND1SO HV 1 rate	BHND3AO & TLD HV TOU	BHNS1AO HV TOU average daily demand	Business total	Customer specific total	BLNP1AO LV public lighting NUOS	BLNN3AO & BLNP3AO & BLNP3AO not in use LV unmetered	Unmetered total	Essential TOTAL
2008	3880.00	0.00	630.00	10.00	4580.00	600.00	0.00	0.00	0.00	**5180.00**
2009	4260.00	0.00	850.00	20.00	5230.00	760.00	0.00	0.00	0.00	**5990.00**
2010	5060.00	0.00	950.00	70.00	6180.00	750.00	0.00	0.00	0.00	**6930.00**
2011	5230.00	0.00	1220.00	110.00	6710.00	900.00	0.00	0.00	0.00	**7610.00**
2012	5420.00	0.00	1450.00	110.00	7180.00	970.00	0.00	0.00	0.00	**8150.00**
2013	5600.70	0.00	1526.40	116.55	7451.60	868.04	0.00	0.00	0.00	**8319.60**
2014	5495.30	0.00	1485.60	111.82	7289.70	962.14	0.00	0.00	0.00	**8251.90**
2015	5605.90	0.00	1498.80	112.31	7415.20	923.27	0.00	0.00	0.00	**8338.50**
2016	5720.70	0.00	1519.00	113.13	7550.30	952.15	0.00	0.00	0.00	**8502.50**
2017	5837.10	0.00	1537.30	113.91	7686.10	948.13	0.00	0.00	0.00	**8634.20**
2018	5959.60	0.00	1559.20	114.91	7831.30	961.55	0.00	0.00	0.00	**8792.90**
2019	6063.80	0.00	1576.80	115.57	7953.30	964.18	0.00	0.00	0.00	**8917.50**
2020	6165.20	0.00	1594.90	116.24	8072.60	970.44	0.00	0.00	0.00	**9043.00**
2021	6296.60	0.00	1620.00	117.48	8230.40	976.67	0.00	0.00	0.00	**9207.10**
2022	6425.20	0.00	1642.70	118.51	8382.70	983.69	0.00	0.00	0.00	**9366.40**
Percentage changes										
2014	-1.88	0.00	-2.67	-4.06	-2.17	10.84	0.00	0.00	0.00	**-0.81**
2015	2.01	0.00	0.89	0.44	1.72	-4.04	0.00	0.00	0.00	**1.05**
2016	2.05	0.00	1.35	0.73	1.82	3.13	0.00	0.00	0.00	**1.97**
2017	2.03	0.00	1.20	0.69	1.80	-0.42	0.00	0.00	0.00	**1.55**
2018	2.10	0.00	1.42	0.88	1.89	1.42	0.00	0.00	0.00	**1.84**
2019	1.75	0.00	1.13	0.58	1.56	0.27	0.00	0.00	0.00	**1.42**
2020	1.67	0.00	1.15	0.58	1.50	0.65	0.00	0.00	0.00	**1.41**
2021	2.13	0.00	1.57	1.07	1.95	0.64	0.00	0.00	0.00	**1.81**
2022	2.04	0.00	1.40	0.87	1.85	0.72	0.00	0.00	0.00	**1.73**
		0.00					0.00	0.00	0.00	
Compound growth rate (per cent)										
2014-2022	1.97	0.00	1.26	0.73	1.76	0.28	0.00	0.00	0.00	**1.60**

Note: All data are for the financial year ending in June of the year specified.

Table A.5 Total off-peak demand – Essential Energy (MW)

	Residential			Controlled load			Business			
FYear	BLNN2AU LV residential continuous	BLNT3AU LV TOU RES	Residential total	BLNC1AU Controlled load 1	BLNC2AU Controlled load 2	Controlled load total	BLND1CO & BLND1SR & BLND1SU LV 1 rate	BLNT1SU & BLNT1AO LV TOU over 100 MWh	BLNS1AO LV TOU average daily demand	BLNT2AU LV TOU <100 MWh
2008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.00	0.00
2010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80.00	0.00
2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	130.00	0.00
2012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	190.00	0.00
2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	186.66	0.00
2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	181.92	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.42	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	181.08	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.67	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.89	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.21	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	179.53	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	179.62	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	179.58	0.00
Percentage changes										
2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.54	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.82	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.23	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.38	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.38	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Compound growth rate (per cent)										
2014-2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.16	0.00

Note: All data are for the financial year ending in June of the year specified.

Table A.5 Total off-peak demand – Essential Energy (MW) – continued

	Business						Unmetered			
FYear	BLND3TO & BLND3AO & BLND4NO & TLD LV TOU 3 rate	BHND1CO & BHND1SO HV 1 rate	BHND3AO & TLD HV TOU	BHNS1AO HV TOU average daily demand	Business total	Customer specific total	BLNP1AO LV public lighting NUOS	BLNN3AO & BLNP3AO & BLNP3AO not in use LV unmetered	Unmetered total	Essential TOTAL
2008	3750.00	0.00	640.00	10.00	4440.00	630.00	0.00	0.00	0.00	**5070.00**
2009	4120.00	0.00	870.00	20.00	5080.00	740.00	0.00	0.00	0.00	**5820.00**
2010	4930.00	0.00	990.00	60.00	6060.00	740.00	0.00	0.00	0.00	**6800.00**
2011	5050.00	0.00	1230.00	90.00	6500.00	920.00	0.00	0.00	0.00	**7420.00**
2012	5260.00	0.00	1440.00	90.00	6980.00	960.00	0.00	0.00	0.00	**7940.00**
2013	5405.50	0.00	1513.60	93.84	7199.60	888.20	0.00	0.00	0.00	**8087.80**
2014	5318.40	0.00	1474.30	90.76	7065.40	968.83	0.00	0.00	0.00	**8034.20**
2015	5418.00	0.00	1486.80	90.79	7176.10	937.14	0.00	0.00	0.00	**8113.20**
2016	5532.80	0.00	1507.10	91.64	7312.60	962.62	0.00	0.00	0.00	**8275.20**
2017	5643.40	0.00	1525.10	92.18	7441.40	960.47	0.00	0.00	0.00	**8401.80**
2018	5762.80	0.00	1546.90	93.03	7583.60	973.11	0.00	0.00	0.00	**8556.80**
2019	5863.00	0.00	1564.40	93.55	7701.20	976.26	0.00	0.00	0.00	**8677.50**
2020	5961.40	0.00	1582.30	94.10	7817.30	982.36	0.00	0.00	0.00	**8799.70**
2021	6088.30	0.00	1607.20	95.10	7970.20	988.80	0.00	0.00	0.00	**8959.00**
2022	6212.70	0.00	1629.70	95.93	8117.90	995.85	0.00	0.00	0.00	**9113.80**
Percentage changes										
2014	-1.61	0.00	-2.60	-3.29	-1.86	9.08	0.00	0.00	0.00	**-0.66**
2015	1.87	0.00	0.85	0.04	1.57	-3.27	0.00	0.00	0.00	**0.98**
2016	2.12	0.00	1.37	0.94	1.90	2.72	0.00	0.00	0.00	**2.00**
2017	2.00	0.00	1.19	0.58	1.76	-0.22	0.00	0.00	0.00	**1.53**
2018	2.12	0.00	1.43	0.93	1.91	1.32	0.00	0.00	0.00	**1.84**
2019	1.74	0.00	1.13	0.55	1.55	0.32	0.00	0.00	0.00	**1.41**
2020	1.68	0.00	1.14	0.59	1.51	0.62	0.00	0.00	0.00	**1.41**
2021	2.13	0.00	1.57	1.06	1.96	0.66	0.00	0.00	0.00	**1.81**
2022	2.04	0.00	1.40	0.87	1.85	0.71	0.00	0.00	0.00	**1.73**
		0.00					0.00	0.00	0.00	
Compound growth rate (per cent)										
2014-2022	1.96	0.00	1.26	0.70	1.75	0.34	0.00	0.00	0.00	**1.59**

Note: All data are for the financial year ending in June of the year specified.

Table A.6 Total shoulder demand – Essential Energy (MW)

	Residential			Controlled load			Business			
FYear	BLNN2AU LV residential continuous	BLNT3AU LV TOU RES	Residential total	BLNC1AU Controlled load 1	BLNC2AU Controlled load 2	Controlled load total	BLND1CO & BLND1SR & BLND1SU LV 1 rate	BLNT1SU & BLNT1AO LV TOU over 100 MWh	BLNS1AO LV TOU average daily demand	BLNT2AU LV TOU <100 MWh
2008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	0.00
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
2010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00
2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	150.00	0.00
2012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	200.00	0.00
2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	208.73	0.00
2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.37	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	198.73	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.95	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	198.25	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	198.12	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.56	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	196.72	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	196.86	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	196.80	0.00
Percentage changes										
2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-5.44	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.39	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.07	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.28	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.43	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Compound growth rate (per cent)										
2014-2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04	0.00

Note: All data are for the financial year ending in June of the year specified.

Table A.6 Total shoulder demand – Essential Energy (MW) – continued

	Business						Unmetered			
FYear	BLND3TO & BLND3AO & BLND4NO & TLD LV TOU 3 rate	BHND1CO & BHND1SO HV 1 rate	BHND3AO & TLD HV TOU	BHNS1AO HV TOU average daily demand	Business total	Customer specific total	BLNP1AO LV public lighting NUOS	BLNN3AO & BLNP3AO & BLNP3AO not in use LV unmetered	Unmetered total	Essential TOTAL
2008	4080.00	0.00	720.00	10.00	4870.00	630.00	0.00	0.00	0.00	**5500.00**
2009	4480.00	0.00	950.00	20.00	5550.00	770.00	0.00	0.00	0.00	**6320.00**
2010	5340.00	0.00	1060.00	70.00	6580.00	770.00	0.00	0.00	0.00	**7350.00**
2011	5510.00	0.00	1340.00	110.00	7110.00	950.00	0.00	0.00	0.00	**8060.00**
2012	5730.00	0.00	1570.00	110.00	7610.00	1000.00	0.00	0.00	0.00	**8610.00**
2013	5922.60	0.00	1654.20	117.01	7902.50	1356.92	0.00	0.00	0.00	**9259.50**
2014	5810.30	0.00	1609.30	112.04	7729.10	1227.95	0.00	0.00	0.00	**8957.00**
2015	5927.70	0.00	1624.00	112.65	7863.10	1303.83	0.00	0.00	0.00	**9166.90**
2016	6048.90	0.00	1645.70	113.41	8005.90	1278.41	0.00	0.00	0.00	**9284.30**
2017	6172.10	0.00	1665.60	114.22	8150.10	1305.50	0.00	0.00	0.00	**9455.60**
2018	6301.60	0.00	1689.20	115.21	8304.10	1307.35	0.00	0.00	0.00	**9611.50**
2019	6411.70	0.00	1708.40	115.88	8433.60	1319.19	0.00	0.00	0.00	**9752.70**
2020	6519.00	0.00	1727.90	116.55	8560.20	1323.55	0.00	0.00	0.00	**9883.70**
2021	6657.90	0.00	1755.10	117.80	8727.70	1334.11	0.00	0.00	0.00	**10061.80**
2022	6793.90	0.00	1779.70	118.82	8889.20	1342.60	0.00	0.00	0.00	**10231.80**
Percentage changes										
2014	-1.90	0.00	-2.71	-4.25	-2.19	-9.50	0.00	0.00	0.00	**-3.27**
2015	2.02	0.00	0.91	0.54	1.73	6.18	0.00	0.00	0.00	**2.34**
2016	2.04	0.00	1.34	0.68	1.82	-1.95	0.00	0.00	0.00	**1.28**
2017	2.04	0.00	1.21	0.71	1.80	2.12	0.00	0.00	0.00	**1.85**
2018	2.10	0.00	1.42	0.87	1.89	0.14	0.00	0.00	0.00	**1.65**
2019	1.75	0.00	1.14	0.58	1.56	0.91	0.00	0.00	0.00	**1.47**
2020	1.67	0.00	1.14	0.57	1.50	0.33	0.00	0.00	0.00	**1.34**
2021	2.13	0.00	1.57	1.07	1.96	0.80	0.00	0.00	0.00	**1.80**
2022	2.04	0.00	1.40	0.87	1.85	0.64	0.00	0.00	0.00	**1.69**
		0.00					0.00	0.00	0.00	
Compound growth rate (per cent)										
2014-2022	1.97	0.00	1.27	0.74	1.76	1.12	0.00	0.00	0.00	**1.68**

Note: All data are for the financial year ending in June of the year specified.

Table A.7 Total capacity demand – Essential Energy (MW)

	Residential			Controlled load			Business			
FYear	BLNN2AU LV residential continuous	BLNT3AU LV TOU RES	Residential total	BLNC1AU Controlled load 1	BLNC2AU Controlled load 2	Controlled load total	BLND1CO & BLND1SR & BLND1SU LV 1 rate	BLNT1SU & BLNT1AO LV TOU over 100 MWh	BLNS1AO LV TOU average daily demand	BLNT2AU LV TOU <100 MWh
2008	0.00	0.00	0.00	0.00	0.00	0.00	2010.00	0.00	0.00	0.00
2009	0.00	0.00	0.00	0.00	0.00	0.00	1710.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00	0.00	0.00	1590.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00	0.00	0.00	1440.00	0.00	0.00	0.00
2012	0.00	0.00	0.00	0.00	0.00	0.00	1180.00	0.00	0.00	0.00
2013	0.00	0.00	0.00	0.00	0.00	0.00	1136.10	0.00	0.00	0.00
2014	0.00	0.00	0.00	0.00	0.00	0.00	1037.50	0.00	0.00	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	986.90	0.00	0.00	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	940.10	0.00	0.00	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	894.90	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	852.70	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	809.30	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	767.60	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	731.60	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	696.60	0.00	0.00	0.00
Percentage changes										
2014	0.00	0.00	0.00	0.00	0.00	0.00	-8.68	0.00	0.00	0.00
2015	0.00	0.00	0.00	0.00	0.00	0.00	-4.88	0.00	0.00	0.00
2016	0.00	0.00	0.00	0.00	0.00	0.00	-4.74	0.00	0.00	0.00
2017	0.00	0.00	0.00	0.00	0.00	0.00	-4.81	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	-4.72	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	-5.09	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	-5.15	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	-4.69	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	-4.78	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
Compound growth rate (per cent)										
2014-2022	0.00	0.00	0.00	0.00	0.00	0.00	-4.86	0.00	0.00	0.00

Note: All data are for the financial year ending in June of the year specified.

Table A.7 Total capacity demand – Essential Energy (MW) – continued

	Business						Unmetered			
FYear	BLND3TO & BLND3AO & BLND4NO & TLD LV TOU 3 rate	BHND1CO & BHND1SO HV 1 rate	BHND3AO & TLD HV TOU	BHNS1AO HV TOU average daily demand	Business total	Customer specific total	BLNP1AO LV public lighting NUOS	BLNN3AO & BLNP3AO & BLNP3AO not in use LV unmetered	Unmetered total	Essential TOTAL
2008	0.00	1150.00	0.00	0.00	3160.00	0.00	0.00	0.00	0.00	**3160.00**
2009	0.00	970.00	0.00	0.00	2680.00	0.00	0.00	0.00	0.00	**2680.00**
2010	0.00	790.00	0.00	0.00	2380.00	0.00	0.00	0.00	0.00	**2380.00**
2011	0.00	590.00	0.00	0.00	2030.00	0.00	0.00	0.00	0.00	**2030.00**
2012	0.00	650.00	0.00	0.00	1830.00	0.00	0.00	0.00	0.00	**1830.00**
2013	0.00	613.27	0.00	0.00	1749.40	0.00	0.00	0.00	0.00	**1749.40**
2014	0.00	529.73	0.00	0.00	1567.30	0.00	0.00	0.00	0.00	**1567.30**
2015	0.00	476.43	0.00	0.00	1463.40	0.00	0.00	0.00	0.00	**1463.40**
2016	0.00	430.77	0.00	0.00	1370.90	0.00	0.00	0.00	0.00	**1370.90**
2017	0.00	388.84	0.00	0.00	1283.80	0.00	0.00	0.00	0.00	**1283.80**
2018	0.00	351.87	0.00	0.00	1204.60	0.00	0.00	0.00	0.00	**1204.60**
2019	0.00	317.37	0.00	0.00	1126.70	0.00	0.00	0.00	0.00	**1126.70**
2020	0.00	286.30	0.00	0.00	1053.90	0.00	0.00	0.00	0.00	**1053.90**
2021	0.00	259.50	0.00	0.00	991.10	0.00	0.00	0.00	0.00	**991.10**
2022	0.00	234.77	0.00	0.00	931.30	0.00	0.00	0.00	0.00	**931.30**
Percentage changes										
2014	0.00	-13.62	#DIV/0!	0.00	-10.41	0.00	0.00	0.00	0.00	**-10.41**
2015	0.00	-10.06	#DIV/0!	0.00	-6.63	0.00	0.00	0.00	0.00	**-6.63**
2016	0.00	-9.58	#DIV/0!	0.00	-6.32	0.00	0.00	0.00	0.00	**-6.32**
2017	0.00	-9.73	#DIV/0!	0.00	-6.35	0.00	0.00	0.00	0.00	**-6.35**
2018	0.00	-9.51	#DIV/0!	0.00	-6.17	0.00	0.00	0.00	0.00	**-6.17**
2019	0.00	-9.80	#DIV/0!	0.00	-6.47	0.00	0.00	0.00	0.00	**-6.47**
2020	0.00	-9.79	#DIV/0!	0.00	-6.46	0.00	0.00	0.00	0.00	**-6.46**
2021	0.00	-9.36	#DIV/0!	0.00	-5.96	0.00	0.00	0.00	0.00	**-5.96**
2022	0.00	-9.53	#DIV/0!	0.00	-6.03	0.00	0.00	0.00	0.00	**-6.03**
	0.00			0.00		0.00				
Compound growth rate (per cent)										
2014-2022	0.00	-9.67	#DIV/0!	0.00	-6.30	0.00	0.00	0.00	0.00	**-6.30**

Note: All data are for the financial year ending in June of the year specified.

Appendix B: NIEIR's relevant experience

NIEIR has a long history of experience in the energy sector and in forecasting spanning some 30 years.

In the 1980s and early 1990s, NIEIR prepared economic and energy projections for Elcom, SECV, QEC, SP Power Networks and, on occasion, SECWA. NIEIR was also engaged by the ESAA to complete both major studies and forecasting work.

NIEIR's client base expanded significantly over the 2000s in terms of the energy sector. NIEIR has a regular client base which includes nearly all network businesses on the eastern seaboard as well as network service providers in each State.

NIEIR is also directly involved in preparing energy and maximum demand forecasts for the States of Victoria, Queensland, Western Australia and Tasmania. These forecasts are used by organisations such as Transend Networks (Tasmania), Powerlink Queensland and the Independent Market Operator (Western Australia) in their Annual Planning Reviews.

NIEIR also services a large number of distribution businesses in Australia, preparing both energy forecasts and maximum demand forecasts (at various levels of disaggregation – terminal stations, BSPs, zone sub-stations). Most of these businesses have been clients of NIEIR for some 10-15 years. Forecasts prepared over the last 12 months include those for the following companies (these are regular clients):

- Agility Management (AGL Electricity)
- United Energy
- Citipower
- Powercor Australia
- Integral Energy
- Essential Energy
- Ergon Energy
- Independent Market Operator (IMO)
- ENERGEX
- Endeavour Energy
- SA Power Networks
- Transend Networks
- Ausgrid Energy

NIEIR has also previously completed work for Transgrid, Origin Energy, TRUenergy (now Energy Australia) and Aurora Energy.

NIEIR has a project team within the company who are effectively engaged full time in electricity and gas forecasting.